

Academic Careers: A Comparative Perspective

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1 Introduction

Jeroen Huisman

The Dutch *Adviesraad voor het Wetenschaps- en Technologiebeleid* (AWT) has commissioned The Center for Higher Education Policy Studies (CHEPS) of the *Universiteit Twente* to investigate the issue of academic careers in a number of Western European countries. The general objective was to enable the advisory council to observe the present-day state of the art and developments in the Netherlands from a comparative perspective. In collaboration with the commissioner, the following countries – next to the Netherlands – have been selected: Finland, Flanders, Germany, Sweden and the United Kingdom.

The issue of the academic career was narrowed down by looking at the position of PhD candidates, and at the position of ‘advanced’ academic employees in the higher education systems. With respect to the position of PhD candidates, attention was paid to quantitative aspects (number of PhDs, composition of the cohorts, etc.), financial aspects (salaries and funding mechanism), and the transfer to the post-PhD period. Concerning the position of ‘advanced’ academic employees in the higher education systems, particular attention was paid to the rank structure, salaries and the comparison of academic positions with labour market positions elsewhere.

The project has been co-ordinated by dr Jeroen Bartelse and dr Jeroen Huisman of CHEPS. Regarding the report, they took care of this introductory chapter (chapter 1), the description and analysis of the Dutch case (chapter 2) and the comparative analysis (chapter 8). The other country studies have been written by international colleagues considered experts in the area of academic careers in the respective countries. Dr Beate Baldauf (Institute for Employment Research, University of Warwick, United Kingdom) took care of the British case. The Flemish case has been delivered by prof. Jef Verhoeven and Kurt De Wit (Centre for Sociology of Education at the Catholic University of Leuven, Flanders). The Finnish case study has been taken care of by dr Päivi Kaipainen, prof. Osmo Kivinen and dr Sakari Ahola (Research Unit for the Sociology, University of Turku, Finland). Dr Jürgen Enders (Centre for Research on Higher Education and Work, University of Kassel, Germany) wrote the German case. Dr. Lillemor Kim (Research Director of the Swedish Institute for Studies in Education and Research, Stockholm, Sweden) took care of the Swedish country study. We would like to thank our foreign friends for their high-quality country studies and for keeping to the guidelines provided by the co-ordinators. We would also like to thank dr Hendrik Snijders (AWT) who has contributed to the guidance of the research process from the perspective of the principal.

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2 The Netherlands

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2.1 Introduction

Whereas an academic career in the Netherlands implied a highly esteemed and steady position a few decades ago, the present-day situation is rather different. The relatively small scale of the system and – in connection – the (then) elite characteristics of the university had a considerable impact on the status of academics. The growth towards a mass higher education system has undoubtedly played a role in the changing status and career perspectives through time, but this cannot be seen as the sole drive for change.

In the 1980s, the focus of national policy makers and the universities was on the establishment of the so-called second tier in university education. In 1982, the two-tier structure was implemented, implying a first tier of four years leading to the degree of *doctorandus* (comparable to the Master's degree). In fact, the four-year programmes meant a reduction of the nominal length of the programmes, which before 1982 could amount to six or seven years. Along with the shortening of the length of programmes, ideas were developed concerning the second tier of university education. Students could opt for quitting the university to find a position on the labour market or continue in postgraduate education. In the beginning of the 1980s it was not yet clear how postgraduate training was to be organised (and funded). Postgraduate education slowly developed in a variety of forms (e.g. through specific national discipline-oriented organisations, PAO's). The 1984 Beiaard policy paper made suggestions concerning the structure and content of research training, leading to the introduction of the AiO system in 1986 (see further below).

Probably the most important issue at stake in recent policy debates relates to concerns about the knowledge infrastructure, and the position of the Netherlands in the global knowledge society. With the growing importance of knowledge and the swift developments in information and communication technology, it is common sense that universities are to play an important role in the knowledge infrastructure. To secure this role, the development of research in certain areas is crucial. It is expected that a shortage of academics carrying out the research might damage the international position in research of the Netherlands. Given the tight relationship between the knowledge infrastructure and the general economy – but also the expected contribution of the knowledge infrastructure to other elements of society –, shortages or other barriers will also impact on the economic position.

Recently, an advisory committee – set up by the Minister of Education, Culture and Science – has made an inventory of barriers in academic personnel policies (report 'Talent for the Future. Future for talents', 2000). According to the committee, there are four main problems. The first concerns the decrease of the academic supply in the 1990s. To be able to cope with the outflow of older academics, financial support is necessary to include young talents. Second, the committee points at the meagre image of universities on the labour market. Students and graduates seem not to be attracted by academic jobs. Third, the foreseen outflow of top researchers forces the universities to develop policies to retain top researchers and attract future top researchers. Fourth, whereas a majority of the graduates is female (54%), this is not reflected in the composition of staff at the universities. Of the PhDs, only 35% is female. In higher academic ranks the percentage women is even lower: 7% of the professors is female. The committee recommends speeding up job transitions for high quality researchers

and post-docs. Furthermore, career perspectives should be improved. Third, the labour market position and the working climate should be improved. With respect to the position of women in academic position, additional policies are necessary. Finally, financial support is necessary to be able to fulfil the recommendations mentioned.

2.2 The position of PhDs in the Netherlands

The higher education system

The Netherlands has a binary system of higher education: a university sector and a non-university sector consisting of so-called *hogescholen*. In the *hogescholen* advanced professional education is offered, comparable to the former British polytechnics. Around 60 *hogescholen* provide four-year programmes, leading to the degree of *baccalaureus* (bc), comparable to the Bachelor's degree. In 1998 there were 290,500 students enrolled at *hogescholen*. Thirteen universities constitute the university sector, offering four- to six-year programmes leading to the *doctorandus* degree. In the university sector, 160,000 students were enrolled in 1998. The *doctorandus* (literal meaning: he who is entitled to become a doctor) degree is usually the minimal requirement for enrolling a doctoral position, although it is at the discretion of the universities to admit *hogeschool* graduates. Doctoral candidates may have a normal research or teaching position at universities or other research institutes, or they may hold a distinct doctoral position as research trainee (AiO, *Assistant-in-Opleiding*). At the level of post-initial higher education, both universities and *hogescholen* offer a variety of programmes, leading to both recognised and unaccredited degrees. These post-initial programmes generally have a market orientation.

The AiO system

The AiO position can be seen as the first step in the academic career. From an international perspective, the Dutch AiO system is a unique arrangement, for the AiO holds an academic position, whereas in most countries starting academics working towards the PhD are students. The idea of the AiO system is to provide advanced research training to doctoral candidates (research trainees) by way of active participation in university research and, to a limited extent (<25%), in teaching and administration. In the *Act on the adjustment of the second tier* (1985), the AiO was introduced as a distinct academic position. The Netherlands Organisation for Scientific Research (NWO) until recently also employed research trainees under slightly different employment conditions, so-called OiOs (*Onderzoeker-in-Opleiding*). Nowadays, OiOs are not employed anymore by NWO, but by the university (NWO transfers the accompanying personnel – and research – budget to the university). Next to the two types of research trainees, the category of *bursalen* was introduced in the 1990s, being AiOs not having an academic position, but a position as a student. The *bursalen* were introduced in the mid-1990s at some universities for a specific reason. Although the salaries of the AiOs were relatively low, the regulations concerning personnel recruitment and dismissal forced the universities to pay part of the allowances in case of unemployment after dismissal. In order to avoid paying these allowances, some universities choose for the student position of PhD candidates. At present, the *bursalen* system is under pressure for various reasons most of these relating to the present healthy economic situation in the country. First, the attractiveness of the *bursalen* system is lower than the AiO system (low grants, no pensions, weak legal

status). Because most universities still adhere to the AiO system, graduates often have the choice between a *bursalen* or AiO position. Second, the differences between a *bursalen* position and an academic career on the one hand and a position and career in business (but also to a considerable extent in the public domain) are increasing, both in terms of salaries and terms of employment. The latter argument relates also to the differences between an AiO position and a career in business and the public domain. Data from recent research confirm the decreasing interest of graduates for an academic career ('Talent for the future. Future for talent' part III).

Size of the doctoral system

In 1986 (the beginning of the AiO system), 401 AiOs and OiOs started as PhD candidates. Through time, the number of starting PhD students gradually increased until the peak in 1992 (2012 students). Since then the enrolment alternately goes down and up. In 1998, there were 1994 commencing students (see table 2.1). The larger part are AiOs, *bursalen* constitute a minority of the PhDs (in 1996 there were 425 starting *bursalen*, less than 25% of the total number of PhDs).

For 1995, enrolment data show that PhD students make up 5% of the total enrolment of the university sector (first-year students). In 1998, the PhD students constitute 5.7% of the enrolment of the university sector. When we relate the number of commencing PhD candidates (1998) to the number of university graduates (1997-1998), the percentage of graduates enrolling a PhD position is 8.8%. This percentage is relatively stable through time. In 1992, the share was 8.3%, in recent years the share is slightly increasing due to the drop in the number of university graduates.

Table 2.1: *Commencing PhDs 1986-1998*

	AiO	OiO	Total
1986	302	99	401
1987	1178	68	1246
1988	1269	132	1401
1989	1240	386	1626
1990	1315	419	1734
1991	1443	444	1887
1992	1506	506	2012
1993	1436	520	1956
1994	1292	513	1805
1995	1179	438	1617
1996	1344	474	1818
1997	1423	370	1793
1998	1809	385	1994

Source: KUOZ 2000 (the category AiOs includes *bursalen*)

A breakdown by discipline reveals that the percentage of graduates continuing an academic career (as AiO) in 1997-1998 is much larger in natural sciences (about one out of three graduates), agriculture (one out of six) and health (one out of five) than in economics (one out

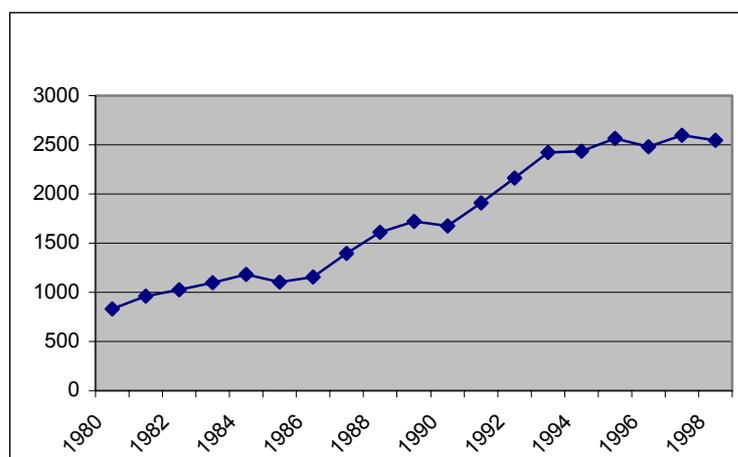
of 40) and law (one out of 200). At the programme level there is a similar level of variation. For example, in mathematics, almost 30% continued in 1997-1998 as a PhD, in physics and chemistry the proportion is around 60%. In econometrics the proportion continuing as a PhD is much higher than in economics and business studies. These data stem from a sample of university graduates (see table 2.2, taken from 'Talent for the future. Future for talents', part III, p. 98-99).

Table 2.2: Graduates continuing as PhD candidates by discipline 1994-1997 (in %)

	1994	1995	1996	1997
Economics	3.5	3.6	2.6	2.5
Agriculture	21.1	12.0	16.6	17.7
Natural sciences	30.4	30.4	30.8	35.0
Engineering	13.0	12.4	10.2	7.8
Law	0.8	1.4	1.5	0.5
Humanities	4.4	3.0	2.4	2.3
Social sciences	5.0	2.4	3.3	4.5
Health	4.0	3.8	7.7	19.0
TOTAL	9.2	7.8	7.3	8.7

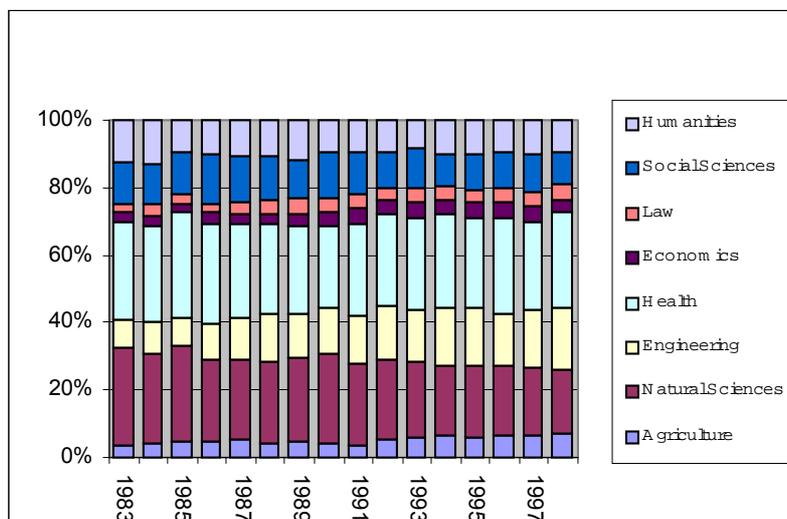
Figure 2.1 presents the total number of PhD degrees awarded between 1986 and 1998. These data not only include the degrees of AiOs and OiOs (and *bursalen*), but also the degrees of academics employed as researcher or university teacher at the universities. The introduction of the AiO system has increased the production of dissertations. Whereas the number of PhD degrees increased between 1980 and 1986 from about 800 to about 1200, from 1988 (shortly after the introduction of the AiO system) there is a steep increase of degrees.

Figure 2.1: PhD degrees awarded 1986-1998



Source: KUOZ 2000 (PhDs internally prepared but awarded elsewhere excluded)

Figure 2.2: Breakdown of PhD degrees awarded by discipline



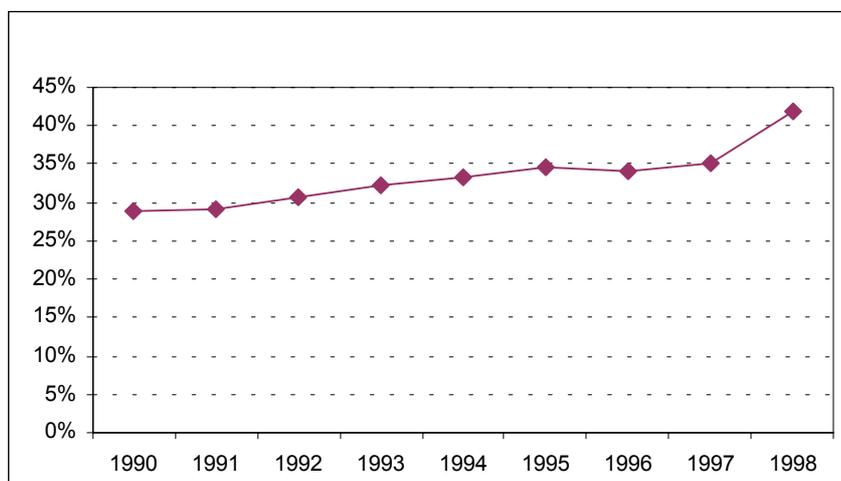
Source: VSNU, 1996, 1997, 2000

Figure 2.2 shows a proportional breakdown of PhD degree awarded by discipline. Remarkable in this figure is the decrease in the number of PhD (degrees awarded) in the natural sciences and the increase in engineering. All other fields remained relatively stable over the past two decades. A similar pattern emerges when we look at the proportional breakdown of commencing PhD candidates: a decrease in the natural sciences (to some extent in the social sciences and humanities) and an increase in engineering (and in health).

Female participation

Female participation in doctoral education is reflected in figure 2.3. The participation of women has gradually increased from 29% in 1990 to 35% in 1995. In 1998, the percentage of female commencing PhD candidates is above 40% (about 42%, KUOZ 2000). The differences between the disciplines are remarkable.

Figure 2.3: Female participation in doctoral education



Source: VSNU, 1996, 2000

Systematic data on the number of foreign doctoral students in the Netherlands and the number of foreign doctoral degrees earned by Dutch citizens are not available so far. The impression is that Dutch universities increasingly attempt to attract foreign PhD students. Particularly in the sciences, which face difficulties to fill vacant doctoral positions, the number of foreign doctoral students is increasing. The report 'Talent for the future' states that the proportion of non-Dutch PhD candidates at the universities varies between 20% and 37%. The research of Hulshof *et al.* (1996) reports much lower percentages (on average 1%); their survey relates to PhD holders that received their degree between 1990 and 1994.

At the national and supra-national level, several initiatives have been developed to stimulate international mobility of doctoral candidates (see also the German country report). At the initiative of the Dutch Minister of Education and Science, Belgium, France, Germany, the Netherlands (and later Denmark as well) established an international advisory committee on new organisational forms of graduate research training. The committee was established with the following terms of reference: to provide an opinion on the proposal of the Dutch Committee on Graduate Schools, in particular in the light of European and international aspects; "to consider and compare the new organisational forms of graduate research training on a doctoral level currently emerging in many European countries (...); to provide indications and recommendations that allow for more co-operation at the level of graduate training; and to sketch ideas for the further evolution of these new systems of graduate training" (De Wied, 1991: p. 9). The co-operation that evolved from this initiative has led to a 'letter of interest' signed between Belgium, Denmark, France, Germany and the Netherlands in January 1996. These countries have committed themselves to support the exchange of doctoral candidates and inform each other on developments regarding doctoral programmes and graduate schools.

Financial situation of PhD candidates

Dutch doctoral candidates are basically funded by three different sources, called first, second and third money flows (Koelman *et al.*, 1998). The first flow is supplied by the Ministry of Education, Science and Culture to the universities. The universities employ their academic staff and research trainees from these funds. The second flow of funds is allocated through the Netherlands Organisation for Scientific Research (NWO). From the latter funds, the OiOs are employed (until recently directly by NWO, nowadays by the universities themselves). The third flow of funds is acquired through contracts with government, non-profit organisations, private companies, charitable boards, and the European Community. In addition to these sources of support, doctoral candidates can be financed by other employers, or by their own.

Dutch PhD candidates are appointed for a four-year period, in which the PhD thesis should be written. During that period, the student may attend classes that relate to the subject of the thesis. The student can also be called in for teaching activities in the department or faculty that appointed him/her. The AiOs receive salaries according to a special salary-scale. In the first years of their appointment, the salaries are cut back to compensate for the training that the AiOs receive. In practice this means that AiOs receive 55% of the salary (before tax deduction) of the salary of an academic in the same salary scale in the first year and 85% of the salary in the fourth year. Below the monthly incomes are reflected for each year of the appointment (per 01-05-2000):

Table 2.3: Monthly incomes of AiOs

Year of appointment	Salary
1 st year	DFL 2.398,--
2 nd year	DFL 2.686,--
3 rd year	DFL 3.224,--
4 th year	DFL 4.077,--

Recently, the labour market situation forced universities to change their financial support system of AiOs. In 1995, a number of PhD holders coming out of the AiO system could no longer be absorbed by the (academic) labour market. The universities were however obliged to give unemployment payments, which signified an important financial ‘loss’. Some universities decided to introduce PhD-grants (the candidates were called *bursalen*) instead of employment. This would discharge them of unemployment payments. The resistance from the side of the doctoral candidates is imaginable: lower incomes, worse secondary conditions of employment and a feeling of disappreciation for their work.

In the following years however, the labour market situation for academics improved considerably. Almost all universities abandoned the grant-system again; it is only still in place for PhD programmes that aim to attract international candidates. Instead, as AiO positions became difficult to fill, universities have started to complement AiO salaries (and terms of employment, such as travel and accommodation budgets, computer facilities, etc.) to a level comparable to other academic staff members. In particular at the universities of technology this phenomenon is now common place.

The recent developments regarding the terms of employment illustrate the ambiguity that exists around this issue. The doctoral candidates (AiOs) basically have a hybrid position at the Dutch universities. On the one hand, they are students who receive training and supervision. On the other hand, they are considered the engine of scientific work. The financial support structure that was introduced in the framework of the AiO system basically reflects this hybrid position. But external forces, such as the labour market and the internationalisation of postgraduate training, are increasingly putting pressure on this situation.

Leaving the doctoral system

In the Netherlands, 7% of the PhD candidates finishes the degree within the nominal time of 4 years; after 5 years, this percentage is 35%; and after 6 years 55%. Eventually, 75-80% of Dutch candidates obtains a doctoral degree (VSNU, 2000). There are – again – considerable differences between the disciplines. In engineering the completion rates are higher and PhD candidates deliver their dissertation earlier than in other disciplines. In law and the humanities, the time to degree is on average much higher than in other disciplines.

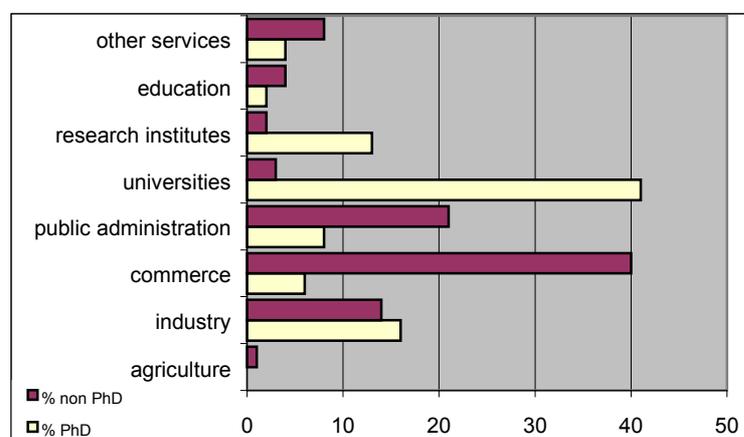
Concerning the average age of PhDs, recent data are not available. The research by Hulshof *et al.* (1996) points out that in 1995 28% of those graduating between 1990 and 1995 were between 20-29 years old, 38% were between 30-34 years old, 20% were between 35-39 years old, and 14% was older than 40 years.

The labour market position of doctoral degree holders has been subject of discussion since the mid-1990s. The Dutch academic labour market was perceived to be unable to absorb the increasing number of young doctoral degree holders aspiring an academic career. At discussion seminars on this topic, doctoral candidates tended to refer to themselves as a ‘lost generation’. In 1996, the Ministry of Education, Culture and Science commissioned a study into the labour market situation of doctoral candidates (Hulshof *et al.*, 1996).

Unemployment among doctors appeared to be less than among non-PhD holders: 6% versus 14%. For those PhD holders who obtained their degree through an AiO or OiO position, the unemployment figure is slightly higher: for the AiOs 9%, for the OiO 12% (Hulshof *et al.*, 1996: p. 51). Overall this picture, as compared to the Dutch labour force, is not negative. However, the employment conditions – in terms of salaries en job security – are generally less favourable for PhD holders.

Figure 2.4 shows the labour market destination in percentages of PhD holders as compared to non-PhD holders. Clearly, most PhD holders find work in research and teaching positions at the universities or in research institutes (54%), or in industry (16%). There is however a move out of the academia into other positions. In 1983, 70% of the PhD holders worked at universities. In 1995, only 38% were employed by a university. Although 70% of the PhD holders has a research job – a figure that is quite stable since 1983 – most doctors change this type of work for other work along their career path. Two impediments are mentioned in the research by Hulshof *et al.*: in their job search, PhD holders are relatively often thought to be too specialised and relatively often (in particular the case for non-AiOs) too old and too expensive.

Figure 2.4: labour market destination of PhD holders



Source: Hulshof *et al.* 1996, p. 65-66

Selection mechanisms and characteristics of AiOs

For many PhD positions, the traditional recruitment pattern of advertisement, followed by a preselection of letters of applications, followed by interviews is still much used. The selected candidate is offered the position. In some departments, graduates are offered a one-year allowance to work on a project proposal. Selection takes places after this first year and those selected continue as PhD candidate. However, also (perceived) suitable Master degree students are often asked to continue at the same department as PhD candidate without following the traditional recruitment pattern.

Research by SEO (2000) concerning the choices for a PhD (or not) in the period 1994-1997 point out that those pursuing the PhD are on average significantly younger, more often male, have higher grades on secondary school examinations and during their studies. To illustrate the latter: one point increase in the average grade during the Masters programme increases the chances on a PhD career with 10%. One point increase in the average grade of secondary school examinations increase the chances with 2-3%.

Berkhout and Zijl (2000) investigated the quality of the inflow of graduates in jobs in the public domain. Part of their research concentrated on PhDs versus non-PhDs (Master degree graduates in 1996-1997). With respect to motivational factors there are no significant differences between the two groups (except for natural sciences versus other disciplines). Concerning the IQ there is a significant difference (also for most disciplines, except for economics and law). With respect to experience (work, or in governance e.g. student organisations) there are no significant differences between PhDs and non-PhDs.

2.3 The career perspectives of the academic

Rank structure

In principle, five distinctive categories of academic personnel exist in the Dutch system. The first category – consisting of PhDs candidates – has been extensively discussed above. Next to this category, there are university teachers (universitair docent, UD), associate professors (universitair hoofddocent, UHD), full professors and other academic personnel (e.g. researchers). Table 4 gives an overview of the composition of the total academic staff of all universities and the percentage females per category.

Table 2.4: *Academic staff employed by universities 1998*

	Professors	UHD	UD	AiOs	Other
Academic staff	2,474	2,623	5,930	3,886	6,147
% female	5.4	8.2	21.2	39.9	32.4

Source: KUOZ 2000

The data show that there is (still) an uneven representation of women in all academic positions, even though the participation of women increases over time. Comparisons with 1993 point out that the number of full professors, associate professors and other academic personnel increases, the number of university teachers decreases.

Career structure

The rank structure of academic personnel implies that the traditional career pattern consists of a start as a PhD, a transformation to the position of university teacher, then a change to a position of associate professor and (finally) towards the position of full professors. It will be obvious that – given the relatively scarce number of professorial chairs – this career pattern is not feasible for each PhD candidate. Related to the ranks there are – with small variations from university to university and from individual to individual – fixed salary scales for each academic position. As a consequence of the decentralisation of personnel policies and terms of employment from the government to the universities, there is nowadays some leeway for

the institutions to apply other rank structures and salaries. However, universities hardly make use of these possibilities, partly because of the considerable impacts (in terms of budgets) changes in structure and salaries may have, partly because the decentralisation is only a fairly recent development.

Comparisons with career patterns outside the university

Compared to the career patterns in other jobs than at universities, the former are considered as much more rewarding (in terms of salary and terms of employment) and much more flexible. With respect to the former, in general work autonomy and relatively flexible working hours are elements of academic work highly appreciated. However, the financial rewards for the work are considered as insufficient. Compared to jobs in business and in the public domain (given a similar study programme background and work experience), those working at the university are considerably worse off in terms of salaries. This is almost by definition the case for AiOs, for their salaries in the first two years are close to the minimum wages (although the situation has improved in recent years), but it is also the case for those in higher academic ranks (see for some data, e.g. the Elsevier special on the labour market position in 2000, June 2000). Also the terms of employment differ considerably between the two groups and are in many respects increasing in several disciplines (e.g. informatics, economics, business studies). The final striking difference relates to the relative inflexibility of the salary structure. Within the universities it is difficult (and/or not much common in terms of culture?) to deviate from the general standards of the salary scales. Salaries are mostly based on number of years in the academic workforce and hardly performance-related. Performance-related rewards in particular relate to the highest ranks (top professors) but to a much lesser extent in lower ranks. The 'Talent for the future' (2000, pp. 68-72) report describes a number of developments (both policy initiatives and actual practices) concerning the improvement of the mobility, employability, and flexibility of academic personnel.

2.4 Conclusion

The current discussions on the labour market for PhD holders are gradually less dictated by the quantitative problem of an oversupply of doctoral holders, which cannot be absorbed by the labour market. For that matter, any discussion about quantitative discrepancies between supply and demand is highly complex given the dynamics in the valuing, acquisition and use of academic degrees on the labour market. Moreover, one might even argue that an oversupply of doctor degree holders should not be a problem in a knowledge-intensive society.

The development towards the knowledge-intensive society has fueled the debate on the role of the university in this society. The motion in Parliament proposed by Van der Hoeven accentuates the idea that the present situation in Dutch academe is worrisome. The report 'Talent for the future' (the consequence of the above-mentioned motion in Parliament) gives a detailed account of many aspects of the solicitous developments. The authors do not feel the need to repeat the analysis, but stick to the main message of the report. This message underscores the increasing difficulties that universities are confronted with in playing a distinguished role in the knowledge society. These difficulties focus on the attractiveness of the university sector as an employer. The difficulties in filling PhD positions (the numbers of starting PhDs are dropping, many foreigners fill the vacant positions) are indications for the

waning attractiveness. Also in the 'further' careers of academics quite a number of hindrances can be detected, varying from lower salaries (compared to those employed in non-academic positions) to relatively poor terms of employment to uncertain career perspectives.

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3. United Kingdom

Beate Baldauf

3.1 Introduction

Changes as a result of the transition from elite to mass higher education have affected academic careers as well as education and training leading up to it. The traditional perks associated with an academic career have become fewer. On the other hand expectations and actual demands placed upon academics have increased. Higher education institutions have become more accountable in the wake of growing public education budgets, so have staff at these institutions. The actual workload of academics has increased following rising student numbers not matching the necessary additional funding. This has just recently culminated in a heated debate over top-up fees following the publication of the Greenaway/Haynes report commissioned by the Russel group (an informal group of the most prestigious university institutions). There is also some talk of ‘dumbing down’ or relaxing entry standards of students following efforts to widen access to higher education, which, if the case, will have an impact on the academic workload. Furthermore, the government wants to establish a ‘third leg’ on top of teaching and research: links with industry to help promote a knowledge-driven economy. All this has put a lot of pressure on academic staff which, some studies claim, has an impact on their morale and their well-being. Employment conditions do not compensate for this. Fixed-term contracts have been on the increase for many years now. Although there is evidence that temporary contracts are also increasing in teaching, most of the staff on fixed-term contracts are researchers. Recent studies have also revealed that salaries in higher education have declined relative to other relevant sectors. In light of these issues it does not seem surprising that in the professional press (Times Higher Education Supplement) negative headlines seem to dominate.¹

There appears to be a “knock-on” effect on potential new recruits to PhD. Although the numbers of PhDs awarded are still rising, the number of British students embarking on a PhD has fallen in its fourth year now. Increasing debts following the recent introduction of tuition fees and low stipend levels can be seen as factors contributing to this development, as are the career prospects of PhD graduates inside and outside higher education. Those having graduated with a PhD find it hard to get into academic careers or make their living in academic research because the supply is much higher than the current demand, except for certain subject areas. Opportunities outside academia or academic related labour markets are limited, as employers seem to prefer applicants with a masters degree rather than a PhD.

These are certainly some major issues surrounding current discussions on academic careers in the UK. The purpose of this chapter is to provide an overview on selected aspects of PhD study and subsequent careers in universities, and to briefly touch upon some recent developments. Section 2 provides a short overview on the higher education sector and the degree structure in the UK. Section 3 moves on to some of the key features of PhD study in the UK, such as the quantitative dimension, getting into the system, funding, bringing the PhD to a close and moving on after the PhD. The final section will then outline the career structure in academia, the situation of certain staff sub-groups and issues revolving around recruitment and retention of academics.

¹ The following selection may illuminate this: “A holiday - what’s that?” (11/8/00); “Stressed lecturers plagued by illness” (14/4/00); “Increased burden means academic pay must rise” (17/3/00); “Stark warning of staff crises” (25/2/00).

3.2 Higher education and the academic career

As a result of the 1992 Further and Higher Education Act, the UK has now a unified system with 113 university institutions. Yet there are still differences in the mission of the former polytechnics (the post-1992 universities), and the pre-1992 universities. Due to history and a more research-led environment pre-1992 universities will still award most PhDs. Although universities are legally independent corporate institutions, governmental pressures are effectively restricting the autonomy of institutions. Public money is an important income stream, yet the more successful universities have been able to attract a very substantial amount of external funding. Postgraduate study in general is a very important income generator as student numbers are not limited by governmental regulations and institutions have more autonomy in the level of fee levied.

The UK has a tradition of undergraduate and postgraduate education. The latter has expanded rapidly in recent years following increased demand. A first degree usually takes three years full-time and leads to a bachelor award. Some first degrees, particularly at Scottish universities or in certain science disciplines, may take four years. The degree aims at conveying specialised knowledge whereas, generally, training in research methods is not regarded as part of the undergraduate syllabus. Those striving for a PhD may either take a one year masters degree in the first instance before moving on to a three-year PhD or they may opt for the three year PhD straight away. Part-time students will be given nearly double the amount of time. In social sciences and humanities a (research-based) masters degree will usually be completed before embarking on a PhD. Following an initiative of the British government in the early 1990s there are also moves to strengthen the formal research training by introducing a compulsory one year master of research before entering PhD study (1+3 model). The first pilot programmes for such MRes programmes were introduced in 1995 and endorsed in a first evaluation in 1997. The recent decision of the Economic and Social Research Council (ESRC) in the wake of the 1999 consultation favours the 1 plus 3 model, but does not make it compulsory (THES, 2000). In contrast, the Arts and Humanities Research Board has reservations about the MRes.

Since the end of the 1980s the British PhD has changed dramatically with the introduction of research training courses as part of the PhD, primarily intended to improve low submission rates. What started in the social sciences has now spread to other disciplines. Following the 1993 White Paper there is now also more emphasis on the promotion of generic or transferable skills (see for example the training guidelines of the following research councils: BBSRC, NERC, EPSRC, ESRC) to help the growing number of PhD graduates find alternative careers outside higher education.² The research training shall assist the PhD student in making an original contribution to knowledge, proven by the delivery of a thesis. It should consist of no more than between 70,000 and 100,000 words in order to discourage *magna opera*. The submission of the thesis is followed by a final oral examination, called the viva.

The PhD has virtually become a necessary entry-ticket to an academic career (see for example Elias *et al.*, 1997 regarding social science graduates), although less so in post-1992 universities. Yet it is an entry ticket to a rather uncertain and more pressurised academic

² For further issues surrounding research training see Baldauf 1999.

career than ever before. Before turning to the academic career in more detail, an overview on some relevant features of PhD study will be given.

3.3 Phd study and career prospects

Scope of doctoral research in the UK

As table 3.1 shows, the higher education system has steadily expanded in the past five years³. In 1998/99 less than half a million qualifications were awarded: first degrees accounted for 59.0%, higher degrees for 12.5% and doctoral degrees for 2.4%. Whereas the numbers of first degrees awarded compared to the overall number of degrees have decreased in the past five years due to the cap imposed by the government, the proportion of higher degrees and PhDs awarded have nearly steadily increased.

Table 3.1: Number of degrees awarded in 1994/95 to 1998/99 by type of degree

	1994/95	1995/96	1996/97	1997/98	1998/99
<i>Total number of degrees awarded</i>	387,294	416,297	427,070	437,128	446,942
<i>of which</i>					
First degrees	237,798	251,248	255,260	258,753	263,671
Higher Degrees ¹	39,409	46,491	48,788	53,975	55,837
Doctoral degrees	7,559	9,761	10,214	10,993	11,338

Source: HESA, various years

¹ Includes masters and higher bachelor degrees. Comparisons between the number of masters and higher bachelor degrees in 1997/98 seem to indicate that the relative numbers of higher bachelor degrees are negligible (see OST 1998 and HESA 1998)

It is difficult to indicate how many graduates carry on studying for a doctoral degree. As discussed earlier there are different routes into the PhD. First-degree graduates can directly start a PhD, but will normally need to register for an MPhil first. However, in some disciplines a master degree is usually taken first, and in other disciplines moves into this direction are also encouraged. Taking the relationship between masters awards and doctoral awards as an indicator for the number of students progressing to a PhD will certainly overestimate the situation, as those students taking the MPhil route would need to be included in the denominator accounting for a decrease in the percentage. Basing the calculations on first degrees instead of masters will grossly underestimate the situation.

Since 1994/95 the number of doctoral degrees awarded has steadily increased and stood at an excess of 11,000 in 1998/99.⁴ By far the most degrees were awarded in the sciences (see table 2 and table A1 in the appendix for further details), but relative numbers have slightly dropped since 1994/95. The number of degrees awarded to women still decreases as the degree level increases. In 1998/99, 54% of women gained a first degree, 46% a masters degree and 37% a doctoral degree. Compared to the previous five years the relative number of doctoral degrees awarded have increased by 6% (see table 3.2).

³ Following the end of the binary divide in 1992 and the establishment of a new statistical agency (HESA) shortly thereafter, the data definitions and the time period covered have been changed, making comparisons with any period before 1994/95 a difficult endeavour. The most decisive change is that „dormant students“ are now excluded, accounting for a sudden drop in the numbers of qualifications awarded in 1994/5 compared to the previous year.

⁴ These awards include a tiny percentage of those having been awarded a professional doctorate.

A key feature of the UK is the considerable intake of overseas students, most of them from other EU-countries and Asia. Overseas students account for about one third of the overall PhDs. Their share hasn't changed dramatically over the last five years (see table 3.2), but numbers might drop in future following the recent crisis in Asia. Figures for 1996/97 reveal that the relative numbers of overseas PhDs are quite high in social sciences (e.g. business and administrative studies: 49.8 percent), engineering (42.5%) and computer sciences (42.7%) (see Baldauf, 1999a; pp 122-123)⁵.

The number of students studying in 1998/99 for a doctoral degree has reached 78,072, including 648 PhD students on a taught doctoral degree course, mainly not based on research (HESA 2000). However the number of full-time British first year PhD students has dropped for four years in a row now, causing concern among academics and politicians. The situation is particularly bad in information technology and computing sciences where nearly all surveyed academic staff admitted difficulties in "attracting sufficiently high quality British PhDs" due to better employment prospects elsewhere (Strategic Marketing Associates, 1999; p. 6). Economists have also pointed out that the number of British students applying for an ESRC studentship in their discipline has plummeted (Machin and Oswald, 2000, F337).

Table 3.2: Doctoral degrees awarded in 1994/95 to 1998/99 by subject area, gender and area of domicile (in %)

Doctoral degrees awarded	1994/95	1995/96	1996/97	1997/98	1998/99
<i>By subject area</i>					
Humanities and Arts	11.4	11.4	11.1	11.7	12.0
Social sciences	12.7	13.3	13.4	14.4	16.0
Sciences	44.1	44.3	42.4	42.0	41.3
Engineering and Technology	17.6	16.0	17.2	16.7	15.9
Medicine	12.6	12.8	14.6	14.0	13.4
Combined	1.7	2.3	1.3	1.3	1.4
Total	100.0	100.0	100.0	100.0	100.0
<i>By gender</i>					
Female	30.8	32.1	33.4	34.1	36.7
Male	69.2	67.9	66.6	65.9	63.3
<i>By area of domicile</i>					
Overseas	34.3	35.3	34.0	35.2	33.8
Home	65.7	64.7	66.0	64.8	66.2

Source: HESA various years and own calculations

Getting into the system

When selecting PhD students the formal qualifications and a thesis outline will usually be taken into consideration, given the department has the expertise to supervise the students on his or her particular subject. An interview may assist further in the selection process, particularly in the case of external candidates. As Becher (1994) pointed out, formal requirements may be waived if a candidate is well known to the potential supervisor.

⁵ These data have been provided by SRHE.

Research council funded PhD studentships require at least a good honours first degree, but competition for these studentships is fierce. In the humanities only those with a top grade stand a chance of winning such an award. Institutions may accept students with a lower second first degree if they have successfully completed a masters degree.

Motivation may come in once the formal requirements have been met. Based on empirical research, Becher (1993) devised three types of motivation of PhD students: external motivation, staying on to enjoy the student life but without a career in academia in mind, and internal motivation. The latter seems to equip the student best to get them through the ups and downs of their research.

A case study in business studies revealed that academics may disagree over the relevance of formal qualifications in the selection process of students, but they stress the importance of other factors. Apart from the academic qualifications more personal characteristics such as the perceived or suspected motivation or drive of an applicant plays an important role. These personal qualifications will help the PhD students to master the inherent difficulties of doing a PhD; it may also reduce the actual time necessary for supervising a particular PhD student, hence senior staff were particularly keen to recruit self-starters; and some claim it is the best indicator of whether or not a student will actually complete the PhD (Baldauf, 1999b).

Funding the PhD

In the UK most of the people studying for a PhD degree are (full-time) students and not university employees like in some other European countries. Yet there is also a smaller group of PhD students who work inside or outside higher education. University employees registered for a PhD may be working full-time or part-time as either teaching assistants, lecturers or contract researchers. Those employed outside higher education will usually be registered part-time for a PhD that may or may not be related to their professional practice.

While undergraduate education was basically free for home students until 1998, when a means tested tuition fee of Euro 1,640 (£ 1,000) was introduced, postgraduate students have always had to pay study fees. It is this part of the PhD funding for which statistical data are available. Most grants will cover both tuition fees and maintenance, but there are also fees-only awards, one example being universities waiving tuition fees for employees. According to figures for UK domiciled first year PhD students studying either science, engineering or technology (SET) in 1997/98, the research councils are by far the single most important sponsor for tuition fees, accounting for nearly 35% of the funding. A further 26% are funded by other public sources of which universities are most prominent (18% overall). One in ten got funding from private industry/commerce and nearly one in five had to pay the tuition fees out of their own pocket. However, the picture is completely different for part-time students comprising one in four SET students. One in two had to fund the tuition fees themselves (compared to less than one in ten full-time students) and only one in five could rely on public funding compared to nearly three quarters of the full-time students (OST, 1999).

A comparison with earlier figures seems to suggest that there are slight differences in the main sponsor for all full-time students and SET full-time students. The first group seems to have to pay the tuition fees more often themselves whereas the latter seem to be able to rely more often on public funding, particularly from research councils and universities (OST, 1998).

The main sponsor, the research councils, provided in 1999/2000 a fee-award and a maintenance grant of Euro 10,586 (£ 6,455) per annum for a maximum duration of three years. In recognition of the actual duration of the PhD, the EPSRC has suggested to allow universities to decide on the level and duration of the grant for research studentships. The maintenance award compares to less than two fifths of the mean starting salary for graduates, thus making PhD studentship not too attractive an option. The research studentships are almost entirely provided for full-time students; it is only in recent years that some research councils have started to award a smaller number of research studentships to part-time students. Far higher grants are awarded to the comparatively few PhD students funded by the Wellcome Trust, a charity promoting biomedical research. Students receive £ 11,962 per year for either a three-year programme or a four-year programme just recently introduced. As funding from the Research Councils is generally only awarded for three years maximum, PhD-students will have to look for alternative sources of funding if they overrun, be it (part-time) work, a loan or family support, with the first solution likely to increase the time to degree even further.

Following decreasing numbers of first year PhD students, unfilled studentships in engineering and physical sciences, and concerns that the level of the stipend acts as a deterrent to attracting good quality home students, as several studies suggest, the stipend level has been increased twice fairly recently in the wake of spending reviews of the government. The stipend was first raised in 1998 by £ 1000. And it was just recently announced that from 2003 onwards research council funded PhD students will receive Euro 14,760 (£ 9,000) per year (OST, 2000).

Bringing the PhD to a close: submission rates, drop outs and age of PhDs

Although funding for a PhD studentship is only for a three year period, most PhD students will need one extra year, if not more (OST, 1999). There are no comprehensive statistics available for the time to degree, yet figures for submission rates relating to (full-time, British) research students funded by research councils are accessible. Depending on the subject area between 69 and 83% of students have submitted their thesis within four years after the PhD studentship has been awarded and altogether between 83 and 93% within a five year period (OST, 1999, for details see table A2 in the appendix).⁶ PhD students funded by the Medical Research Council needed on average longer than those funded by the BBSRC and the PPARC. There is a pressure on students to submit within four years because otherwise the institution will be penalised by the research council. Apart from sanction levels, research councils have also set expectation levels: at least 70% of PhD students should submit their PhD within a four year period and at least 85% within five years. Compared with these figures institutions seem on average very close or well above this target. After the submission of the thesis it may take another couple of months before the final oral examination takes place.

Drop out rates of research council funded PhD students seem to be fairly low. Of the one in two responding to a tracer study 94% have been awarded a research degree, 97% of them a PhD/DPhil and 3% an MPhil. Failing of a PhD seems to be very rare according to the report, as less than 1% of the PhD students had been awarded an MPhil (Social and Community

⁶ In comparison, the Wellcome Trust (2000a) has actually asked its former PhD students for the time to degree: slightly more than one in two had the oral examination within 3.5 years and eight in ten within four years.

Research Planning, 1998). Figures from the Wellcome Trust (2000a) were broadly similar: 91% had successfully completed their PhD.

Most British PhD graduates will be considerably younger than their European counterparts, due to factors related to the education system and beyond. If a PhD student goes straight from school to university he or she will be able to get a PhD degree by his or her mid twenties or certainly well below the age of 30: university entry at the age of 18, followed by three (or four) years undergraduate degree plus possibly a one year Masters degree and eventually a further three to four years for a PhD degree.

The comparatively small group of British PhD students funded by the Wellcome Trust – probably most likely to go straight for a PhD - were on average 22.5 years old when they started their PhD (Wellcome Trust 2000). Given that four-fifths had successfully completed their PhD within four years, by far the vast majority must have been between 26 and 27 years old.

Overall, the average age of PhD graduates will probably be higher than the one just referred to. For example, students might opt for a gap year before entering university. There are also a number of mature students embarking on a PhD, possibly after having completed a masters degree opening up new careers. Overseas students will also be on average older as British PhD students, as most of them might have some years of professional experience.

Moving on: Careers of PhDs

Positions open to successful PhD candidates in academia are either in research or teaching. Lecturer jobs, although hard to get, offer more job security than research posts, as by far the majority of them will be permanent. However, since the abolition of tenure in the late 1980s, university staff have become employees and could thus be made redundant in case of financial constraints of the institution. A lecturer position may require a publication record in a relevant area and/or teaching experience; either of them might need to be acquired following the completion of the PhD. Some PhD graduates may prefer to work in research, but they might want to pursue the second best option and take up a lecturer post as this gives them the best chance of securing a permanent contract (see for example ARCS and IER, 1999b).

In its efforts to monitor its funding outcomes, the research councils conduct first destination surveys 15 months after the funding had ended. These figures might be a bit premature as a substantial proportion is not employed at the time of the survey suggesting that they might still be writing up their thesis. Yet these figures show that those nearly one in three 1996 graduates who worked in academia at the time of the survey were mainly in fixed-term positions (see table A3 in the appendix), except of those disciplines within the remit of the ESRC and the NERC where permanent academic appointments actually outweigh fixed-term appointments.

Just recently, two tracer studies of PhD sponsors have been published, providing information for the first and the current job: one undertaken among research council funded students whose funding terminated in 1987/88 and 1988/89 (n = 851 former research students; Social and Community Research Planning, 1998) and one among Wellcome Trust funded PhD graduates working on biomedical research who received a PhD-studentship between 1988 and 1990 (n=143; Wellcome Trust, 2000a). Therefore, details on the first job after graduation rather reflect the situation of new entrants six to 13 years ago than the current one. Yet in

accordance with an earlier study (Pearson *et al.*, 1991) they reveal that the numbers of PhD graduates working in academia decreases substantially as time goes by with the private sector gaining more prominence instead.

- The research council study revealed that one in two started their career at the university (or a polytechnic at that time), but only one in three were up to nearly a decade later employed at a university. Figures for those working in the private sector rose from 28% to 44%.
- Compared to the research council funded PhD graduates former Wellcome Trust award holders were more likely to continue with academic research. The report revealed that initially more than four in five had taken up an academic position, yet four to seven years after having successfully completed the PhD this proportion has steadily decreased to one in two, with far more women leaving academic research than men. Following disillusionment with academic research, industry had become more important four to five years after successful completion of the PhD. Three in ten worked at the time of the survey in either biotechnological/pharmaceutical companies or in other commercial organisations (compared to less than one in ten initially).

Younger generations seems to be more sceptical about an academic career. Less than seven in ten Wellcome Trust funded PhD students who were in their final year in 1998 and 1999 preferred to stay in academia, partly with the intention of staying on temporarily before moving on to a different job (Wellcome Trust, 2000b).

Yet for those who want to pursue an academic career, what are its characteristic features and what are the prospects for academics? It is these questions that will be considered now.

3.4 Career structure and career prospects in academia

Ranks and promotion

Due to history and the different missions, ranks, career patterns and the style of staff management vary in pre-1992 and post 1992 universities. The academic career ladder at the pre-1992 universities comprises the following ranks: lecturer A, lecturer B, senior lecturer/reader and professor. At the post-1992 universities the ranks are: lecturer, senior lecturer, principal lecturer (being broadly equivalent to the senior lecturers at pre-1992 universities) and professor. Research staff in pre-1992 universities are graded as researchers Ia, Ib, II and III and those in post-1992 universities as researcher A and B. Yet it has to be said that, although a career structure in research exists, there are very few posts, in sciences even more so than in social sciences. In view of this situation the Research Careers Initiative, set up to monitor the Concordat for contract research staff, suggested that an overall framework for a career path for research-only positions should be established, modelling a four-rung career ladder ranging from research assistant to professorial fellow (RCI, 1998). In principal, academics can be promoted from junior ranks right through to the highest ranks at the same institution. However moving to another institution will usually be an easier way to get promoted, especially in new universities.

Decisions on promotions will be taken by academic promotion committees considering nominations from heads of departments or applications from individuals on an annual basis. The commission will be guided by promotion guidelines issued by national organisations

(CVCP and AUT, 1987a and b; NAFTHE, 1992; CVCP, 1993; CUCO, 1997) and they may take into account the results of individual appraisals, first introduced in 1987.

Individual research performance has become all the more important since the introduction of the research assessment exercise (RAE) in 1986, as its outcomes affect the amount of public money awarded to the institution. There have also been cases reported where star performers had been head-hunted from other universities to boost the institution's RAE performance. Not surprisingly, a recent survey among academics provides evidence that promotions in pre-1992 universities are mainly based upon the achievements in research. In post-1992 universities staff felt that success in administration was the single most important factor in their most recent promotion, closely followed by research (Court, 1998). However, it has to be said that some universities have recently started to accept promotions mainly taking into account the teaching performance.

In recent years there has also been more emphasis on training the professionals. The PhD is essentially research training, but PhD graduates will start their academic careers as lecturers in teaching. There are now more initial teacher training programmes. Equally training provisions for supervisors have increased.

In order to elevate the status of teaching the Dearing committee recommended to establish an Institute for Learning and Teaching (ILT) in Higher Education (NCIHE, 1997). The remit of this new professional organisation should include the accreditation of higher education teacher training programmes and the provision of support for teachers. Over the medium term, new full-time staff with teaching responsibilities should become a member of the ILT in order to successfully complete the probation period. Since the ILT was set up in 1999 the number of members have increased, yet so far only a small proportion of junior and senior staff encouraged to register with ILT, have actually done so.

Policy statements suggest that progression from lecturer A to lecturer B is based on merit in teaching, research and/or administration (if applicable). A competitive element, showing that the candidate has achieved better results than others, comes into play when promotion to senior lecturer is considered. Evidence from a staff survey suggests, however, there are also a substantial number of cases where the promotion from lecturer A to lecturer B was felt to be competitive (Court, 1998).

Following the abolition of an overall 40% senior staff quota in the pre-1992 universities, the number of people who can be promoted to senior staff (senior lecturer grades and above) is limited by the figure stipulated annually by the university council. Promotions thus depend on the financial constraints of the institution. Empirical evidence of whether this has statistically improved promotion prospects is not conclusive. The Dearing report revealed that the senior staff quota is now at an average of approximately 46% thus helping to partly compensate for low pay (NCIHE, 1997), whereas an Association of University Teachers study concluded that non-professorial senior staff were statistically worse off than their colleagues in the early 1960s (Court, 1998).

Contract research staff

Contract researchers are a vital part of the university, yet they are operating in a highly insecure environment. An analysis of HESA data by Bryson (1999) revealed that contract research staff comprised in 1997 nearly 30% of staff in all higher education institutions and

more than 40% in the pre-1992 universities, with overall 95% of contract research staff being employed on temporary contracts. Contract researchers are not part of the academic establishment. They are a rather heterogeneous group of staff seen as being 'in transition' to academic careers or careers outside higher education or they may see themselves as more or less successful 'career researchers' (ARCS and IER, 1999b; p. 4).

Concerned about the future of this vital part of the academic workforce the Committee of Vice-Chancellors and Principals (CVCP) and the Research Councils signed in 1996 a Concordat to support the research staff in their career management. The first follow up report in 1998 argued that only a minority of contract research staff can realistically expect to stay in academia and therefore measures need to be devised to help contract research staff settle into careers outside higher education. However, most researchers still want to pursue teaching or research in academia as a recent study on Scottish contract researchers, conducted in response to the Concordat, revealed: 26% strive for a traditional academic career, 36% for a career in academic research and 17% for a research post outside higher education (ARCS and IER, 1999a). Furthermore, the second follow-up report of the Concordat revealed that, although progress has been made regarding, for example, career guidance and training of researchers, more remains to be done (RCI 2000).

Equal opportunities

There is evidence that women as well as members of the ethnic minority and disabled community are under-represented in academia and more likely to be over-represented in lower-paid jobs. If we look, for example, at the situation of women, statistical data for 1998/99 reveal that 34.8% of academic staff are female, but this percentage dwindles as the career progresses (HESA, 2000). At lecturer level 38.5% were women – this is slightly more than the percentage of women graduating with a PhD. At senior lecturer/researcher level the proportion was down to 22.6% and at the professorial level it stood at just 10.2%. Women in nearly all grades are also more often found in less secure positions, funded by external sources, and they are more likely to work part-time to juggle family and work. Furthermore, there is evidence that women academics, on average, are earning less than their male counterparts. Even if the mode of employment and grade is held constant, (slight) gender differences remain (Bett, 1999).

Efforts to address equal opportunity issues in UK higher education have just recently been strengthened. In 1999, a project was launched to improve access, participation and promotion of women (students and staff) in science, engineering and technology in higher education institutions – an area, where women representation is particularly low. The so-called Athena project, funded mainly by the higher education funding councils, aims to increase the percentage of women academics to match the percentage of women undergraduates in the long run. Furthermore, in 2000 plans have been announced to set up a new equality action group for higher education to promote equality for all staff in colleges and higher education institutions. The initiative is funded by HEFCE, CVCP and the Standing Conference of Principals. Although some progress has been made concerning equal opportunities, one of the main issues seems to be putting policies into practice and monitoring the outcomes.

Remuneration of academics

Most academics are paid according to nationally negotiated, but locally flexible minimum pay scales, yet the pay of senior staff and professors is determined locally⁷. Apart from the professorial post, each grade corresponds to a salary range allowing for differences in experience and semi-automatic salary increase according to the years of service. In 1998, the salaries in the pre-1992 universities started from £ 16,655 for a lecturer A and could lead up to the professorial minimum of £ 35,170 and beyond. Salaries in the post-1992 universities are lower with for example a lecturer salary starting at £ 14,398 (THES, 1999).

Academic pay has been a matter of concern for quite some time. The National Inquiry into Higher Education, chaired by Sir Ron Dearing, looked into pay structures, yet recommend the establishment of a separate independent review of higher education pay and conditions (1997). Data commissioned by this independent review committee, revealed that the academic sector has fallen behind relevant comparators. According to the New Earnings Survey academic salaries in the pre-1992 universities have “increased since 1981 by 30% less than the average for non-manual employees throughout the UK economy and by 18% less than the average for public sector non-manual staff” (Bett, 1999; p. 51). Survey data indicated that salary had particularly fallen behind in the lowest and highest ranks with a pay-gap of between 10 and 30% compared to the private and public sector (see table 4.3). In addition the wider package is also less competitive. Academic staff enjoy a high holiday entitlement, but other fringe benefits for senior staff are below comparators. As already mentioned, the report also revealed that there are some gender differences in pay.

Table 4.3: Salaries in the higher education sector compared to other sectors

	Average salary (in £)	Higher education salary compared to ...		
		private sector (in %)	public sector (in %)	all organisations (in %)
Pre-1992 universities				
Professor	41,782	66	75	66
Reader/senior lecturer	33,202	85	93	84
Lecturer A	19,371	84	87	83
<i>Post-1992 universities</i>				
Professor	37,434	65	72	64
Principal lecturer	33,145	92	101	92
Lecturer	20,041	87	90	85

Source: Bett 1999, pp F30, F35.

The Bett report recommended to increase the minimum rates for academic staff significantly by 2002 (based on a revised pay scale, £ 22,500 was suggested for a lecturer) and to increase salaries for professors and equivalent senior academic managers (for whom a figure of £ 46,500 was given). The higher education sector has lobbied for the suggested budget necessary to implement Bett’s recommendations, as they would not be able to fund it out of their own budget. Yet in the most recent spending review there was no public money

⁷ For more detailed information on pay for professors in new universities see Farnham 1995.

earmarked for addressing the relative pay-gap of the vast majority of academic staff or the equal opportunities issues indicated in the report. Extra money has only been granted for the recruitment of up to 50 leading research staff in key science areas to maintain the UK's competitiveness (OST 2000).

Recruitment and retention of academics

Due to comparatively low pay and slow career progression, concerns regarding recruitment and retention of academics were raised. The Bett committee concluded that the sector was "not experiencing widespread problems in the recruitment and retention of staff", yet pointed to some difficulties in certain staff sub-groups and in particular locations. A replication of the staff survey conducted a year later on behalf of the Universities and Colleges Employment Association (UCEA) confirmed the results of the Bett committee, but revealed that recruitment and retention problems had deteriorated in the meantime. According to the report those disciplines in high demand by the private sector and/or far better career prospects outside the higher education sector, such as business studies, computing/IT and engineering were most affected, as were professors (high calibre staff) and partly researchers (Office for Manpower Economics 2000). A second independent report, commissioned by CVCP, HEFCE and other organisations, provided more in-depth information, highlighting for example that recruitment is more a problem than retention (see also Strategic Marketing Associates, 1999) due to the low pay. It concluded that these problems have a bearing on achieving the institution's goals and may undermine their contribution to the knowledge-driven society (IRS Research, 2000).

Other studies have indicated that low salaries are also one of the main reasons for leaving academia (Wellcome Trust 2000a) or considering leaving it (NCIHE, 1997). PhD graduates who had moved on from academic research to a job in industry actually enjoyed far better employment conditions: they had „ a career structure, greater job security and a substantially larger salary (Wellcome Trust 2000; p. 14).

3.5 Conclusion

Parallel to the overall expansion of higher education there was also an increase in the number of PhDs. Yet their numbers appeared to have gone beyond the demand of universities, so that PhD graduates had to look more and more for alternative careers in research-based labour markets or elsewhere. Concerns about the career prospects of PhD graduates have eventually led to a widening of the research training to allow for the development of generic skills, high in demand in the private sector. The criticism that the PhD was too narrowly focused on careers in academia and academic-related labour markets was also one of the driving forces behind the establishment of a new form of doctorate, the professional doctorate, in the early 1990s.

Yet in the last four years the number of British PhD students has steadily dropped, now causing concern among some quarters that it might effect lecturer recruitment in some disciplines in a couple of years time, when a good proportion of the academic profession will retire. The reasons for the drop are certainly manifold, as indicated already. The recent announcement of the government to substantially increase the stipend level will certainly help to ease the financial problems PhD students encounter (Social and Community Research

Planning, 1998), especially when they need more than the three years funded by most of the sponsors.

Higher education researchers may vary in their assessment of careers in academia, yet their comments are far from favourable. Increasing workloads of staff, a decline in autonomy at work, non-competitive employment conditions, a trend towards more casualisation and institutional approaches to staff management appear to be seen as the main factors. Keep, Storey and Sisson (1996, p. 36) claim that “probably no other ‘professional’ group ... has fallen faster in terms of pay and social status than have academics in the past 15 years”. Farnham (1999, p. 234) suggests that the decline of the donnish dominion has not stopped and speculates that critics may see the decline as terminal “with the profession being reconstituted and diversified under pressures of massification, managerialism, competition for resources and technological change”. Yet here are more positive aspects to it which may still hold true today. Drawing on a staff survey conducted in 1992 for the Carnegie Foundation, Fulton concluded that “... while some aspects of academic work in England may well merit the labels of ‘deprofessionalisation’ or even ‘proletarianisation’ that critics have given them, there is also a strong sense of continuing professionalism. Academic staff give every impression of enjoying and valuing many aspects of their work ...” (Fulton 1996; p. 435). This may partly explain why academics in information technology and computing services considering to move on to jobs in the public or private sector are reluctant to do so (Strategic Marketing Associates, 1999).

However, recent studies have provided evidence that it seems to have become harder to attract new staff and those thinking about qualifying for an academic career - at least in those disciplines where more secure and better paid jobs with better career prospects are offered in the commercial sector. Pay has been identified as the main cause for concern. Yet long-term solutions appear not to be in sight following the outcomes of the recent spending review - and ad hoc measures, mainly including flexible recruitment packages, may not be enough (IRS Research 2000).

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Appendix

Table A1: Number of doctoral degrees awarded in 1994/5 to 1998/99 – by subject area

Subject area	1994/5	1995/6	1996/7	1997/8	1998/99
<i>Humanities and arts</i>	862	1,112	1,132	1,291	1,358
Humanities	389	524	525	590	592
Languages	386	492	493	566	614
Creative Arts & Design	60	68	84	95	114
Librarianship & Info Service	27	28	30	40	38
<i>Social sciences</i>	962	1,295	1,372	1,580	1,812
Social, Economic, Political Sc.	501	646	701	816	921
Business & Admin. Studies	215	342	285	324	403
Law	76	108	113	102	125
Education	170	199	273	338	363
<i>Sciences</i>	3,334	4,327	4,334	4,612	4,680
Physical Sciences	1,457	1,875	1,810	1,951	1,908
Biological Sciences	1,114	1,484	1,580	1,674	1,706
Mathematical Sciences	232	321	345	302	379
Agriculture & Relat. Sciences	216	285	246	288	254
Computer Sciences	222	281	241	263	301
Architect., Building, Planning	93	81	112	134	132
<i>Engineering & Technology</i>	1,327	1,557	1,755	1,837	1,805
<i>Medicine</i>	949	1,248	1,490	1,535	1,535
Medicine & Dentistry	544	728	898	907	907
Subjects allied to Medicine	350	454	514	524	544
Veterinary Sciences	55	66	78	104	72
<i>Combined</i>	125	223	131	138	160
Total	7,559	9,761	10,214	10,993	11,338

Source: HESA, various years

Table A2: Thesis submission rates of research council funded PhD students for degrees started between 1988 to 1994 (in %)

	PhD started in						
	1988	1989	1990	1991	1992	1993	1994
<i>Percentage submitting the PhD within four years</i>							
BBSRC	-	-	70	77	77	83	85
EPSRC	-	-	67	68	67	73	n/a
ESRC	69	73	73	71	75	80	75
MRC	60	58	64	58	67	69	72
NERC	62	72	73	72	72	73	73
PPARC	-	-	82	82	81	80	81
<i>Percentage submitting the PhD within five years</i>							
BBSRC ¹	- ²	-	84	88	85	93	n/a
EPSRC	-	81	80	81	80	93	n/a
ESRC	74	81	80	79	79	83	n/a
MRC	77	77	66	81	83	80	79
NERC	85	89	90	86	83	89	n/a
PPARC	-	85	89	87	92	91	n/a

Legend:

¹ BBSRC: Biotechnology and biological sciences research council, EPSRC: Engineering and physical sciences research council, ESRC: Economic and social research council, MRC: Medical research council, NERC: Natural environment research council, PPARC: Particle physics and astronomy research council

² Indicates that these research councils were established later on following the re-grouping of research councils.

Source: OST 1999

Table A3: First destinations of research council funded PhD graduates¹ (1992 – 1996) (in % of known destinations)

	Graduation year				
	1992	1993	1994	1995	1996
Permanent academic appointment	5	4	5	8	8
Fixed-term academic appointment	11	14	29	25	20
Further training (excluding teaching)	14	15	5	5	4
School teaching or teacher training	2	2	3	2	3
Private sector, industry or commerce	36	37	22	26	32
Government or other public sector	9	8	5	4	5
Other employment	3	3	4	3	2
Not employed	14	12	19	18	17
Overseas	7	7	10	9	9
Total (in %)	100	100	100	100	100
Total (n)	2,281	2,137	2,109	2,730	2,649

¹ The survey took place 15 months after the PhD studentship ended.

Source: OST 1999

4 Sweden*

Lillemor Kim

4.1 Introduction

Social and economic demands on higher education institutions and on academic staff have been growing in the 1990s. Globalisation and the emergence of the knowledge economy are key elements in this transformation. The higher education institutions have been given a “third role” in addition to their traditional mission of committing teaching and research.

This structural change has given rise to a complex pattern of adjustments and responses in the higher education sector, in Sweden as in most other countries. The entire Swedish higher education system, traditionally centralised and uniform in structure, is now moving towards increased differentiation in power and prestige between institutions and different parts of the higher education sector. This development has had, and will continue to have, great impact on the academic career and the inner life of universities. According to Askling (2000a) the Swedish academic staff is currently faced with changes in two respects:

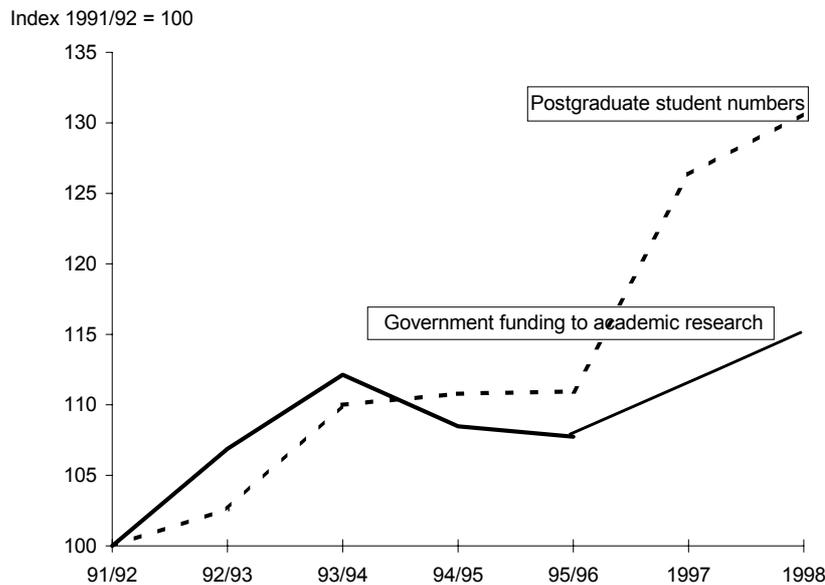
- 1) Due to the radical deregulation in the beginning of the 1990s and the sharp growth in student numbers during the same period the working environment and the working profiles of academics are getting more varied.
- 2) The entire regulative legal framework for academic appointments, activities and promotion has recently been reformed (1 January 1999). The new framework opens for an individual variation in working conditions and duties, incentives and career patterns among staff members.

In addition to this the training of postgraduate students is changing in a way that may in the long run completely revise the recruitment to the academic profession (see e.g. Kim, 2000).

After a period of stand still in the 1980s undergraduate education in Sweden started to expand again around 1990. During the last decade the number of students has increased by 50%. However, budget allocations did not grow at the same pace. The government made substantial budget cuts and the institutions must rely on external funding to keep up their research activities. Even including these external contributions, research allocations during the 1990s did not grow at the same rate as the number of doctoral students (figure 4.1). Not even state study assistance for postgraduate training corresponds to the goals set up by government for the number of examinees. The reduction of government grant per undergraduate student in the last five years can be estimated to 15 - 20 per cent and the student/teacher ratio has increased from 10:1 to 15:1. The government has made substantial budget cuts and the institutions must rely on external funding to keep up their research activities. Even including these external contributions, research allocations during the 1990s did not grow at the same rate as the number of doctoral students (figure 4.1). Not even state study assistance for postgraduate training corresponds to the goals set up by government for the number of examinees. There are great expectations that these gaps will be filled in the Government Bill now under way (see below).

* This chapter is based mainly on the data prescribed in the general outline for the comparative study.

Figure 4.1: Government funding to academic research and postgraduate student numbers 1991/92 – 1998 (index: 1991/92 = 100)



During the period 1992 – 1999, academic teaching staff has increased by roughly 30%, postgraduate students also by 30% and doctorates awarded by 60%. Thus, in spite of economic restrictions the output has increased faster than the input. All the same, ‘inefficiency’ of postgraduate training has been a topic of intense debate lately. The debate on academic careers has focussed mainly on the following issues:

- effects on quality of the rapid expansion of post-secondary education;
- the spreading out of research funding to new institutions of higher learning;
- equal opportunities for men and women in academic careers;
- increased competition internationally and nationally for scientific competence;
- the lack of a postdoctoral career in the Swedish system;
- increasing work load and worsening working conditions of academics;
- problems related to an ageing faculty;
- low geographical mobility in the Swedish research system;
- leadership and management in higher education institutions;
- growing demand for postgraduate training, notably in science and engineering.

The German *Lehrstuhl*-tradition, still with firm roots in academia, and the split in the academic profession between a teaching and a research career (introduced in the 1960s to cope with the educational expansion of that time) have been special features of the Swedish higher education system not in line with the demands from the modern knowledge society. Ongoing reforms may be seen against this background.

4.2 Higher education and the academic career

In 1993, the then government initiated a comprehensive reform of higher education. This reform reduced the detailed influence of central government and decision making was decentralised to the institutions. A new system of allocating resources to undergraduate training based on national price tags, student numbers and performance was also introduced.

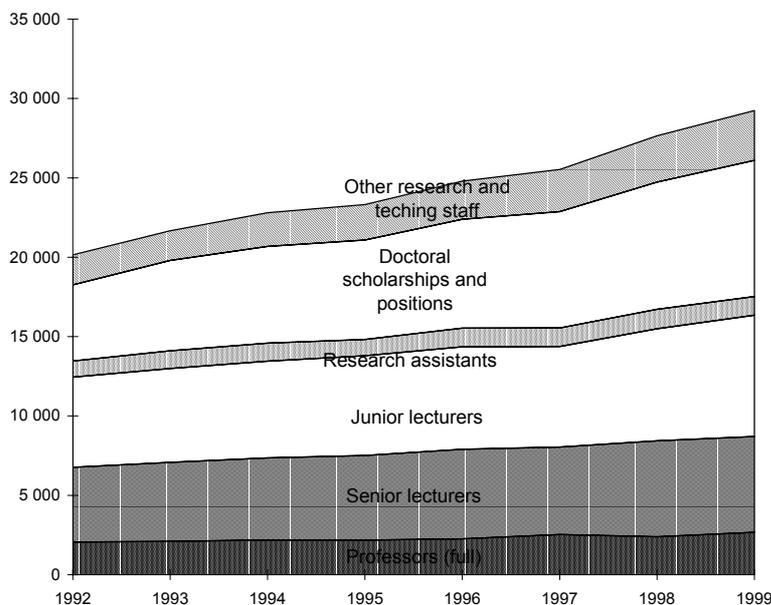
The reform called for more planning, accountability, control and more responsibility for those who are in leadership positions – and thus also for a stronger and more pronounced institutional governance. The internal devolution of authority, awaited by many academics, did not occur, which led to a heated debate in some quarters (Bauer *et al.*, 1999).

The tendency to organise higher education as a unitary system is in many respects still strong in Sweden (notably after the return of the social democratic government in 1994). As far as academic careers is concerned the Higher Education Ordinance contains regulations with respect to the appointment and promotion of teaching staff. Although there are in fact large differences between the old universities and the new institutions of higher learning (without the right to give postgraduate training or award doctorate degrees), the same rules are applied to all institutions. There is at the moment a marked tendency towards academic drift and more and more research positions and professorships are established at the new institutions.

The present career structure, comprising the whole higher education sector in Sweden, consists of four different types of posts. The categories concerned are: *professor* (full professor), *lektor* (senior lecturer), *adjunkt* (junior lecturer) and *forskningsassistent* (research assistant, postdoctoral fellowship). In recent years a fifth category has been more frequent: due to new regulations of postgraduate education (see below) the doctoral scholarship position (*doktorandtjänst*) has been more frequent than earlier. For a quantitative presentation of the rank structure 1991-1999, see figure 4.2.

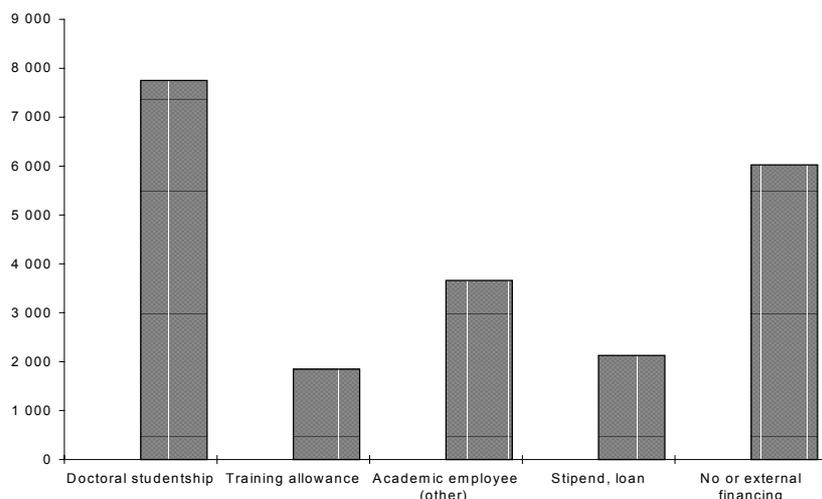
For professors, senior lecturer and research assistant a doctoral degree is required. For junior lecturer position, a doctoral degree is not demanded. Almost all professors and lecturers have permanent tenured posts. Apart from these permanent positions there are part-time teachers, guest teachers and research personnel who, because of current regulations, can hold their posts for a limited period of time. Nowadays the institutions themselves make the decisions about all types of teacher employment, even the professorships.

Figure 4.2: Academic staff 1991 - 1999 by rank (teaching posts)



Source: Statistics Sweden

Figure 4.3: Funding of postgraduate students enrolled in spring term 1999



Source: Statistics Sweden

Doctoral scholarship positions were in fact introduced already in the 1980s. The intention was to successively increase the number of scholarships so that all postgraduate students who wanted could get a position and possibilities to study full-time. Not more than 20% of full working time may be used for other purposes than study. A PhD student may have such a position no longer than four years. Due to lack of resources the number of scholarship is still low. Only around 40% of postgraduate students hold a scholarship of this kind (figure 4.3).

Although a close connection between teaching and research is prescribed in the Higher Education Act a small number of full professors have traditionally been doing mainly research while a large number of senior and junior lecturers have taken care of undergraduate training. This dividing line between different types of academic teachers was one main reason behind the reform of the career system, which was intended to imply a break in this respect. A single career track was established from junior lecturer to senior lecturer and from senior lecturer to professor. Promotion should be based on successive assessment of the individual teacher's competence. The individual teacher has to apply for promotion and is subjected to an assessment of traditional kind. Lecturers who meet qualification requirements for appointment as professor shall be employed as professors but on the other hand they have to reach sufficient level in *both* teaching and research. Educational skills should, on the whole, be given greater weight than before.

In addition to these general regulations of academic appointments and career structure, the government has set up detailed objectives (institution by institution) with the view to increase the number of women among newly appointed professors. A number of new professorships, where women are given the right of precedence, have also been established lately with the same intention of increasing the female participation in the research community. However, according to a recent verdict of the European Court this is not in accordance with European law.

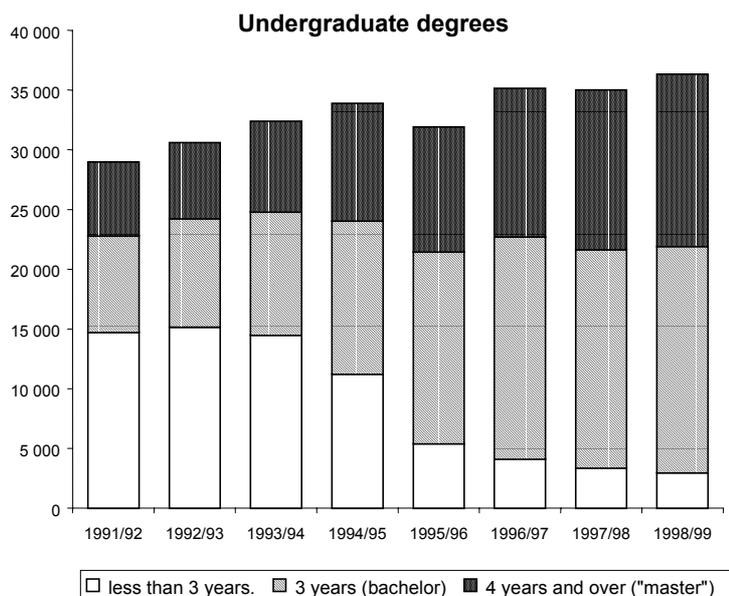
4.3 The career perspective of the PhD candidate

The Swedish academic system issues four different degrees: *kandidat* (corresponding to bachelor), *magister* (Master), *licentiat* (optional degree halfway between master and doctor) and *doktor* (PhD, MD etc). The nominal study time for these degrees is 3+1+2+2. The formal requirement for entering postgraduate study is a bachelor degree of three years length but since the introduction of the Master degree, another year of study is often needed in order to be admitted to postgraduate studies, at least in subject areas where competition is high.

Like in most other countries, the postgraduate training in Sweden is being modified towards a shorter and more structured study progress. A reform was launched in 1998 in order to shorten the study time, improve the financial conditions, the supervision and the support of students. Among other things it was stipulated that applicants must have guaranteed funding (post or grant) for the whole period of study to be admitted. This did create problems for students in “poor” subject areas like humanities and social sciences. The number of new entrants in these fields also decreased substantially hereafter. At present there are large differences between subject areas. In some areas, notably science and technology, there are not enough applicants to fill the places, while on the other hand the competition for admittance to postgraduate studies in humanities and social science is hard.

An overview of qualifications obtained in Swedish higher education system in the 1990s is given in figures 4.4 and 4.5. In contrast to the number of degrees taken in basic higher education, the number of postgraduate degrees shows a marked increase over the past ten years (+ 60%). The overall transition rate from undergraduate to postgraduate studies has gone up from 6% to 7%.

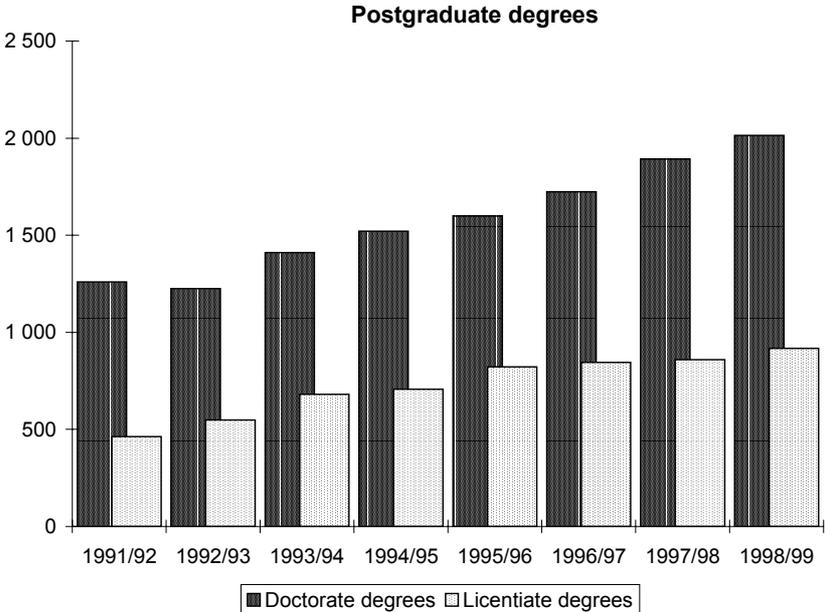
Figure 4.4: Undergraduate degrees in Sweden 1991/92 – 1998/99



Source: Statistics Sweden

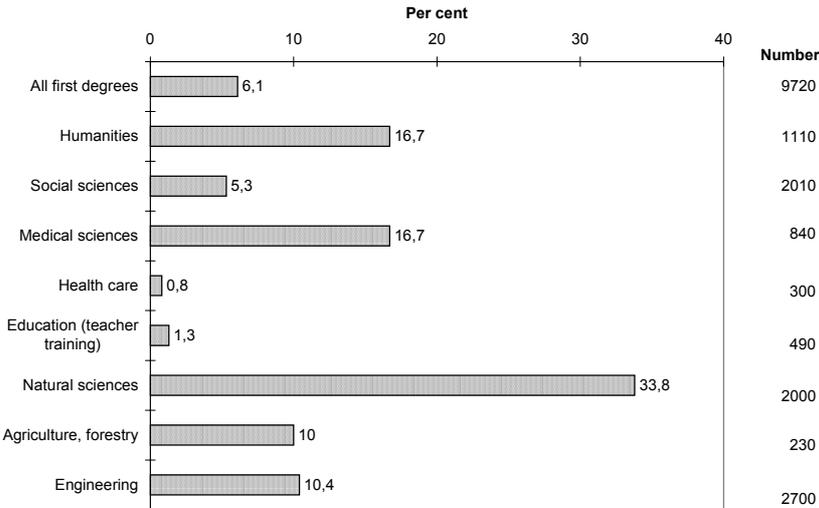
The actual increase in transition rate may be even bigger taken into account that only part of the undergraduate programs in fact prepare for postgraduate studies (academic programmes of at least three years of length). The average transition rate from the academic sector is approximately 15%.

Figure 4.5: Postgraduate degrees in Sweden 1991/92 – 1998/99



Source: Statistics Sweden

Figure 4.6: Percentage of first degree students 1989/90 – 1993/94 enrolled in postgraduate education (within 3-4 years after graduation) by subject area.



Source: Statistics Sweden

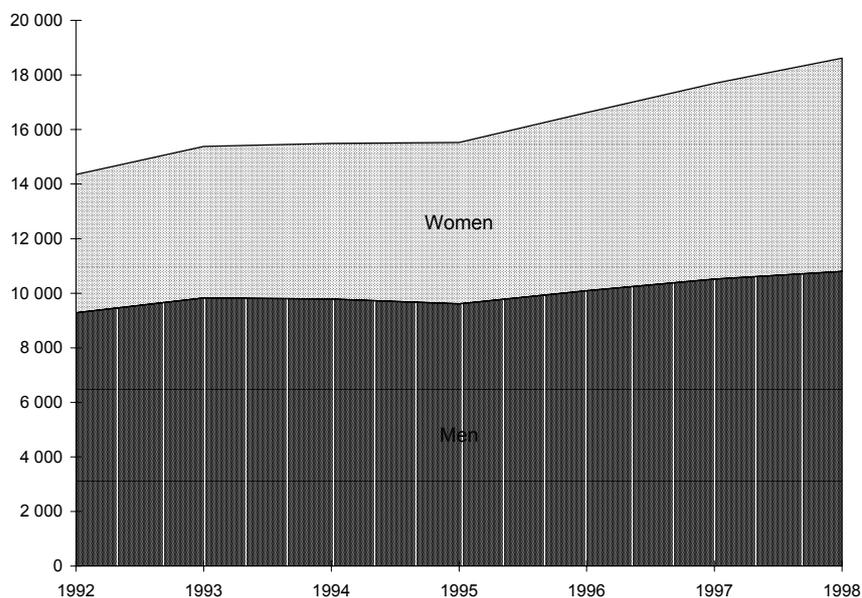
As shown in figure 4.6 there is a great variation between subject areas. Very few students from social science programs and teacher training apply for further training at postgraduate level. Science students, on the other hand, are more inclined to take up postgraduate studies. In some natural science subjects the majority of graduates aim for a doctorate degree, and the undergraduate education is at present too small to satisfy the need for postgraduate training in this field.

Postgraduate training is financed out of the block funding allocated to each institution (faculty). There is also funding from external resources such as research councils, the new strategic research foundations and/or from private sources. Money can be used both for doctoral scholarships and for study grants. A relatively common way of financing postgraduate studies is to do parallel work on a research project funded by a research council or an external agency.

Apart from the rule of “full financing” there are no general rules as to selection of postgraduate students. It is up to every institution, in fact every department, to decide on the application of the general statement that “students who are assumed to perform best should be selected”. In fact most students now have to take a Master degree before being admitted and offered a scholarship. Their achievements on the Master level are probably given high value in selection of applicants.

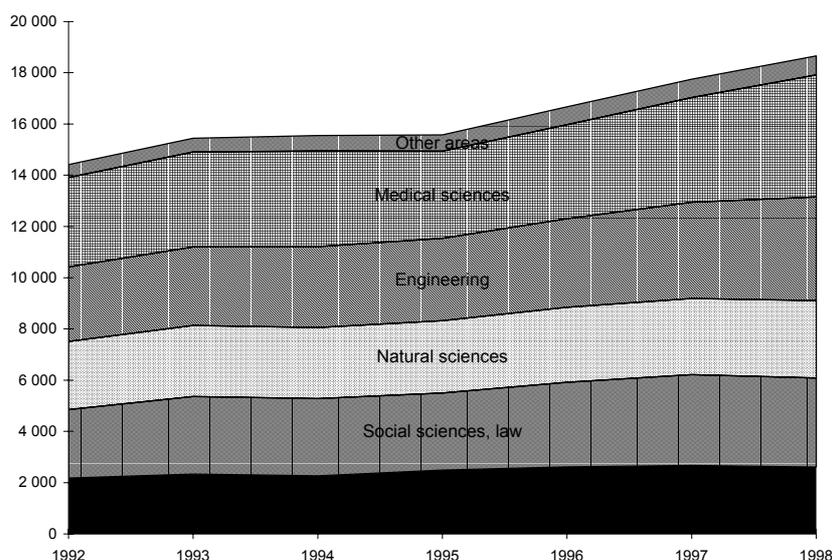
Figure 4.7 and 4.8 present time series of the volume of doctoral candidates from 1992 onwards by subject area and gender. The total number of postgraduate students has increased by 30%. Women make up 38% of the total number of new entrants during this period with an increasing percentage every year (42% in 1998).

Figure 4.7: Postgraduate students enrolled in 1992-1998 by gender



Source: Statistics Sweden

Figure 4.8: Postgraduate students enrolled in 1992-1998 by subject area



When comparing figures on female participation in research and research training from the beginning of the 1990s with the situation today, one can see that the proportions of men and woman have become more equal, most of all in recruitment to postgraduate training and junior positions which means that during the next decade there might be a breakthrough for female academics in Sweden.

The number of foreign postgraduate students has also increased in the 1990s but their share of the total student population has decreased at the same time (table 4.1). Foreign students now make up around 15 percent, more than half coming from countries outside the Nordic region and the EU. Almost half of them come from Asiatic countries (mainly China) and the rest from around 80 different countries. More and more students come from East European countries. The majority goes for ‘hard’ subjects, medicine is the most popular subject area. They are financed the same way as Swedish PhD students.

Table 4.1: Postgraduate students 1992/93 and 1996/97 by citizen-ship and subject area

Citizenship/subject area	1992/93		1996/97	
	number	%	number	%
Sweden	13,114	83.0	15,669	83.1
Nordic region	452	2.9	466	2.5
EU	325	2.1	475	2.5
Other foreign countries	1,317	8.3	1,416	7.5
of which Medical sciences	405		459	
Engineering	327		339	
Natural sciences	275		283	
Social sciences	168		152	
Humanities	109		125	
Agriculture, forestry	46		65	
Unknown citizenship	593	3.8	831	4.4
Total	15,801	100	18,857	100

Source: National Agency for Higher Education

Their achievements are good, PhD degrees taken by non-European students corresponds to almost 15% (far more than their share of the total enrolment). The official attitude towards foreign students, which recently turned out somewhat ambiguous, is now moving in a more positive direction. An investigation is being made into the possibilities of increasing foreign participation in Swedish higher education by introducing tuition fees.

The nominal time for a doctoral degree is four years (equal to eight terms in the Swedish system), a goal reached only by few students, mainly in medical sciences (table 4.2). Postgraduate students in natural science and engineering need on average up to one year extra and the students in social sciences and humanities another year to reach the doctoral degree. There is a great difference between gross and net study time, on average one year and a half (for humanities and social science 3 to 4 years). Attempts to overcome the long duration of postgraduate studies and the abundance of part time study at postgraduate level have been main driving forces behind recent reforms of postgraduate education and the introduction of so-called *graduate schools*. According to a study initiated by The Swedish Association of Universities and Colleges in 1998 the most important causes for prolonged study times were excessive thesis requirements, inadequate guidance from teachers and an excessive amount of teaching and other departmental duties. The proportion of students complaining about insufficient support from thesis adviser was alarming: 37%.

Table 4.2: Average time to degree (number of terms, median) for students who passed a doctorate degree 1991/92 and 1998/99 by subject area

Subject area	1991/92		1998/99	
	Gross time	Net time	Gross time	Net time
Humanities	20.0	13.9	20*	12.0*
Social sciences	20.0	12.0	18*	11.2*
Natural sciences	13.0	11.0	12	9.5
Engineering	13.0	11.5	12	9.1
Medicin	12.0	6.5	10	6.8
Odontology	14.0	8.6	14	6.5
Pharmacy	15.5	8.0	13	8.0
Agriculture	14.0	11.8	12	9.2
All areas	14.0	10.0	12	9.0

Source: Statistics Sweden

* refers to 1997/98 due to lack of data for 1998/99

Table 4.3: Average promotion age (median) of doctorates awarded 1991/92 and 1998/99 by subject area

Subject area	1991/92	1998/99
Humanities	40.5	41.5*
Social sciences	42.5	41.5*
Natural sciences	32.5	32
Engineering	32.5	32
Medicin	38.5	39
Odontology	35.5	45
Pharmacy	34.0	35
Agriculture	36.5	35
All areas	35.5	35

Source: Statistics Sweden

The average promotion age of doctorates, 35 years, has remained almost unchanged during the last decade (table 4.3). There is a big difference between ‘hard’ and ‘soft’ subject areas in this respect. Doctorates in humanities and social sciences are on average five years older than their equals in natural sciences and engineering (and medical doctors in non-clinical subject areas). Criticism from industry saying that freshly-baked doctorates in Sweden are too old and not appropriately educated for industrial careers was one reason for the survey mentioned above. The study, however, revealed no complaints from employers about the doctors being too old. All the same, ‘old age’ remains an important argument for the reforms of postgraduate training now under way.

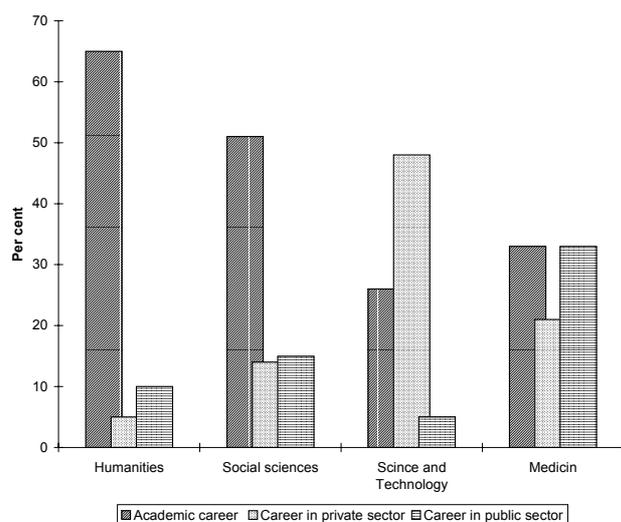
Table 4.4: Doctorates awarded in 1991/92 and 1998/99 by subject area

Subject area	1991/92	1998/99	Difference 98/99 – 91/92
Humanities	134	185	+ 38%
Social sciences, law	152	276	+ 82%
Natural sciences	279	403	+ 44%
Engineering	212	407	+ 92%
Medical sciences	443	646	+ 46%
Agriculture, forestry, other areas	39	97	+ 149%
Total	1,259	2,014	+ 60%

Source: Statistics Sweden

As can be seen from table 4.4 the number of doctorates awarded has increased by 60 per cent in the nineties, i.e. double the increase rate in student numbers. By international standard and in relation to population size this is fairly good but not in the very top position. The Swedish degree profile is, moreover, extreme in that the humanities and social sciences represent a considerably smaller share of the total number of doctor’s degrees than in most other countries. This is partly explained by the fact that demand for people with postgraduate qualifications has remained rather low outside the university sector.

Figure 4.8: Postgraduate students' career plans in 1998 by subject area



Source: Swedish Association of Universities

The largest increase in doctorates awarded in the 1990s was in medicine, but the relative increase was highest in engineering. Doctorates in social sciences increased by 80%, but from a fairly low level. So there are no signs yet that the skew distribution between fields of study will change in the near future, rather the opposite.

According to the survey mentioned above the proportion of postgraduate students who primarily plan for an academic career was barely 40%, i.e. somewhat less than have actually stayed in academia. Increasing numbers are aiming at careers in the private sector (one third on average). Career patterns differ not only between faculties but also between candidates in different subject areas in one and the same faculty (figure 4.8). More than half of the doctoral students in humanities and social science is aiming at an academic career while 50 percent of students in science and technology tend to work in industry or business. A large majority replied that they would like to have more training in using information technology, project management, teamwork etc. Asked whether their training had adequately prepared them for careers outside academia, less than half of the respondents replied "Yes".

Postgraduates get on average 45% higher salary than newly-baked undergraduates. Employment rate is also high. Most recent statistics show that within a month after graduation, 70% of the doctorates were gainfully employed and after three years 90% had got a permanent position. Very few remained unemployed. At present, (1999) 45% of all postgraduates on the labour market are in the higher education sector, 29% in private sector and the rest (26%) in the public sector. Compared to three years ago this means an increase of 3% in private sector. This means that the majority of new doctors have lately entered the private zone, indicating a quite new employment pattern.

4.4 The career perspective of the academic

Apart from a presentation of the development of various teaching post in the Swedish academic system (an important condition for advancement in the career ladder) this chapter will only cover a few aspects of the career perspective of the academic, namely the salary structure compared to the private sector, the gender issue, mobility and the working load of academic staff.

The volume of teaching staff (doctoral scholarships not included) has increased by roughly 30% since 1992 (figure 4.2, see above). Junior lecturers, doctoral scholarships and other research posts have increased faster than professors and senior lecturers. The numbers of research assistants, the one and only post-doc positions in the Swedish system, have barely increased at all. As a consequence the postdoctoral phase remains a real bottle-neck in the system. Available positions are too few to meet the demand from newly-baked doctors, but they are also too few for recruiting new senior lecturers (which will create problems in the years to come).

Another problem of balance is between the teaching and assistant staffing in higher education. There has been a reduction in administrative support staff, mainly due to reductions in technical assistants and people doing relief work, but also reflecting a general strive to reduce the costs for administration. Even between academic staff the trend goes in the same direction. More and more work is put on doctoral students and junior lecturers, people having the lowest salaries and often females. Together with a shortening of postgraduate training and new rules of promotion the whole academic system may be on the way to 'downgrade'. As a consequence new types of 'excellence' marks are emerging, e.g. Uppsala university has introduced a system where promoted professors are distinguished (in responsibilities and status) from traditionally appointed professors. The development towards a more formalised postdoctoral career may be seen as a step in the same direction. The doctoral degree is becoming either a final step before a more diversified professional career outside academia or a first step in an academic career where further qualification is needed during a postdoctoral period, preferably abroad, to become a full-fledged researcher.

Mobility is rather low in the Swedish society in general. In the higher education sector this applies both to the transition from undergraduate to postgraduate level, during the doctoral training period and after graduation. Only a minority is 'movers'. 85% Of students continue their postgraduate training where they had their basic degree. Two out of three professors and around 80-85% of other teaching staff at Swedish universities have been awarded their doctorate degree at the same university where they teach. There are several reasons for this low mobility in Sweden: the notion of uniformity and equivalence between institutions, the regulated system of salaries, the large geographical distances and the rather strong local traditions. The disadvantages are, however, obvious. A change may prove decisive for the vitality of the Swedish research system in the long run and universities and research councils are now trying to change attitudes and behaviours in favour of increased mobility within the nation as well as internationally.

The effects of the recent career reform on gender equality are just appearing. Out of 650 professors, appointed in 1999, around 500 were so-called promoted professors. They were evenly distributed between faculties. Female professors made up 20% of both promoted and traditionally appointed professors, so the reform as such does not seem to have any gender bias. The earlier mentioned professorships directed towards women (many of them appointed in 1999) may have had an impact on these figures. However, 20% is far more than the total female proportion of the whole professorial body at the moment.

The increasing workload for teachers has been on the agenda for a rather long time. An increase from 40 to 50 hours per week has been noted in some studies. As already mentioned the number of students per teacher has also increased as a result of budget cuts in the late 1990s. The distribution of working hours on tasks of various kinds is regulated locally at the institution. Working hours for teaching staff is no longer defined in numbers of lessons but in hours (an overall working time of 1 757 hours per year). According to a recent case study of

academic teachers at eight different institutions (NAHE, 2000), the real teaching time often exceeds the recommended limit of nine hours per week. Teachers claim they do not have enough time for research activities. They work on average 49 hours per week, sickness is on the increase and they feel lack authority.

Salary structure is important not only for the individual teacher, but also for the attractiveness of the higher education sector as a whole. The general level of salaries for academic staff is lower than in many other countries and has been a source of dissatisfaction and discontent amongst academic staff for some time. It has also given rise to a heated debate on “brain-drain” of academics, preferably engineers, to foreign countries. There are tendencies in that direction, although not so alarming yet.

In contrast to the situation earlier there is nowadays a fairly large room for individual agreements on salaries. Figures shown in the tables below are mean values and the difference between lowest and highest payment may amount to 100% in one and the same position and institution. From table 4.5 it is clear that the increase in average monthly salary in the 1990s was lower for most academic professionals than for comparable occupational groups in the state sector and also lower than the average salary increase in the whole state sector. Within academia, the scientifically more advanced professors and research assistants have had the largest increase while doctoral students and junior lecturers were kept behind.

In table 4.6 some data are presented comparing employees holding a postgraduate degree in higher education and private sector. Figures reveal the general differences between male and female workers. Other differences are also sensational. The average gross salary for senior lecturers in universities and colleges are lower than for economists, lawyers and engineers (without such a degree) in private sector already ten years after graduation. Although the mean salary of professors has gone up substantially in recent times it is still less than the average pay of an economist or lawyer (without postgraduate degree) get after twenty years in the profession.

Table 4.5: Average monthly salary (SEK) of academic professionals and comparable occupational groups in state sector 1992 and 1999

Occupation	1992	1999	Diff (99 - 92)
<u>Academic professionals:</u>			
Professors	30,000	39,000	+ 30%
Senior lecturers	23,000	29,000	+ 26%
Junior lecturers	19,000	23,000	+ 23%
Research assistants	18,000	24,000	+ 33%
Doctoral scholarship holders	14,000	17,000	+ 21%
<u>Government professionals:</u>			
of high rank	28,000	40,000	+ 41%
of lower/middle rank	18-22,000	24-31,000	+ 37%
<u>Legal professionals:</u>			
of high rank (magistrate)	27,000	38,000	+ 44%
of lower rank (clerk)	13,000	17,000	+ 29%
<u>All state sector</u>	15,000	21,000	+ 38%

Source: Statistics Sweden and Swedish Association of University Teachers

Table 4.6: Average monthly salary (SEK) of employees holding a postgraduate degree in higher education institutions compared to comparable groups in private sector 1998

Subject area of degree	Private sector *		Higher education institutions	
	Men	Women	Men	Women
Humanities, arts	27,300	25,800
Social sciences, admimistration, law	29,000	26,300
Natural sciences, engineering	35,000	28,400	28,900	25,100
Medical sciences	..	34,000	31,600	25,800
Agriculture, forestry	44,100	..	29,600	24,500
Other			28,700	26,300
All areas	36,100	29,100	29,100	25,700

Source: Statistics Sweden and Swedish Association of University Teachers

* figures based on surveys (.. = few observations)

4.5 Conclusion

Most of the problems related to academic careers mentioned in the introduction will continue to be on the agenda in the years to come due to continued expansion and increased diversification of higher education in Sweden. The number of students will continue to expand and the number of postgraduate degrees is expected to double within the next ten years – all according to the plans of the present government. The effects – in quantitative as well as qualitative terms - of ongoing reforms are still unknown. The main problem will be how to maximise their positive consequences while limiting their less fortunate effects. By all means they will have profound impact on postgraduate training as well as on the academic career pattern.

The main conclusions to be drawn from the facts and figures presented in this paper may be summarised in terms of *recruitment, financing, career structure, mobility and attractiveness* of the academic profession.

Problems of recruitment may arise in ‘hard’ as well as in ‘soft’ areas of study. In science and technology it may be hard to find the right number and quality of candidates while in social sciences and humanities suitable candidates may be lost due to the big oscillations in intake capacity. Woman participation in academic work will have to increase in certain subject areas. Modes of financing postgraduate training, institutions as well as students, that will allow for a continued increase in student numbers, have to be implemented. The recent career reform may end up in nothing if no money goes with it.

While more and more strict rules are applied to the postgraduate training period, ‘grey zones’ are emerging before and after the formal training period (in the time waiting for a scholarship and in the period following graduation). The whole academic career must be taken into account and the post-doc phase must be given a real place in the career structure. Incentives for increased mobility and international co-operation in training of young researchers are needed.

The main problems related to the more “advanced“ academic employees concern the growing competition from outside and the decreasing attractiveness of academic posts in relation to other sectors of the economy.

In all these respects there are big differences between subject areas and institutions. Diversification of higher education in general may lead to differences in career structure growing even bigger (attractiveness, employment conditions, career pattern etc.) This may create severe internal tensions in the integrated higher education system in Sweden.

Most of the issues at stake here are taken up in the new Government Bill, “Research and Renewal”, just released. In short, the funding of research and research training will increase by 1,3 billion SEK in the next three years, sixteen new “research schools” are set up at different institutions (in co-operation between old and new universities), a new type of assistant lecturer position and special recruitment programs will be introduced for young researchers. Gender equality will be enhanced through the use of so called “positive discrimination” in recruitment to these programs. Even the notion of “centres of excellence” is now on the way in Sweden.

It is, however, too early to judge whether these actions will suffice to make academic careers in Sweden competitive on the national and international arenas and what will be the long term effects on academic careers of the present higher education policy. According to a recent study on higher education reforms in Sweden in the 1990s (Bauer *et al.*, 1999), the traditional role of the academic is under increasing challenge from internal and external demand and forces. Fragmentation constitutes a serious threat to the deeply held belief among academics that teaching and research should be integrated. The authors of this study conclude that the strong negative reaction in Sweden to forces fragmenting the academic profession may ensue from the experience since the 1960s of separating teaching from research by establishing a university lecturer position that holds a total teaching duty. To solve these conflicts in an expanding and geographically dispersed higher education sector like the Swedish one will be a great challenge for the future.

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5 Finland

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5.1 Introduction

In Finland, academic research or teaching is still the most common first employment for the young PhDs, but it does not necessarily lead to an academic career. Recent policy changes, including the establishment of graduate schools, have emphasised, however, the growing need of PhDs in the private sector, business and industry. In addition, the exceptionally fast increase in the numbers of doctoral degree holders suggests that in the future more and more PhDs should find employment outside the academia.

The attraction of a secure academic career based on tenured posts and ‘academic freedom’ is eroding in many ways. In addition to the widening salary gap between university personnel and graduated employees in the private sector, the changes in the university environment and higher education policy have increased the uncertainties of academic careers. The number of short-term posts and research projects is growing, the number of students is increasing while basic budget for teaching is decreasing, and the quest for contract research and outside funding has become a full-time endeavour for professors and heads of department.

The current rhetoric of the ‘information society’ includes the idea that also PhDs should be entrepreneurial and makers of their own careers, but postgraduate education is still quite traditional preparing for the basic academic functions: research and teaching. Depending on the field of study, the labour market need of PhD qualifications outside the university is only moderate, relatively small or non-existent.

5.2 Higher education and the academic career

In the Finnish dual higher education system including the university and the non-university (AMK) sectors only the universities can award doctoral degrees.

The university degree system is trifold, consisting of the lower (bachelor’s), the higher (master’s) and the postgraduate degrees (licentiate’s and doctor’s degrees). The basic academic degree is the master’s. The bachelor’s degree which was introduced during 1994-96 in most disciplines has not yet earned its value in the labour market. The licentiate, originally an intermediate degree between master and doctor, is changing towards vocational further education degree or totally disappearing depending on the field.

The AMKs are important in this context because they are offering potential career options for future PhDs. According to the Polytechnics Act, principal lecturers must have a postgraduate degree (licentiate or doctorate). At the moment only one third of AMK staff satisfies this criteria.

The current university legislation gives a considerable freedom to individual institutions in deciding their office structures. The University Act only states that a university has professors and, in addition, other personnel for teaching, research, and other functions. Most professors have a doctoral degree but in technical fields, however, the amount of incompetent professors is high.

In addition to professors, the regular staff includes three main categories. Senior assistants and lecturers must have a postgraduate degree or, in special conditions, a master's degree, and a deep teaching experience. Assistants are required to have a higher academic degree (master). Assistants' posts are traditional entrance points for postgraduate students, and they are filled for three or five year periods. The rest of the teaching personnel are usually recently graduated young persons who have to take a lot of teaching on their shoulders. In addition to this hierarchy of the teaching staff, universities are nowadays crowded with contract researchers who usually also conduct postgraduate studies.

Table 5.1: *Teaching staff by main categories (%) and the number of researchers in Finnish universities in 1992-1999*

	Professors	Senior assistants	Assistants	Lecturers	Regular Teaching staff	Other research staff
1992	28.6	9.3	26.8	35.3	6738	2262
1993	29.1	9.1	26.8	35.0	6742	2330
1994	29.8	9.2	27.1	33.9	6653	2630
1995	30.3	9.3	26.6	33.7	6668	3692
1996	30.5	9.7	25.8	33.9	6778	4212
1997	31.2	10.1	25.3	33.4	6810	4591
1998	31.5	10.2	23.9	34.5	6393	5479
1999	32.1	10.5	23.4	34.0	6364	5998

Source: KOTA

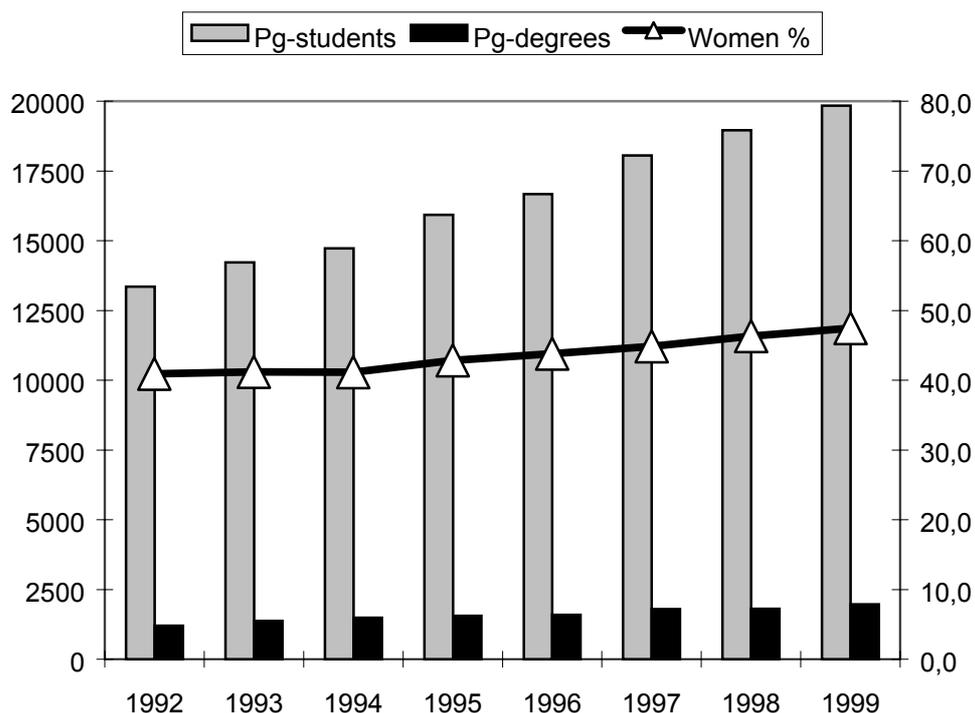
Table 5.1 indicates that the number of regular teaching staff is going down (this applies also to the total teaching input). At the same time, student numbers are growing fast, and the student/teacher ratio has changed from 18 in 1992 up to 24 in 1999.

5.3 The career perspectives of the PhD candidate

From 1992 to 1999, the number of master's degrees awarded annually has grown 36%, from 8713 to 11856. Growth has been fastest in the field of engineering (69 %) while in medicine the number of basic degrees has not changed much during the 90s. At the same time, however, the number of doctor's degrees has roughly doubled, from 527 to 1165. The growth has been most rapid in the field of social sciences where the number of doctors has almost tripled (see appendix).

The share of women graduates was 55% in 1992, and it has grown only slightly being 58 % in 1999. Instead, women's share of the doctor's degree holders has grown from 31 to 43% during this period. There are still, however, great differences between fields of study. In the field of humanities, for instance, almost 80 percent of master's degree holders are women whereas in engineering their share is only 20% (see appendix).

Figure 5.1: Total amount of postgraduate students and the number of postgraduate degrees (including the licentiate) and the share of women from postgraduate students (1992-1999)



Source: KOTA

Figure 5.1 shows the number of postgraduate students which has also grown rapidly, about 50% from 1992 to 1999. Compared to the number of postgraduate degrees (including licentiates) the postgraduate student body is relatively large which indicates delayed studies and problems in graduation. The share of women is nowadays almost half of postgraduate students.

The number of foreign postgraduate students has almost doubled from 1992 to 1998, but their share of the student body is still very low. It was 4.3% in 1992 and has remained almost steady, being slightly over 5% of all postgraduate students (see table 5.2).

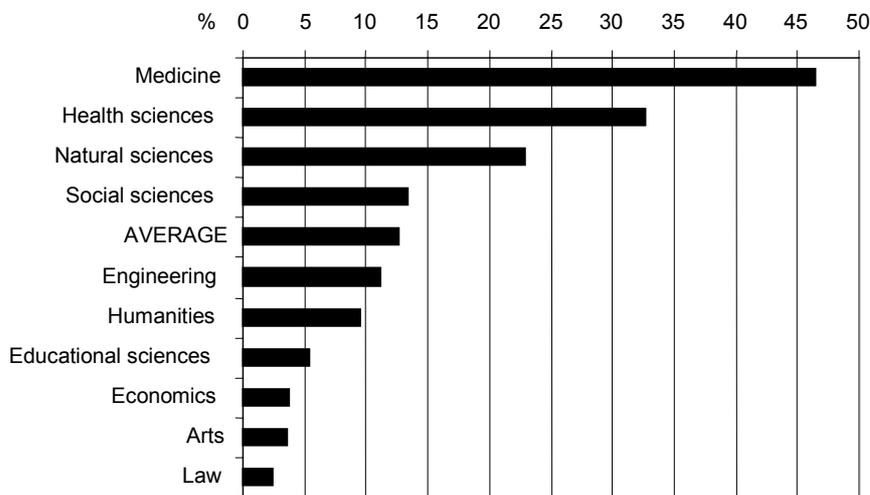
Table 5.2: Amount of foreign postgraduate students by field between 1992-1998

Field of study	1992	1993	1994	1995	1996	1997	1998
Humanities	86	95	106	118	114	136	129
Social sciences	51	57	63	68	79	108	104
Natural sciences	87	105	133	146	165	163	159
Engineering	209	225	236	264	287	313	334
Medicine	30	52	60	80	85	87	100
Other fields*	117	139	156	175	202	212	232
Total of foreign post-graduate students	580	673	754	851	932	1019	1058
Allpostgraduate students	13358	14218	14730	15927	16674	18056	18958
Foreign pg-students (%)	4.3 %	4.7 %	5.1 %	5.3 %	5.6 %	5.6 %	5.6 %

* including Agriculture and Forestry, Arts, Dentistry, Economics, Educational sciences, Health sciences, Law, Pharmacy, Psychology, Sport sciences, Theology, Veterinary medicine, Source: KOTA

There are no accurate statistics on the transition to postgraduate studies. In the Finnish system, it is relatively easy to gain a postgraduate status and, thus, the intensity of the studies varies considerably as already indicated above (see fig. 1). If compared to the number of completed master's degrees ten years before, the proportion of PhDs is on an average 12% (see figure 5.2). The pursue for the doctoral degree is greatest in the field of medicine where almost half of the students continue their studies gaining the degree. About every third master in health sciences and every fourth in natural sciences completes a doctorate, whereas in the fields of law, arts and economics, the corresponding share is less than 5%. In the fields of humanities, social sciences and engineering, the ratio between the numbers of PhDs and master's degrees is near to the average. (Ahola *et al.*, 1999)

Figure 5.2: Ratio between PhDs awarded in 1996-1998 and master's degrees awarded in 1986-1988 in selected fields. (Ahola *et al.*, 1999)



Source: KOTA

The new University Act (adopted in 1998) preserves the traditional autonomy of the universities and prescribes their functions in general terms only (Ministry of Education, 1998). This gives latitude especially concerning the organisation of postgraduate studies: master's degree or similar education is the basis of postgraduate education. Further regulations are given in separate Degree Acts, and more detailed regulations concerning postgraduate education are given only at the faculty level. Faculties have put the regulations in practice in different ways. Qualifications other than the master's degree required from post-graduate students have varied not only between different fields of study, but also between different universities or faculties. Usually the only requirement is a study plan which includes an outline for the thesis and an agreement on the tutoring professor. In most fields of study it has not been seen necessary to restrict the number of post-graduate students. Access to a graduate school requires, however, a more refined research plan, and research posts in graduate schools are usually subject for open application.

The more rapid growth of doctor's degrees than of the numbers of postgraduate students indicates, among other things, that the time to degree, which has been relatively long in Finland, has shortened. There are no accurate statistics on the time to degree, but we can estimate them using information on the age of graduates. According to table 3, in 1998 the average time to the PhD was about nine years, and the median age at the time of getting a

doctorate was 36 years. Ten years earlier the median age for PhDs was 38. In the fields of humanities and social sciences, time to degree is over eleven years whereas in engineering postgraduate students complete their studies in seven years on an average.

Table 5.3: Age (median) at the time of the master's and doctor's degrees and the estimated average time to the doctor's degree by field of study in 1998

Field of study	Age at the time <i>of master's (median)</i>	Age at the time <i>of doctor's (median)</i>	Time to doctor's degree
Humanities	28.1	39.5	11.4
Social sciences	28.5	39.8	11.3
Natural sciences	26.8	33.6	8.5
Engineering	26.9	34.2	7.3
Medicine	26.8	36.0	9.2
All fields - average	27.4	36.3	8.9

Source: Statistics Finland 1999

In Finland the problem is a delayed entry in the universities in general. Also, completing the basic degree (master's degree) takes a relatively long time (5-8 years) and, as a consequence, the PhD students are already quite old when they start their doctoral studies. Especially those who study according to the traditional system (e.g. along with an academic or other work) usually use a long time to finish their degree. For them, the doctoral thesis has become more of a life-work or a masterpiece than an apprentice demonstration for the research career (Ahola *et al.*, 1999).

With the introduction of the graduate school system in 1995, in order to lower the age of graduating PhDs, the objective for the completion of the doctoral degree was set to four years of full time study. According to a survey of the doctors who have studied in the first four-year period of graduate schools (1995-1998), the average age at the time of the degree was 32 (MoE, 2000). This indicates that the time to degree is actually going down.

Graduate school students work in a full-time research position funded by various sources. About one third of the posts are funded directly by the Ministry of Education. The rest of the posts is accounted for by the universities themselves, by The Academy of Finland, companies and various foundations. In addition to the full-time graduate school students, the majority of postgraduate students work in different university posts or as contract researchers, or they prepare a dissertation in addition to their regular jobs outside the university.

Graduate school students receive a salary of about EUR 1,500 per month during their four-year programme. Those postgraduate students who work as a (research) assistants at the university may receive a little bit higher salary (varying from EUR 1,500 to EUR 2,090) depending on the department, working experience and qualifications.

According to the graduate school survey (MoE 2000, 32), the first destinations of those who had completed their studies successfully were the following: 64 % were employed by universities and research institutes (21 % of this group was working abroad). 14 % were employed by other educational institutions and the public sector. The share working in the private sector was 17 % (and 6 % of this group in foreign companies). Thus, altogether 15 % were employed abroad. The unemployment rate was only 0.3 %. These figures correspond quite well with other information concerning the employment of PhDs (see Ahola *et al.*, 1999, 66-70). There are naturally clear differences in the destinations between graduates in different

fields. PhDs in natural sciences and engineering have more often found work in the private sector as the others. In the field of humanities and social sciences the universities are the main employers.

The career perspectives of the academic

There is, at the moment, no accurate information on the careers and career prospects of young employed PhDs. For instance, in the graduate school survey referred above, the information on the sector of employment was collected from the heads of the graduate schools, and the PhDs themselves were not approached.

The following table presents some selected information on the earnings of postgraduate degree holders in the private sector compared to the state sector. Because the number of PhDs in the private sector varies greatly according to the field of study, the statistical information which is based on survey technique does not cover all degrees.

Table 5.4: Mean earnings (in Euro) of PhDs in selected fields in the state and private sector, and the women/men earnings ratio in 1998

	State sector		Private sector	
<i>Field of Study</i>	<i>Mean earnings, EUR</i>	<i>W/M</i>	<i>Mean earnings, EUR</i>	<i>W/M</i>
Humanities ¹	2,870	91	2,950	97
Social Sciences	3,380	88	4,230	81
Natural Sciences	3,030	85	3,470	96
Engineering	3,700	88	3,970	91

Source: StatFin

¹ Includes also licentiates

On average, the earnings of all postgraduate (licentiate and doctor) degree holders working in the state sector are 87% of the earnings in the private sector. In the private sector, social sciences PhDs who probably work in top management earn more than their colleagues with science or engineering PhD who are usually employed in research and development where their wages are not much higher than those of basic degree holders. However, mean earnings do not give a good picture of the real earnings, especially in the private sector. The gap between private and state sectors is much wider than it seems by looking these figures.

In comparison to the above figures, we can note that the usual starting salary of a young assistant at the beginning of his/hers academic career is about EUR 1,500 and a professor usually gets about EUR 3,900.

As indicated by table 5.1, at the same time as the number of PhDs has doubled the number of professors has remained almost the same. Depending on the field and the age structure of the chair holders, the academic career is nowadays more or less blocked.

In order to improve the career perspectives of young PhDs, the government is now investing in post doc positions. Budget proposal for 2001 includes the financing of altogether 500 post doc posts. The Academy of Finland grants these post-doc positions according to applications which are open also to firms in the industry and business.

5.4 Conclusions

Two main conclusions can be made: one is that PhDs unemployment is only a marginal problem, another is that it is difficult to describe a typical PhD career outside universities, except in the medical field. Medicine differs from the other fields for it is profitable for medical graduates to acquire a doctoral degree because the work outside the universities (e.g. at hospitals) is organised in the way that a doctoral degree is an advantage both in getting a promotion and a better salary. For the doctors of other sectors the future career is very much in their own hands.

In recent years, Finland has made considerable investments in R&D activities but, at the moment, PhDs make up only a small part, about 2%, of the total labour input in private sector R&D. This should create lots of employment opportunities for PhDs — as the Ministry interprets the situation. On the other hand, we can ask whether the fact that private sector research and development work is mainly done by engineers and technicians is an indication that there is not much need for PhD qualifications? At the moment, both the R&D investments and the need for PhDs are highly segmented and concentrated mainly to certain hi-tech fields. On the other hand, in the fields of social sciences and humanities, there is a growing concern about how their PhDs' future in the technology-driven information society will turn out. Notwithstanding the R&D increase also in the university sector, the postgraduate expansion inevitably means that a growing number of new PhDs have to break away from their traditional university and R&D employment.

The problems that PhDs encounter in the private sector are manifold. In part, they are prejudicial. Especially the SME sector sees PhDs as too theoretically oriented and lacking the required flexibility and salesmanship. In addition, PhDs are relatively old and do not have much work experience. Working in graduate schools or post-doc positions is not considered as 'real' work experience. Only large companies like Nokia or some special fields like biotechnology are able to invest in such R&D activities where also PhD qualifications can make a difference.

On the other hand, the new tripartite alliance of universities, enterprises and the State, the 'triple helix', is seen increasingly important in facilitating the science-based economic growth, and in Finland the increase in the number of technology centres and science parks has been impressive. This mode of thinking is beneficial especially for the hard sciences, in which basic and applied research can be organised according to the triple helix model. However, in the field of humanities and social sciences, anything comparable to the technology centres has not yet been established, even though there are some efforts to that direction.

Thus, for the young PhDs for whom the traditional academic career perspectives get narrower and narrower, the question is about the forms, methods and the quality of postgraduate education in connection with what is expected from PhDs in the changing labour market. Firms are not interested in formal qualifications, they are looking for transferable skills.

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Table 1. The number of Master's and Doctor's degrees between 1992-1999.

Appendix

Field of Study	1992		1993		1994		1995		1996		1997
	amount	women %	amount								
Humanities											
Master	1107	78.2	1218	79.3	1172	77.1	1233	77.1	1504	80.0	1274
Doctor	45	31.1	45	46.7	64	43.8	70	42.9	71	52.1	88
Social sciences											
Master	716	62.8	767	58.5	771	62.4	943	61.5	1013	64.6	992
Doctor	36	25.0	40	32.5	55	30.9	59	27.1	59	30.5	72
Natural sciences											
Master	852	49.2	1025	48.2	947	50.5	1006	48.7	1126	52.6	1185
Doctor	118	33.9	121	33.1	175	33.7	164	36.6	202	41.1	201
Engineering											
Master	1515	19.5	1644	20.3	1721	18.5	1891	19.9	2057	19.8	2026
Doctor	93	11.83	94	18.1	114	15.8	125	11.2	130	17.7	150
Medicine*											
Licentiate	457	64.8	517	60.2	543	62.8	390	59.0	478	67.4	505
Doctor	129	34.1	194	43.3	163	49.1	183	51.9	207	51.2	210
Other fields **											
Master	4066	60.7	4268	62.1	4461	65.1	4356	65.9	4433	65.9	4911
Doctor	106	40.6	153	40.5	127	40.2	163	42.1	182	41.2	213
TOTAL Master's degrees	8713	55.0	9439	55.1	9615	56.4	9819	56.0	10611	57.5	10893
TOTAL Doctor's degrees	527	30.6	647	36.6	698	36.2	765	37.1	851	40.2	934

* in Medicine the basic degree, equivalent to Master's degree in other fields, is Licentiate

** including Agriculture and Forestry, Arts, Dentistry, Economics, Educational sciences, Health sciences, Law, Pharmacy, Psychology, Sport sciences, Theology, Veterinary medicine

Source: KOTA

6 Flanders

Jef C. Verhoeven & Kurt De Wit

6.1 Introduction

In the debate on academic staff in Flemish universities, four issues are central. First, there is not much flexibility in the managing of human resources and this for two reasons. On the one hand, the unit of resource in universities is being squeezed. Because of real cutbacks in spending and increasing student numbers, universities have to provide more teaching and research with less resources. Universities are trying to expand their research capacities relying on external research money, but this new money only provides them with the opportunity to increase their junior staff, not their senior staff. On the other hand, senior academic staff at universities have permanent contracts. With an ageing academic staff, there will be many retirements in the next few years and this will offer new job opportunities to younger academics, but some policy-makers consider this process to be too slow. Consequently, proposals for premature early retirements have been discussed and, though not acted upon generally, some universities have encouraged those over 60 to retire and have provided them with full pensions.

Second, the introduction of quality assurance systems in universities since 1991 had a double effect. There is not much doubt that these new systems have improved teaching performance, even though there are some signs of evaluation fatigue. But some argue that this new system of quality management interferes with academic freedom and distracts academics from their real work, namely teaching and research.

Third, on the PhD level, the effect of postgraduate research training is still unclear. Postgraduate research training in Belgium is a rather recent phenomenon. Although research became increasingly important for universities since the 1970s, it lasted until the 1990s before the legislator created the legal basis for the organisation of this training. From 1994 on, science policy makers have stressed that this training programme would become legally obliged. To the present moment, however, it is the autonomous decision of each university whether to oblige postgraduate students to attend a training programme or to leave it to their own choice to attend some seminars, courses, conferences, etc.

Last, filling in vacancies for research positions at universities (both PhD positions and other) is becoming increasingly difficult. The unpublished results of a research project currently being carried out by the authors show that about one third of the heads of research units often or always has problems with finding candidates for vacancies. This problem in particular arises in the field of applied sciences (i.e. engineering).

6.2 Higher education and the academic career

Flanders has a binary higher education system, consisting of universities on the one hand and colleges of higher education (*hogescholen*) on the other. The missions of these two forms of higher education differ, but when it comes to the education they provide, the distinction is not always clear. One major divergence, however, is that only universities can grant PhDs. Therefore, this text only regards universities.

All universities, whether private or public, have a recognised legal status and receive grants according to their functions and number of students. Universities are autonomous in the ways in which they are managed, although within the limits laid down in laws and decrees. The Flemish government determines the fields of study and the degrees an institution may

provide, and the quality assurance system. State officials control whether institutions meet these prescriptions and their legal obligations.

Academic education consists of:

1) Academic training courses.

University education follows after secondary education and is organised in two cycles. The first cycle takes two or three years, depending on the subject, and leads to the degree of *candidate*. The second cycle, which lasts two to four years, leads to the diploma of *licentiate* (with the exception of doctors, vets, pharmacists, and civil engineers, who receive the title of that profession) which is a qualification for either employment outside the university or for working on a PhD or research within a university. Each licentiate has to write a thesis proving that he or she is able to do research.

2) Continuing academic training courses.

These enclose:

- supplementary and specialising training courses (programmes intended for students who have successfully completed their second cycle, and which cover subjects from other basic academic fields or a specialisation in a specific sub-field respectively);
- teacher training;
- postgraduate research training (doctoral training courses); universities can only offer postgraduate research training and award the academic degree of "Doctor" in those scientific fields they offer at the level of academic training courses.

3) Post-academic training.

The staff of universities can roughly be divided into three categories: independent academic personnel (ZAP or *zelfstandig academisch personeel*), auxiliary academic personnel (AAP or *assisterend academisch personeel*), and support staff (ATP or *administratief en technisch personeel*). In each group, different ranks are distinguishable (see above). Staff may have permanent or temporary appointments and may be full-time or part-time employees. Full-time ZAP has permanent appointments but this is not the case for AAP. In public universities, the staff are civil servants. Private universities are obliged by law to give the same legal rights to their staff.

6.3 The career perspectives of the PhD candidate

Size and composition

Qualifications obtained in the HE system

Students who successfully complete the two cycles of an academic training course, i.e. after four to seven years of study, are generally awarded their *licentiate* diploma (see also below).

However, several programmes lead to titles like 'Physician' (medical practitioner), 'Veterinarian', 'Dentist', 'Pharmacist', 'Civil Engineer', or 'Civil Engineer-Architect'.

The degree of *doctor* can only be obtained by defending a dissertation at least two years after obtaining one of the diplomas just mentioned, or a diploma that is accepted as equivalent (see below).

Doctorates awarded by subject area

In table 6.1, and more detailed in the annex, we present the number of doctorates awarded in Flemish universities, broken down by field of study, nationality, and sex.

Table 6.1: Number of doctorates awarded in Flemish universities (1992-1998)

	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998
total number PhDs	514	596	586	598	580	672
% soc/humanities	21.8	21.6	23.9	23.4	21.9	20.8
% natural sciences	63.8	60.6	55.5	62.9	62.1	56.9
% medical sciences	14.4	17.8	20.7	13.7	16.0	22.3
% female	27.2	28.5	29.2	31.4	32.6	33.2
% foreign	19.5	27.4	26.5	27.3	26.9	26.8

Source: Vlaamse Interuniversitaire Raad

Study area

The figures clearly show the large proportion of PhDs awarded in the exact sciences, fluctuating as they do around 60% of all PhDs every year. The number of PhDs in the medical sciences varies considerably from year to year, but was never higher than 22% (academic year 1997-1998). Taking into account that almost all of these PhDs are granted in the field of medicine, this too is a high proportion. By contrast, in other fields of the biomedical sciences (dentistry, veterinary science, ...) and in the humanities, only a small group earns a PhD.

Next to the AAP, there is also a limited number of positions for doctoral students financed by research funds (see below). For example, the FWO finances some 150 PhD students per year. The figures regarding these students globally show the same trends as those concerning the AAP. Most grants are awarded in the field of the exact sciences.

Percentage male/female PhD students

Whereas the male/female ratio among first and second cycle students is about 50/50, only 33% of all doctor's degrees are awarded to women. There are, however, major differences between fields of study. In science, for instance, 31% of the PhDs are women, whereas in language and literature this figure is 70%, and in applied sciences only 10%. Moreover, we notice a slow but consistent improvement in the proportion of women finishing their PhD (from 27% in 1992-93 to 33% in 1997-98). This positive trend does not (yet?) continue regarding the appointment in the permanent staff of universities, especially in the higher ranks.

Percentage of foreign PhDs

About 27% of the PhDs are awarded to foreigners, which is a rather high proportion. Most of them are granted in the fields of the sciences, applied sciences, and applied biological sciences: together they provide 56% of the PhDs granted to foreign students. A high share of foreign students is also found in theology and canon law (a specific field of study offered at K.U.Leuven), and in medicine (where most foreign students are Dutch).

Volume of doctoral candidates and percentage enrolling in a PhD project

Figures about the volume of doctoral candidates and the percentage of students enrolling in a PhD project after obtaining their first degree, are not available for the Flemish situation. As a

rough indicator, we can compare the number of AAP with the yearly number of graduates in academic training courses. We have to stress, however, that these figures are not the same as the number of people actually enrolling in a PhD project or a doctoral programme. Not all assistants, although legally a large part of their working time should be spent working for their PhD, are making a PhD, and this is also the case for the grant holders. Moreover, in some faculties researchers working for contract research also work for a PhD.

Table 6.2: Number of AAP in Flemish universities (1992-1999)

	1991-1992	1993-1994	1995-1996	1997-1998
Number of 2nd cycle graduates	7,223	7,392	8,230	8,631
Number of AAP (FTE)	1,592 (1992)	1,597.6 (94)	1,687.45 (96)	1,712.43 (99)
Ratio AAP / graduates	22.0%	21.6%	20.5%	19.8%

Source: Vlaamse Interuniversitaire Raad

Selection mechanism used to select PhDs

Besides the requirement of a second cycle academic qualification or equivalent⁸, the rules of acceptance are determined by the university. In general no extra conditions are imposed, but for instance at K.U.Leuven, students have to earn at least two times *cum laude* at the end of a year during the licentiate training in order to get access to the doctoral training programme.

Next to these requirements, a student is allowed to work for a PhD only when he or she has written a proposal and defended it for a jury of professors of the university. The defence of the doctoral thesis also takes place in front of a jury composed of professors, but this jury is sometimes larger than the committee of admittance and in some universities professors of another university participate.

Before the university decree of 1991, a dissertation, based on independent scientific research, supervised by a director and publicly defended, was the only condition to gain a PhD (i.e. 'learning by doing' model). Since the decree, each university may organise doctoral studies equivalent to one year of study and oblige PhD students to follow a training programme, i.e. gain credits by choosing from an offer of courses, seminars, conferences, summer schools, etc., before defending the dissertation. When students have a certificate of a doctoral training programme, they are counted twice for the financing of the faculty. Until now each university follows its own rules concerning the doctoral training. For example at K.U.Leuven the doctoral training programme is obliged to all new PhD students since 1994, although the design of the programme was left open to the faculties.

Finance

Salary structure of PhDs

The pay scales for AAP are determined by decree or by decision of the Flemish government, and are adapted regularly to the rise of the index of the cost of living. The salaries of those working with a research grant of the university or another institution (see below), are comparable, although the terms of employment differ. For example, grants are not considered to be wages in the income tax regulations.

⁸ Equivalent are: 1) a degree of graduate engineer-polytechnician / licentiate granted by the Royal Military Academy; 2) a licentiate diploma in commercial sciences or commercial engineering granted by a college (each university or even faculty can define entrance conditions for graduates from colleges with other diplomas); and 3) a diploma of a foreign university or other institution of higher education, if the university board accepts its equivalence. Sometimes, holders of such a diploma need to pass an entrance examination (doctum colloquium).

Table 6.3: Salary structure of AAP in Flemish universities (in BEF)

	gross monthly salary		net monthly salary	
	begin of career	end of career	begin of career	end of career
Research assistant	96,171	162,751	57,454	85,013
Doctoral assistant	119,124	185,703	67,392	93,751

Source: Academic Services, K.U.Leuven

Funding of PhD positions

Universities receive grants for their operations from the ministry. Next to this, there is also research funding, given to universities directly by the ministry or via intermediary organisations, i.e. the Scientific Research Fund (FWO or *Fonds Wetenschappelijk Onderzoek-Vlaanderen*) and the Flemish Institute for the Encouragement of Scientific-technological research in Industry (IWT or *Vlaams Instituut voor de bevordering van het wetenschappelijk-technologisch onderzoek in de industrie*). This explains why PhDs in Belgium can be financed in different ways. We give a brief outline of the most important financial categories.

A first category consists of university assistants. Each university / faculty has a fixed amount of positions for assistants, depending on the number of undergraduate students. An assistant is appointed for two years, and the appointment may be renewed twice (total duration: six years).

A second way of financing is provided by grants from research foundations. These scientific organisations outside the university are funding agencies for doctoral students. Every student who wants to make a PhD, can apply if he/she is less than 30 years old and if his/her seniority does not exceed 2 years. However, there are severe selection criteria (for example, an excellent study career) and the number of positions is small. Though they get paid by these organisations, these students are located in the universities.

Third, all graduates, on the condition of finding a supervisor (promotor) for their project and if they had an excellent undergraduate career, are allowed to the PhD programme. In this case, the PhD student is not paid for making his/her doctorate. Students with a job outside the university sometimes choose this track.

Most PhD students are appointed at a university as an assistant or got a grant from other scientific organisations. Both categories are legally employed (no student status). Those who finance a project themselves are a minority. Besides these categories, a lot of people are doing contract-research at a university (subsidised by federal or regional authorities, or by private companies) but most of them do not make a PhD because this job is part of a commission which is the responsibility of the professor.

Leaving the doctoral system

Time to degree

Although there is not a fixed amount of time in which to degree, most students finish their PhD project -if they finish it- within the time foreseen for their mandate. This means that students working for a PhD in an AAP position theoretically have six years at their disposal. An AAP position does not, however, allow to work on a PhD full time, since it may include up to 1/3 of other tasks (teaching, service provision) as well. PhD positions funded by

scientific research funds mostly last four years. The amount of time not available for working on the PhD is limited in this case to 10%.

Average PhD promotion age

Most students enrol in university education immediately after completing secondary education, that is generally at age 18 (end of compulsory schooling). Starting to work for a PhD, or at least taking up a position that should lead to a PhD, often begins right after graduating from an academic training course. Depending on the course, which can last four to seven years, students enrolling in a PhD project are thus 22 to 25 years old. The median for graduating from university education is 23. As mentioned earlier, the time to degree can be taken to be four or six years. That brings the expected PhD promotion age between 26 and 31.

Percentage of PhD students continuing an academic career / in business

An appointment in a permanent position at a university is not straightforward for PhD students. An exploratory research project at K.U.Leuven showed that in the period 1991-1995 of 14,480 second cycle graduates in the preceding five years, 933 started in a position at the university which could lead to a PhD, 336 finished their PhD project, and 117 were appointed at the university, but only 25 in a permanent (ZAP) position. At all these levels, women are less represented. There are also differences between the fields of study.

In other words, only a small proportion of PhD graduates (let alone people starting in a PhD position) continues an academic career. This situation is very much the same in all Flemish universities. At least partially this can be explained by the lack of flexibility in the managing of human resources at universities, which we mentioned in the introduction. The academic career is somewhat losing its attractiveness because of the restricted number of vacancies for permanent positions and the uncertainties attached to the (also limited number of) temporary positions.

Perspective for PhD students having completed the dissertation

Completing a doctoral dissertation does not automatically give perspective on continuing an academic career. There is the limited number of vacancies (see above). During the last decades the academic profession gradually lost its independence. In some disciplines (for example medicine, engineering, economics) it has to compete with more rewarding professional opportunities. As mentioned in the introduction, this has led to difficulties for recruiting researchers, especially in the field of engineering.

Nevertheless, many young researchers still consider the academic profession offering more opportunities to conduct independently scientific research than other positions do. Moreover, the academic profession still enjoys a social recognition in society as provider of valuable knowledge useful for policy, economics, culture, and industry. An indicator of this may be found in the growing amount of contract research commissioned by foundations and industry. More than in the past, the organisation of universities puts pressure on the academic profession. Universities developed to organisations having to compete with other similar, but also different, organisations (for example non-university research units), nationally and internationally. Effectiveness of teaching and research became more important than ever, and higher education institutions want to know where they are in this competition. When an

academic professional was before more an independent entrepreneur, he or she has to perform now within the structure of the department, the faculty, and the university, which means more social control and more accountability. This certainly contributes to the development of the academic professional into the direction of a member of a team and/or the leader of a team than to an independent researcher.

6.4 The career perspectives of the academic

Rank structure

The career line of the academics is stipulated by decree. The occupational grades are:

- AAP - *assistent* (research assistant)
- *doctor-assistent* (doctoral research assistant)
- ZAP - *docent* (lecturer)
- *hoofddocent* (senior lecturer)
- *hoogleraar* (professor)
- *gewoon / buitengewoon hoogleraar* (ordinary / extraordinary professor⁹)

University boards have to determine annually the number of staff members per teaching grade. They have to maintain control over their staffing levels within their budgetary limits. The basic principle is that a number of points or units are allotted to each faculty depending on the number of students and the nature of the faculty (humanities, sciences, etc.). Each faculty then appoints academic staff on the basis of its point allocation, with a specific point weighting for each grade. Staff-students ratios therefore differ from university to university and faculty to faculty.

Transition from one rank to another

A PhD is required for all posts, except research assistant. Most institutions also take other requirements into account in recruiting staff, although these are not compulsory. Appointment as a research assistant, for example, is only granted to candidates who have achieved excellent marks during their undergraduate training.

Once someone has a ZAP-position other criteria, besides that of a diploma, determine promotion. Taking K.U.Leuven as an example, the criteria are explicitly set out within university regulations. Those seeking to become lecturers must, on the basis of their prior achievements, be able to demonstrate that they will be able to engage in effective research and use good teaching skills. Individuals wanting to become senior lecturers must have proven research records and be effective teachers. Indicators include publications, participating in conferences, being members of editorial boards and attending relevant training courses. Those promoted to professor are expected to be creative and productive researchers (indicators include heading research projects and acquiring research funding), be effective teachers and have broad educational experience. To become ordinary or extraordinary professors, candidates must be first-rate researchers with national or international reputations in their academic discipline.

As educationalists, they are expected to have the necessary didactic skills, broad educational experience and leadership qualities.

⁹ An extraordinary professor is an ordinary professor with a part-time mandate.

The Flemish legislature has made universities responsible for determining seniority conditions for appointment to a given ZAP-rank. Academic staff almost invariably start as lecturers. To become an ordinary or full professor, staff has to proceed through these grades, although it is possible (but does not happen often) to omit some stages.

Though procedures for promoting academic staff differ from one institution to another, most procedures are similar. Assessment committees at departmental and/or faculty level evaluate applications for appointments and promotions. Dossiers for candidature or curriculum vitae are essentially extended letters of application, filled in and documented by candidates. They include achievements in the field of research, teaching and professional activities. At some universities, it also includes assessments of the candidate's teaching capacities by students. The final decision is taken at central university levels.

AAP is appointed for two years. This can be renewed twice, except for doctoral research assistants whose employment may be extended by a maximum of one year. The group of AAP has a large group of temporary research assistants and a small group of temporary doctoral assistants. Members of ZAP are permanently appointed. If they do not meet the conditions for promotion, they stay in their existing rank whilst retaining a permanent appointment (except for extraordinary professors). Retirement normally takes place at 65 but, depending on the circumstances, it may be granted at 60.

Salaries

Contractually, academics are employees in private universities or a sort of civil servants in public universities. University staff is paid by the universities.

There are different pay scales and pay rates for the different ranks of the academic staff. These scales are determined by decree or by decision of the Flemish government, and are regularly adapted to the rise of the index of the cost of living according to the regulations for all public servants. In each academic rank, salaries rise every two years until the highest salary is attained (depending on the rank, after 18 to 25 years working in a rank). In principle, universities can, in addition, reward some staff for special achievements but up till now no university has applied this principle.

Table 6.4: *Salary structure of ZAP in Flemish universities (in BEF)*

	gross monthly salary		net monthly salary	
	begin of career	end of career	begin of career	end of career
lecturer	122,585	180,695	69,507	93,596
Senior lecturer	140,376	220,528	77,138	109,138
professor	164,361	250,889	87,107	120,282
Ordinary professor	184,096	281,249	94,955	131,400

Source: Academic Services, K.U.Leuven

Comparison with business

When comparing the career perspective of the academic with the possible careers in business, we first must point out the difficulty of talking about 'the' business career. Unlike the academic career, which is rather stable and known beforehand, business allows for many career patterns to be followed. These depend on the business sector, but also on the person's diploma, and of course on other factors like his or her personal interests and capacities.

On the level of second cycle diplomas, the ones offering the best career opportunities nowadays are in the fields of computer science, chemistry, business economics, and applied sciences. Less prospects are offered by courses in history, philosophy, geography, and veterinary science. However, all university courses offer good job possibilities.

On the level of the PhD diploma, its impact on the career differs according to the field of study. In a previous section, we noticed the overwhelming achievement of science graduates as far as PhDs is concerned. This is even more stressed when we compare the proportion of the PhDs with the proportion of FTE assistant position in the sciences. Although in the sciences less assistant positions are available than in the humanities, they attain more PhDs per year. These findings point out the importance of a PhD in these fields of study for research in universities and industry.

6.5 Conclusion

One of the most important developments concerning postgraduate research training at this moment is the shift towards a doctoral training programme. Universities have a legal base for this programme. According to the law the Dutch-speaking universities are supposed to organise a training programme of no less than 1500 and no more than 1800 hours of study or other related activities, but they are free to determine the content of the programme. Universities have special training programmes for their PhD students. This shift from a learning-by-doing model, where the individual relation with the supervisor was essential, towards a formal training programme attended by all PhD students, is a consequence of the international development towards *graduate schools*. However, most universities are still in a transitional period. The first steps have been taken but until now the doctoral training has not the same structure as a graduate school.

It is too soon to assess the contribution of this doctoral programmes to the development of the numbers of awarded PhDs. Until now the number of Doctor's degrees awarded is rather low, certainly in the humanities. Science and applied science have more resources to encourage doctoral work, and probably a PhD in these fields enjoys more recognition on the labour market than in the other fields of study. We may conclude that making a PhD in Flanders, still is an occupation restricted to a very small group of second-cycle graduates. Strict access conditions, and a limited amount of positions prevent high numbers of participation. Moreover, there is almost no tradition to work for a PhD, when the candidate cannot rely on a salary as an assistant or a scholarship provided by one of the scientific funds.

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Appendix

Number of doctorates awarded in Flemish universities, broken down by subject area, nationality, and sex (1992-1998)

	1992-1993				1993-1994				1994-1995				1995-1996				1996-1997				1997-	
	B		foreign		B		Foreign		B		foreign		B		foreign		B		foreign		B	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Arts	105	53	35	10	96	60	46	16	86	63	29	12	96	71	32	11	92	69	46	11	97	60
Sciences	56	9	16	-	51	6	36	4	59	8	18	1	56	9	31	4	47	8	22	2	76	7
Biological sciences	25	9	7	3	28	5	8	5	21	9	13	6	22	23	18	3	22	15	19	7	24	17
Sciences	328				361				325				376				360				38	
Medicine	26	17	3	3	56	16	8	2	57	17	17	6	27	12	8	7	30	19	10	5	60	21
Law	2	-	-	-	-	2	-	-	-	-	-	-	3	-	-	-	-	-	1	-	1	1
Science	3	-	-	-	2	-	2	-	3	1	-	-	1	2	1	-	2	1	-	-	1	5
Political sc.	10	7	3	-	9	7	2	-	5	10	2	3	6	8	3	4	6	12	5	2	6	14
Sciences	74				106				121				82				93				15	
Psychology	5	-	4	1	2	-	5	1	6	-	5	1	5	-	3	-	6	2	7	0	3	1
Sociology	2	-	2	2	5	1	8	-	3	1	14	1	1	1	15	-	3	1	10	-	3	1
Literature	10	8	2	-	9	10	2	2	10	6	3	3	4	4	4	4	13	6	1	1	5	13
History	5	2	-	-	4	3	-	2	2	-	-	-	6	1	-	-	3	-	2	-	6	-
Biology	3	1	1	1	2	1	-	-	6	1	-	-	5	2	-	-	4	3	-	-	4	3
Law	13	4	1	-	5	3	1	-	6	4	2	1	13	2	2	-	11	2	2	-	5	6
Technology/educ.	8	2	3	1	12	9	4	2	5	4	3	1	11	5	1	1	7	9	-	-	7	8
Chemistry	12	1	-	-	8	1	-	1	9	3	6	-	9	3	1	1	7	3	-	-	5	6
Sciences	3	1	-	-	5	4	1	1	7	2	1	1	7	3	4	-	7	1	-	1	5	3
Health sc.	1	1	-	-	-	-	-	-	1	-	1	-	1	4	-	-	-	1	1	-	2	1
Education	2	1	1	-	2	2	1	1	3	1	-	-	3	1	2	1	2	7	-	-	6	4
Studies	4	3	1	-	5	2	1	1	7	5	5	-	7	1	2	-	2	1	1	-	3	2
	112				129				140				140				127				14	
Totals	295	119	79	21	301	132	125	38	296	135	119	36	283	152	127	36	264	160	127	29	319	173
Total	514				596				586				598				580				67	

7 Germany

Jürgen Enders

7.1 Introduction

During the last years, the traditional system of higher education in Germany has become under increasing pressure among politicians and public debate, because of its perceived outdated, and inefficient structure. Like in many other industrial countries, massification on the one hand and budget cuts on the other hand have put the system under strain. The trend towards a knowledge society is paradoxically combined with a loss of social exclusiveness for the academic profession. Demands for accountability and control are growing as well as expectations for usefulness, effectiveness and transmission of academic work. Furthermore, the perceived rigidities of a highly homogenous higher education system that is traditionally driven by dense governmental regulations are under debate. Lack of differentiation and competition within higher education, inflexibilities of the current system of public financing and regulation, and perceived problems of international competitiveness are on the agenda of higher education reform. The conditions of academic staff and the civil service structure of academic employment are among the most prominent issues raised in this context. Three areas of special concern can be distinguished:

- The rather loosely organised character of doctoral training, the problems of financing and supervision of doctoral staff, and the difficulties to fill up vacancies for doctoral staff in engineering and some sciences;
- the long and risky nature of academic careers from the post-doctoral stage to a professorship, the dependency of post-docs on professors, and the virtues and plights of the Habilitation;
- the high degree of autonomy of the professoriate, the rigidities of the civil service nature of their contracts, and the lack of performance-related measurements in this career stage.

7.2 Higher education and the academic career

The role and conditions of academic staff and the structure of academic careers are in many respects crucial for the shape and institutional pattern of higher education in Germany. Attempts for the reform of the overall structure of higher education are thus intertwined with changes as regards the academic career ladder, the employment relationships and the conditions of academic staff that are more and more seen as a tool for change. Four major characteristics of the positioning and role of academic staff can be distinguished: a strong connection of the academic estate to the state; an appointment system counterbalancing institutional hierarchies and encouraging a rather cosmopolitan orientation of professors; an in-built gap between professorial and all other, so-called non-professorial staff; and a high in-career selectivity after the PhD that is supposed to serve a variety of labour markets outside higher education as well:

- First, the German professor occupying the top position in universities and being a civil servant, the so-called *Staatsbeamte*, is granted life-long tenure and a high degree of autonomy by the state as a special privilege. The functioning of the professoriate as ‘publicly paid private practitioners’ is thus depending on the state, at the same time reflecting and reinforcing the legitimate state influence on structure, financing, governance, and staffing in higher education.
- A second characteristic is the system of promotion and appointment for a professorial position that encourages mobility of academic staff and helps to counterbalance institutional hierarchies. The scholar’s pride therefore remains personal rather than being centered upon his university for it rests mainly on his personal achievements and promotion.
- A third characteristic is the internal division of academic staff between the professoriate and a much larger group of less privileged, mainly untenured assistants, researchers, and lecturers. The latter are usually on fixed-term contracts, academically dependent on the senior staff and serve as a flexible workforce around the core of the profession. The transition from elite to mass higher education and the increasing number of junior staff and middle rank positions in universities have highlighted this dichotomies.
- Fourth, the doctoral degree is thought of a certificate that serves not only the self-reproduction of the academic profession, but a variety of labour markets outside higher education. It is thus intended that only a minority of doctoral degree holders enter a further academic career while the majority is going for professional careers inside and outside the research system.

7.3 The career perspectives of the PhD candidate

Traditionally, there is no distinction between undergraduate and graduate studies in German higher education. The first degree conferred by universities (*Diplom, Magister or Staatsexamen*) is equivalent to the master’s degree in anglo-saxon countries, and the last two years are regarded as equivalent to the early years of graduate education in the UK or the USA. After the first degree, further studies (*weiterführende Studien*), also called graduate studies (*Graduiertenstudium*) or postgraduate studies (*postgraduale Studien*) can be pursued. We can distinguish three different types of studies after the first degree: First, an additional first degree (*Zweitstudium*); second, students can enter a broad range of specialised courses (*Zusatz-, Ergänzungs-, Aufbaustudien*); third, students can enter doctoral studies.

Doctoral degrees in Germany can only be awarded by university-type institutions in higher education (universities, technical universities, comprehensive universities). After the completion of the required first degree students can enter the rather informally organised status of a „*Doctorandus*”. University or department regulations for acceptance of a doctoral candidate may comprise additional criteria, e.g. above-average marks in the final study exam, special language proficiencies or some work experience at the university. Most doctoral candidates are selected by internal recruitment, i.e. working for their doctoral degree at the university where they received their first degree. There are no restrictions or support programmes regarding doctoral applicants on the basis of age,

gender, national minorities or foreign students. The status of a ‘*Doktorandus*’ is not linked to any kind of grant or employment contract at the university. During doctoral work candidates may interrupt or resume studies, may do work outside higher education, carry out part of their doctoral work at another university or a research institute outside higher education, either in Germany or abroad.

According to the German Science Council (Wissenschaftsrat,1995) we can estimate that about 63.000 candidates were working towards their doctoral degree in 1992:

44.000 of them, that is 70 percent of the overall population of doctoral candidates, were employed as junior staff at universities on respective posts of the institution budgeted by the federal states (*Länder*) or financed by research grants. There are huge differences between the disciplines as regards the use of research grants in this area as well as employment conditions (duration of the limited contract; full-time/part-time contracts; income) of the so-called doctoral staff. They can be explained by factors such as the degree of competition of the universities with the labour market outside higher education and the huge differences between the disciplines as regards the demand among the graduates for doctoral positions (Enders, 1996).

Another 8.500 (14 %) of the 63.000 candidates in 1992 was financed by grants offered by the federal states, (2.500 funded by the *Graduiertenförderung*), by the German Science Foundation (2.300 funded by the *Deutsche Forschungsgemeinschaft* for the *Graduiertenkollegs*)¹⁰ and by organisations promoting the most able (2.700 funded by various *Begabtenförderungswerke*). Most of these grants impose age limits for the applicants. The grants are given solely for the work on the doctoral thesis and are usually awarded for two years with the possibility of a prolongation for another year. Grants are financially far less attractive than, at least, full-time contracts as doctoral staff and – given a duration of 4 - 6 years of the work on the doctoral thesis – do not cover the length of this period.

Contracts for doctoral staff are furthermore provided by public financed research institutions outside higher education, like the *Max-Planck-Institute* or *Fraunhofer Institute*. Another estimated 4.500 doctoral candidates (7 percent) held such contracts in 1992 that are usually funded for a period of three years.

About 5.000 - 6.000 doctoral candidates (10 percent) are believed to work on their thesis without any special funding. They might finance themselves by working outside higher education and public financed research institutes, perhaps receive financial support for being unemployed or might be financed by their families.

The overall number of doctoral degrees awarded in Germany in 1998 was about 24.900 (new *Bundesländer* included). Nearly one third of these doctoral degrees was awarded each in medicine (36 %) and in the natural sciences (31 %), about another 10 percent was awarded each in law/economics/social sciences, in engineering and the humanities.

All in all, one third of the doctoral degrees were awarded to women (compared to an about 50 percent participation rate of women among first year students). Traditionally, we find huge differences across and within disciplinary groups reflecting patterns of self-

¹⁰ Actually, about 10 percent of doctoral candidates are estimated to be integrated into a ‘*Graduiertenkolleg*’.

selection of female students in their choice of the field of study as well as reflecting the degree of closure within the disciplines as regards the further educational career of women. Participation rate of women is lowest in engineering (4 %), with civil engineering and architecture ranging above the average, both technical disciplines that can attract women with a semi-professional background working as technical assistants for civil engineers and architects. The highest participation rate of women can be found in arts (53 %), in medicine (39 %) and in the humanities (40 %).

Compared to some other EU countries and especially compared to the U.S., Germany has a relatively low participation rate of foreign graduates among the doctoral degrees awarded: In 1996 about 7 percent of the doctoral degrees were awarded to citizens of foreign countries. The relatively low degree of foreigners among doctoral degrees and first degrees is often seen as an indicator for the low attractiveness and international competitiveness of the organisation and structure of German higher education. It remains, however, unclear to what extent other factors come into play, i.e. language proficiencies of foreign students in German compared to the new *lingua franca* English, special regional (and historical colonial) affiliation between the host country and the home country of the students.

A further look on the quantitative development in the area of doctoral degrees in Germany shows that the overall number of doctoral degrees awarded increased between 1980 and 1992 from about 11.300 to 18.700 (only German citizens in the old *Bundesländer*), that is an increase of 65 percent. From 1993 to 1998 the overall number of doctoral degrees awarded increased from about 20.900 to 24.800, that is an increase of 19 percent (German and foreign citizens in the old and new *Bundesländer* included). The development of the overall doctoral quota – that is the percentage of the doctoral degrees among first degrees awarded at universities four years earlier – shows, however, that this expansion by numbers is clearly an effect of the overall expansion of higher education. If we take a closer look at the disciplinary groups and disciplines, we find that the doctoral quota is highest in medicine (64 %), followed by the natural sciences (42 %); a far lower doctoral quota can be found in the humanities (15 %), engineering (16 %), the social sciences (18 %), law (13 %) and economics (8 %).

The average age at doctoral degree has constantly increased from 31.2 years in 1980 to 31.8 years in 1992¹¹. Average age was highest in the humanities (34.8 years) followed by engineering (33.2 years), social sciences/law/economics (32.2 years). It was lowest in the sciences (31.3 years) and medicine (31.0 years). First results of an ongoing research project on “Training and Career of Doctoral Degree Holders” (Enders and Bornmann 2001) show that growing age at the PhD is only partly due to a growing time-to-degree in this stage of the life course; other factors like growing age while finishing secondary school, growing proportion of youngsters going for a vocational training before starting undergraduate studies, prolongation of undergraduate studies, have to be taken into consideration as well.

¹¹ Official statistics show age at time of degree until 1992 only. no information on time-to-degree is available from these sources.

Until the eighties, doctoral training was rarely an explicit concern of policy-makers or university administrators in Germany. Doctoral training tended to be regarded as the more or less unplanned outcome of a composite mix of higher education policy and science policy. Overall research support for universities as well as special research and science programmes initiated by the state and/or the science organisation were mainly thought of as instruments of science policy neglecting their direct or indirect impact on junior researchers training and career. Everything else was more or less seen as an 'internal affair' lying in the responsibility of the disciplines and the individual professors. Recent attempts to initiate explicit policies for doctoral training show that the scenery has changed in the meantime. The discussion started in Germany in the 1980s with the perception of an incredible length of this qualification period and the growing age of doctoral degree recipients and focussed in the eighties mainly on problems of finance and status. (Holtkamp, *et al.*, 1986; Enders, 1990) At the end of the eighties the focus of the debates turned from these employment aspects to questions of guidance and training of doctoral staff (Enders, 1996). The major outcome of these debates was the establishment of a new public financed model of research training that tries to bridge the gap between the problems of status and training of doctoral candidates: the graduate colleges (*Graduiertenkollegs*) established in 1990 by the German Science Foundation (Deutsche Forschungsgemeinschaft, 1990).

As regards the further career of PhD holders, conventional wisdom and traditional expectations tend to underline that Germany belongs to those countries where the doctoral degree has not only a relatively high prestige within society but a relatively high value on the overall labour market. First results of the above mentioned study¹² (Enders and Bornmann, 2001) show that the doctoral degree serves many masters, among them the self-reproduction of the academic profession; the research function in the private sector as well as in the public sector outside higher education; the professions and semi-professions; leadership in governmental, administrative and private organisations; the 'educated elites' or 'Intelligentsia'. The study underlines huge differences in further careers by discipline. While only a minority of PhD holders is in the long run staying within academe (depending on the discipline between 20 % and 40 %) most of them find employment outside higher education in the research sector (between 10 % and 40 %) or in business, government, non-profit organisations (BGN) (between 30 % and 70 %). The labour market affiliations of the disciplines and the outcomes of the PhD on the labour market are surprisingly stable and there are little signs for a dramatic change during the last two decades. The study furthermore shows that the PhD holders with careers in BGN - that is outside higher education and the research sector - perceive this not as a

¹² The aim of this study financed by the German Research Foundation is not only to gather empirical information on these issues but to analyse the status of the doctoral degree in the framework of the relationship between higher education and the world of work. The study is mainly based on a questionnaire survey among 2.300 doctoral degree holders in six selected disciplines (biology, economics, electrical engineering, German studies, mathematics and social sciences). In order to analyse changes over time three different cohorts of doctoral degree holders (1980/1985/1990) in these disciplines were surveyed. In order to analyse the impact of the doctoral degree in the professional career of academics another questionnaire survey was undertaken among a comparison group of university graduates (without a doctoral degree) in the six selected disciplines from two selected cohorts.

professional accident or failure. Job satisfaction is, however, highest among those who enter an academic career.

A rather new problem are the emerging difficulties to fill up the vacancies of doctoral training and research positions in some disciplines in engineering and the sciences (see DFG 2000). On the one hand, numbers of young people choosing these disciplines in secondary school and as a field of study in higher education have declined and this is nowadays affecting the postgraduate stage. Problems on the labour market in these fields during the nineties might have contributed to this trend, but a shift in the orientation and value judgement of young people has to be taken into consideration as well. On the other hand, attractiveness of going for another qualification period in higher education is nowadays challenged by growing career expectations in the private sector in selected disciplines.

7.4 The career perspectives of the academic

At present, the academic staff can be mainly divided into the professorial positions and the sub-professorial staff. The professors institutional power, prestige, and autonomy is very high; and this characterizes the relation between professors and non-professors in German higher education in many ways (Enders 2000). Except for the teaching load that differs by type of institution (university professors have a teaching load of eight semester hours per week and professors at universities of applied sciences one of sixteen to eighteen hours per week) there is no clear prescription defining the duties and tasks of professors, their time budget or the amount of time they have to be present on campus. The formal description of the professoriate is uniform, but the internal division in three salary categories, that are named by the acronym of their salary level as C2-professors, C3-professors and C4-professors, divides them in practice. There is not only a hierarchy of incomes between these levels of professorial positions but one of available resources and prestige as well with the C4-professors at the top level. At universities of applied sciences the professoriate is divided into C2- and C3-positions, at universities all three positions can be found.

Recent surveys show that the majority of professors regard their salaries as quite fair (cf. Enders and Teichler, 1995a), although salaries in comparable positions in private business are considerably higher. Basic salary for C2-professor varies, depending on age, between DM 4,600 and DM 8,200 (approx. \$ 2,300 - 4,100), for a C3-professor between DM 5,100 and DM 9,200 (approx. \$ 2,550 - 4,600), and for a C4-professors between DM 6,500 and DM 10,600 (approx. \$ 3,250 - 5,300¹³) per month before taxes. Added to this are supplements depending on the size of the persons family, varying between DM 100 and DM 800 (approx. \$ 50 - 400). In the first half of the 1990s (Enders and Teichler, 1995a: 80-82), the reported annual *grosse* income of professors at universities was less than DM 100,000 (< approx. \$ 50,000) for 26% of them, between DM 100,000 and DM 119,999 (approx. \$ 50,000 - 60,000) for 32%, between DM 120,000 and DM 139,999

¹³ Estimations in US \$ are based on an exchange rate of 2 DM = 1 \$.

(approx. \$ 60,000 - 70,000) for 16%, and DM 140,000 and higher (> approx. \$ 70,000) for 18%.

At the universities of applied sciences, professors yearly income was less than DM 80,000 (< approx. \$ 40,000) for 18%, between DM 80,000 and DM 99,999 (approx. \$ 40,000 - 50,000) for 35%, between DM 100,000 and DM 119,999 (approx. \$ 50,000 - 60,000) for 34%, and DM 120,000 and higher (> approx. \$ 60,000) for 14%.

It must also be taken into account that professors, as public servants, benefit from abundant old age pensions and special regulations as regards social security insurance. C3-professors at universities often apply for C4-professorships. If they are successful, they improve their salary as well as their resources for teaching and research. A C4-professor cannot reach any higher formal status. However, for each offer of a C4-professorship at another university he gets an automatic increase of his salaries of about 1,000 DM (approx. \$ 500) before taxes - if he accepts the offer, on his new professorship, if not, on his old one. In addition, he can bargain for more resources – for instance, another established post for a scientific collaborator or expensive laboratory equipment. After the offer of a C4-professorship scholars cannot apply for another professorship for the following three years.

The institutional division of the higher education system in Germany has clear effects on the structure of academic staff. Since the universities of applied sciences have no right to qualify graduates for and grant them a doctoral degree and are mainly engaged in undergraduate teaching with little possibilities for research in the applied fields (and almost none for basic research), only a very small proportion of sub-professorial positions are established at these institutions to support research and teaching. In contrast, in universities only around 30% of the established positions are those of professors and around 70% of sub-professorial staff. Actual proportion of non-professorial staff even amounts 80% of all regular academic staff due to part-time employment and research contracts financed by external sources. The vast majority of around 90 percent of the non-professorial staff are employed on the basis of fixed-term contracts. All in all, about three fourth of regular academic staff in universities are non-professorial staff with limited contracts while one fourth are professors and middle-rank academics having unlimited contracts as civil servants or public employees. Among these non-professorial staff is a large number of so-called doctoral staff (see chapter 3), the vast majority of non-professorial post-docs is, however, employed as fixed-term staff as well. In the first half of the 1990s (Enders and Teichler, 1995: 83), the yearly income before taxes of non-professorial staff on full-time contracts was in the first half of the nineties less than DM 60,000 (< approx. \$ 30,000) for 23% of them, between DM 60,000 and DM 79,999 (approx. \$ 30,000 - 40,000) for 54%, and DM 80,000 and higher (> approx. \$ 40,000) for 18%.

The post-doctoral academic career in German universities encompasses mainly three events: (1) obtaining the position of an assistant, a similar temporary employment or a post-doctoral fellowship for preparing the *Habilitation*; (2) the granting of the *Habilitation* and the following limbo-status of a private lecturer (*Privatdozent*), which gives the right to perform the task of a professor but is an informal status not combined with an employment decision;

(3) the appointment to a professorship, as the result of a successful outcome of a competition with other candidates for the available position¹⁴.

When a professorial position has to be filled an appointment procedure will start that is determined by various strict regulations set by the government. These tend to prove the scholarly qualifications of different candidates for the vacant position as well as to prevent any parochial promotion¹⁵.

While the outcomes of the *Habilitation* in terms of further promotion are open, the routes to reach the formal and informal qualifications for a professorship are as well. There is a variety of career paths that might lead to a chair and no particularly dominant one. During the last decades post-doctoral assistantship positions with limited tenure have been introduced to install a kind of sequence of career steps towards the *Habilitation* and the first call. Various other options, including positions financed by research grants or fellowships, or a composite mix of all these elements, are, however, frequent.

This career structure produces a considerable number of events and procedures in which scholarly contribution and recognition of junior staff can be measured. In each step (doctoral, post-doctoral, *Habilitation*, private lecturer) new entry and exit options are given due to the contract-track nature of junior staff careers. Major career decisions are made at a relatively late point in time of an academic career. Furthermore, in the chair system the procedure of filling a vacancy is to rank a set of externally applying candidates to find the best; and not to judge an internal candidate according to a peer review by absolute standards. This may as well contribute to a high standard selection assuming that performance can be measured more accurately the longer the candidate can be observed in a competitive environment. The legal enforcement of mobility for the first professorial appointment - it is legally forbidden to promote a junior staff member to a professorial position within the same institution - furthermore contributes to a relatively high degree of institutional mobility within higher education (cf. Enders, 1998).

It is, however, not surprising that the entire logic of such a career system can produce considerable opportunity costs on the individual level as well as overhead costs on the institutional level which have led to various attempts of staff structure reform and quite controversial debates on this issue.

As regards the situation and career perspectives of post-doctoral junior staff in higher education mainly three issues have created attempts to change and reform: (1) the dependency of junior staff on the professors; (2) the long time spent in relatively unstable positions leading to a growing age of candidates for a professorship; (3) the high in-career selectivity and the insecurity as regards career outcomes.

¹⁴ The prerequisites for an appointment differ with the type of institution. At university level institutions experiences in university teaching, as a rule a doctoral degree that indicates high competencies in research and at least five years of postdoctoral research mainly indicated by the *Habilitation* are rewarded. At the universities of applied sciences the *Habilitation* is no prerequisite for an appointment, but at least three of the five years in postdoctoral professional work have to be completed outside academia.

¹⁵ The major steps of the appointment procedure are the following: a) the definition of the position, b) the announcement of the position, c) internal and external review of applying candidates, d) the selection of three candidates by the appointment commission, e) the final selection and appointment decision made by the Ministry of Education which will „call“ the candidate, f) the negotiations between the called candidate, the university and the Ministry about the salary and resources, and g) the final appointment of this candidate.

The first problem of post-doctoral career stages is a too long dependence upon their professors. What is mainly functional for doctoral students who still have to learn many teaching and research skills gradually turns into a serious problem for post-docs. The dependence is already visible in the recruitment procedures of professorial and non-professorial academic staff. While internal promotion to a professorship, in general, is not allowed, up to this point of an academic career local affiliations are rewarded and even indispensable. Promotion ladders for junior staff are thus part of the internal labor market of the respective institution while tenure decision and further career steps in the professorial career ladder are more dependent on the external labor market. In effect, the opportunities for 'sponsored' mobility in junior staff careers are evidently richer compared to career systems emphasizing 'contest'-mobility in earlier doctoral and post-doctoral career stages.

In turning to the length of time spent in post-doctoral positions and the age of eventual candidates for a professorship two effects have to be taken into consideration: First, the timing and structure of careers in a chair system tend to emphasize decisions on most important career steps at a relatively late point in the academic life course; and, second, German post-docs who aspire their *Habilitation* need too long to achieve this. On average, they are about forty when they have finished this career step and finally are private lecturers looking for a professorship - a period that might take another 2-3 years (Wissenschaftsrat, 1996: 28-31, 105).

Last but not least, the problems created by the 'all or nothing' situation faced by the aspiring candidates who have reached the prerequisites for a professoriate are on the agenda. Since internal promotion, in principle, is forbidden, private lecturers apply for an open process of selection at another university competing with other junior or senior candidates for the vacant professorship positions. Outcomes of careers are thus less predictable and less within the control of the aspiring academics, and the feeling of insecurity over consequences of performance and outcomes of action is widespread during this career stage. Low job satisfaction among non-professorial staff is therefore not surprising and is mainly linked to the lack of career prospects and dependency on professors but not as much on the contract nature of employment itself (Enders, 1996).

Some measures to speed up the academic career of post-docs and to reduce their dependency upon professors have, however, been discussed lately. Especially recommendations by the Science Council have focused on this debate (Wissenschaftsrat, 1996). A high agreement is reached that opportunities for post-docs to acquire separately budgeted funds and to manage research projects independent of their professor should be increased. There is a general agreement that the long and difficult *Habilitation* phase reduces the attractiveness of a career in academic teaching. Frequently, highly qualified young scientists and scholars turn their back on their higher education institution as soon as they are offered an interesting job in industry, or a position at a higher education institution abroad. In addition, women who wish to receive the *Habilitation* finish doing so even later than men and have serious problems to reconcile a family with their profession - one of the reasons why there are so few women among the professors. This and other criticisms of the current qualification procedure for university professors have led to the proposal to introduce an assistant or junior professorship position. An important point is that these positions are to be given a greater independence during their qualification phase. Furthermore, the modalities of a first appointment to a chair following a junior professorship, in particular, whether the first appointment is to be limited or should, as a rule, be unlimited, and whether exceptions to the general ban on

appointing members of the university are to be allowed, are on the agenda. In effect, critical elements are discussed that might well lead to a shift from the contract-track tradition to a modified tenure-track model as regards the post-doctoral career stages.

More radical is the renewed proposal that the *Habilitation* should be done away with. Those in favor of such a change refer to other countries most of which do not have this or a similar qualification step. However, especially in the humanities and social sciences, and in medicine as well, the proponents of the *Habilitation* are still numerous. In contrast, many natural sciences will probably substitute the *Habilitation* very soon by other criteria especially publications in refereed journals and successful acquisition of separately budgeted funds to assess the qualification for a professorship. Thus, the future might bring a further diversification of post-doc careers to a professorship by disciplines.

While concern as regards the problems of junior staff careers was and still is one of the major elements of reform debates in this area a number of new developments during the 1990s have emerged that might have a serious impact on the above mentioned positioning of senior staff and their special privileges. With respect to professors, it is attempted – mostly to their surprise – to bring them under a stricter control of university leadership and the respective ministry, and to deregulate employment conditions in order to strengthen accountability, flexibility, and performance related measurements and incentives. Key issues in this context are the strengthening of the position of university rectors and faculty deans, new regulations for partly performance-based academic salaries and the dedication of resources combined with regular evaluation procedures.

7.5 Conclusion

In Germany, like in many other countries, doctoral training and further academic careers have recently become issues of explicit concern and reconsideration. Debates and initiatives in this area reflect a complex picture of changes in higher education, the research system, the overall labour market, and in the expectations both of the economy and society.

In the German context research as well as policy-making in the area of doctoral training have mainly focussed on the structures, procedures and outcomes of the training function itself. The major outcome of these debates was the establishment of a new public financed model of research training that tries to bridge the gap between the problems of status and training of doctoral candidates: the graduate colleges. Like in other OECD-countries, this new model of doctoral training tries to accommodate typical elements of the U.S. graduate schools to the respective national context. First assessments of this new model seem to show that the graduate schools are quite successful. But one has to keep in mind that up to now not more than one out of ten doctoral candidate is working in such a graduate school.

Against that issues related to the labour market function of the doctoral training have only recently come into play and first results of an ongoing investigation in this area show that the doctoral degree in Germany serves, in fact, many masters on the labour market. The majority of PhD holders is leaving higher education for professional careers outside that

differ strikingly by discipline. The outcomes of the PhD on the labour market have been affected by recent developments (e.g. closure of the public service and higher education, expansion in IT) but there are little signs for dramatic changes during the last two decades. PhDs outside higher education are quite pleased by their professional careers but those who have entered an academic career still show the highest job satisfaction.

Attractiveness of the academic career might, however, be influenced by recent debates on reform in this area. On the one hand, measurements are discussed to speed up the post-doc-stages and to strengthen the positioning of junior staff in German universities. Last but not least, this is thought of to make an academic career more attractive. On the other hand, critical elements are discussed to take away some of the traditional privileges of the professoriate. This might well contribute to a decline in the attractiveness of an academic career.

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8 Comparative analysis academic careers

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8.1 Introduction

In the comparative analysis we will follow the outline that also has been applied in the country studies. For both the position of PhD candidates as well as the career perspectives of ‘advanced’ academics, we will first summarise the findings. In the final section we reflect more generally on the findings.

8.2 The position of PhD candidates

Admission, selection and training

With respect to the admission to a PhD position, all systems require that students have obtained the Masters degree or an equivalent degree. In the United Kingdom a one-year Masters of research has been introduced to strengthen the formal research training.

The Masters degree does not automatically lead to entrance into a PhD career. Selection takes place in different ways. In Flanders, the selection most often consists of writing and defending a research proposal. The selection procedure also takes into account the grades of the students. In Finland, a study plan and an outline for the thesis have to be approved before starting a PhD. In the United Kingdom, writing a thesis outline and taking part in an interview are part of the selection. For positions funded by research councils, competition is often fierce, students need top grades to acquire such a position. In Germany, grades and sometimes language proficiency play a role in the selection. PhD candidates are most often internally recruited. In Sweden, students are also selected, but the level of competition differs from discipline to discipline: in science and technology there is hardly competition, in humanities and social sciences competition is fierce. From 1998 on, the students must have guaranteed funding for the whole period of study to be admitted.

Training takes places in different forms, from individually organised to standard training courses for groups of PhD candidates in related fields. The idea of organised training (e.g. in research schools or graduate schools) is most profoundly developed in the Netherlands and Finland, and to a lesser degree in Germany, Flanders and Sweden.

Doctorates awarded

In all researched countries, the number of doctorates awarded has grown considerably. In most of the countries presented, the steep growth of doctorates awarded took place in the late 1980s and early 1990s. Table 8.1 reflects the number of doctorates awarded in 1999 and the growth rate as compared to the year 1994.

Table 8.1: *Number of doctorates awarded in 1999*

	Doctorates awarded in 1998/1999	Growth rate since 1994 (1994 = 100)	Proportion PhDs of graduates
Flanders	672*	115	6-10%
Finland	1,165	132	17-25%
Germany	24,900	115	25-33%
Netherlands	2,547	105	9-13%
Sweden	2,012	132	10-14%**
UK	11,338	150	24-32%

* for 1997/1998

** percentage first degree students 1989-1994 enrolled in PhD positions within four years

In Flanders, 672 PhD degrees were awarded in 1997/98 (57% in the natural sciences, 22% in health, 21% in the social sciences and humanities). The number of PhDs is increasing through time. According to a breakdown by discipline, the increase is relatively high in health. Nevertheless, the number of PhDs is relatively low. In Finland, there were 1,165 PhD degrees awarded in 1998/1999. Most of these were in engineering and the natural sciences. In recent years there is an overall growth in number of doctorates awarded, in particular in the social sciences. In the United Kingdom, there were 11,338 doctorates awarded in 1998/99, most of these were in the natural sciences. In Germany, 24,900 PhD candidates received their degree (36% in medicine and 31% in natural sciences, the two disciplines responsible for the larger part of the degrees). In Sweden, 2,014 degrees were awarded in 1998-1999. Most of these were granted in medical sciences, natural sciences and engineering.

Percentage women and foreigners

In all systems under study, women constitute still a minority in PhD positions. In Flanders, 33% of the PhD candidates is female, at the masters level this is 50%. In Flanders, 27% of the candidates are foreigners. Both the number and share of female and foreign candidates is increasing through time. The variations by discipline are considerable. Finland has the highest share of female candidates: 43%, versus 58% at the masters level. 6% Of the candidates are foreigners, this percentage relates to the number

of foreigners as part of all postgraduate students. As in Flanders, the percentages are in increasing through time and there are substantial variations by discipline. In the United Kingdom, 37% of the candidates is female (compared to the Masters level: 46%). 34% Of the candidates are overseas students, the proportion foreign students is slightly decreasing over time. In Germany, about one third of the candidates is female, of the first-year students 50% are female. The number of foreign candidates is not known, but the 7% PhD degrees awarded to foreigners (1996) indicates the size of this group in Germany. In the Netherlands, 35% of the candidates are female, the proportion of commencing PhD students in 1998 is 42%. This is still lower than the participation rate at the Masters level. Concerning foreign students, national Dutch data are not available. University data indicate that the share of foreigners is rapidly increasing and vary from 20-37%. The foreign students mainly come from East Europe and South East Asia. In Sweden, 42% of the PhD candidates are female. About 17% of the candidates are foreigners from the Nordic countries, the European Union, as well as from other parts of the world.

Table 8.2: *Percentage women and international candidates*

Country	Woman (%)	International candidates (%)
Flanders	33%	27%
Finland	43%	6%
United Kingdom	37%	34%
Germany	+/- 33%	7%*
Sweden	42%	17%
Netherlands	35%	20-37**

* Of the degrees awarded

** Range for all universities

Percentage graduates at the Masters level continuing as PhD

For the systems involved, not exactly the same calculations could be assembled concerning the transition from the Masters degree to the PhD trajectory. In Flanders, the calculation was based on the number of PhD candidates as a share of the second-cycle graduates a year before: 20%. In Finland, the researchers calculated the proportion of PhD degrees awarded in 1996-1998 as part of the Masters degrees awarded in 1986-1988: 13%. In the United Kingdom the following estimation was used: the PhDs starting in 1998/99 divided by the number of Masters degrees awarded in 1994/95: 29%. According to the British country report, this is a slight overestimation of the real number. In Germany on average 19% of the Master degree students continue as PhD candidate (those starting as a PhD in medicine were excluded from this average). In the Netherlands the enrolments in PhD positions were related to the outflow of the university sector in the year before: 9%. As was the case for female and foreign participation, transition rates from Masters degree level to PhD level vary considerably by discipline in the

Netherlands. In Sweden, 6% of the graduates at the Masters level continue in a PhD career within three years after graduation.

There are some difficulties in arriving at comparable data for the countries involved. This is partly due to the fact that the category PhD students in a number of countries forms a fairly heterogeneous group. In some countries PhD candidates can be students or staff members. In addition to this, for those belonging to the staff of universities it is difficult to say whether they are working on the dissertation full time or only as part of their assignment. The variety does not allow us to put forward a fully reliable comparative conclusions concerning the relationship Masters level graduates and PhD candidates. As an indicator we calculated the number of PhDs awarded in a recent five-year period and divided this by the number of Masters degrees awarded also in a period of five-year. With respect to the choice of this latter period, the average time to degree was taken into account. For the Netherlands, for example, we divided the PhDs awarded in 1994-1998 by the number of Masters degrees in the period 1989-1993, for the UK we took the periods 1994-1998 and 1990-1994, respectively (see table 8.1). It must be stressed however, that the data used for calculating the indicators are somewhat distorted. First, taking the number of graduates at Masters level excludes some candidates entering a PhD track based on another qualification. Second, the assumption of a rather straightforward relationship between graduating at the Masters level and acquiring the PhD after a specific number of years can be challenged. Third, the inflow of foreign students in PhD career tracks is not taken into account. This in particular relates to the UK data, the considerable inflow of foreign students in the Netherlands is a much more recent phenomenon. It therefore is recommendable to interpret the data with some caution, a reason why not the precise percentages are presented but a range.

Masters and PhD students by discipline

The data above already indicate that the number of PhD candidates differ from discipline to discipline and the participation by gender also varies from discipline to discipline. One of the most interesting features to look at in more detail is the comparison of participation rates across disciplines at the Masters level and at the PhD level.

In Flanders, 57% of the PhD students graduated in the exact sciences (in 1997-1998). Within the medical sciences, the proportion was 22%. The smallest share was in the social sciences and the humanities: 21%, languages and literature being the largest (sub)discipline. At the graduate level (1996 data, CHEPS Monitor), these proportions are 22%, 20%, and 57% respectively. In Finland, the data are based on a comparison of PhDs awarded in 1996-1998 with Masters degrees awarded in 1986-1988. The largest share of PhD candidates is in medicine (47%), followed by health sciences and natural sciences. The lowest proportions are in economics, arts and law (less than 5%). For the Netherlands, the information is based on a survey amongst PhD students. Most PhD students can be found in natural sciences (35%), followed by agriculture and health (including medicine). The lowest proportions are in law, humanities and economics. In Sweden, by far the largest proportion of graduate students in natural sciences continued as a PhD (34%). Also in medical sciences and the humanities the proportion is relatively

high (both 17%). The lowest shares can be found in health care, social sciences and education. In the United Kingdom, the proportion of PhDs awarded is highest in the sciences (41%). The humanities and arts, social sciences, engineering and technology, and medicine are comparable in their share of the PhD awarded (12-16%). The share of natural sciences at the Masters and Bachelors level at universities is 10%. The proportions for the social sciences, humanities and arts, engineering and technology, and medicine are 12%, 16%, 14%, and 11% respectively (1996 data, CHEPS Monitor). In Germany, 36% of the PhD is awarded in medicine, at the Masters level this proportion is 8%. The share of PhD in the natural sciences is 31%, at the Masters level it is 18%. For law/economics/social sciences, the proportion at the Masters degree level is 27% and much lower at the PhD level: 10%. In engineering, both at the Masters and the PhD level the proportion is about 10%. In the humanities the proportion at the Masters level is much higher than at the PhD level: 29% versus 10%.

Salary and funding

In Flanders, the gross monthly starting salaries vary between 1,923 and 2,382 EURO, respectively for those appointed as research assistant and doctoral assistant. To have a point of reference, this is compared to the salary of a lecturer (the lowest academic rank, apart from the PhD). The salary of an academic in this position is 2,460 EURO. In Finland, the PhD candidate earns EURO 1,500 per month. Postgraduate students working at the university as research assistants earn a slightly higher salary. In the United Kingdom PhD candidates are eligible for grants by research councils, may be appointed by the university, or have to make a living outside the university. The grants of research council amount to some 800 EURO per month. One should take into account that this monthly budget includes the fee PhDs candidates have to pay the institution. In practice it means that PhD candidates earn 40% of the average starting salary for Masters level graduates. In the Netherlands, PhD candidates earn almost 1,100 EURO in their first year, which is 55% of his/her colleague in the same salary scale. In Sweden, the salaries/grants for PhD students are 2,040 monthly. PhD candidates can however also have a position at the university. In the German system, PhD students can also have different positions; calculating an average seems not appropriate.

Table 8.3: *Salaries of PhD candidates*

Country	Earnings (starting monthly salaries in EURO)
Netherlands	1,079
Germany	Dependent on position
Sweden	2,040
United Kingdom	882 (research grant)
Finland	1,500 (graduate school) 1,500-2,000 (employed by university)
Flanders	1,923 (research ass.) 2,382 (doctoral ass.)

The appointments of PhD candidates are funded differently. In Flanders, universities receive budgets for the positions from the government. Also, research councils fund such positions. A minority of candidates is self-supporting. In Finland, a mixture is found of ministerial budgets, budgets from foundations to the universities and from the universities (part of the lump sum budget) themselves. In the United Kingdom, 35% of the students receive allowances from research councils, 26% receive money from public sources, 10% from private sources, 20% of the PhD candidates are self-supporting. In the Netherlands, most PhD positions are funded by the universities (which receive lump-sum budgets from the government) and by research councils. A minority of PhD positions is funded from private sources. In Germany, 70% of the candidates have junior staff positions at universities, 14% of the students receive grants from the regional governments or foundations, 7% are paid by research institutes (e.g. Max Planck Institute, Fraunhofer Institute).

Time to degree and drop out

In Flanders, it is estimated that most candidates finish their degree within the time foreseen (i.e. six years), the promotion age ranges from 26 to 31. In Finland, it takes on average nine years to finish the dissertation. The median age is 36 (in the social sciences and humanities the age is even higher). The introduction of the graduate school system has lowered the time to degree and promotion age. In the United Kingdom, 69-83% (this is the variation by discipline) finish within four years, 83-93% in five years. The dropout rate is very low and the promotion age is roughly estimated as 26-27. For Germany, some older data are available about the average age of promotion. In 1992 the age was 32. In the Netherlands, data on the average age of promotion were not available. 7% Of the PhD students finish within four years, 35% within five years. In the end, 75-80% of the candidates obtain a PhD degree. In Sweden, those that passed the degree in 1998-1999, took on average nine years to complete the dissertation. The average promotion age is 35 years.

8.3 The 'advanced' academics

After the degree

In Flanders, data were available from one university (representative of Flanders as a whole). Of the 933 PhD candidates that started in 1991-1995, 10% was appointed at university and 3% had a permanent academic position (in 1998). Whereas the academic profession in Flanders still enjoys social recognition, there is pressure on the autonomy of academic work (quality control, accountability). There is also increasing competition with more rewarding professional opportunities. In Finland, 60% of the PhD graduates stay in the university sector, 17% move to the private sector, 15% go to the public sector, and 3% move to the non-university sector. 15% Of those having reached the PhD go abroad, only 0.3% are unemployed.

In the United Kingdom, 20% are appointed at academic position, 8% have a fixed academic position, 32% move to the private sector (this percentage is still growing), and 17% is unemployed. Data stem from a survey 15 months after graduation. In Germany, 20-40% stay in academe, 10-40% move out of higher education, 30-70% move to business, government or non-profit organisations. The ranges mentioned indicate the variety by discipline. In the Netherlands, 54% find a research and/or teaching position in universities or research institutes. 17% Find a job in industry. There is a development towards a decreasing outflow to academic positions. In Sweden, 45% of PhD graduates stay in higher education institutions, 29% leave for the private sector and 26% take up a position in the public sector (1999 data).

Rank structure

For details concerning the rank structure we refer to the country studies. Each system is characterised by different positions, each with (rather inflexible) accompanying salary scales. Requirements for transitions from one rank to another are often laid down in university regulations, national regulations or collective agreements. Promotion from one rank to another are partly determined by the regulations, but – in the case of the higher ranks – also decided upon by academic promotion committees. These committees in general take into account research performance (becoming more and more important), teaching qualities and – to some extent – administrative qualities.

Comparison with business

For most of the countries specific comparisons are difficult to make. The Flemish country study, for instance, argues that the situation in business organisations is too varied to come to general conclusions. Except for the conclusion that on average, the salaries are lower for academic positions than for positions in business organisations. Also in the other countries the average earnings are lower in academic positions. This is the case for the earnings of postgraduates in Finland (state sector versus the private sector). In the United Kingdom, surveys point out that academics in general fall 10-30% behind the private sector. Also in the Netherlands and Germany, those working in academic positions are worse off in terms of salary and terms of employment than those in the private sector and other parts of the public sector.

8.4 Conclusions

Behind the diverse stories of the countries presented in this report, we find a number of common trends that draw the attention. A society based on knowledge requires a highly skilled workforce. Economies have grown more complex and knowledge intensive. In many European countries the importance of highly trained workforce is high on the agenda. The universities play a pivotal role in providing higher learning, and since the 1970s, higher education systems have faced the massification of its system and

institutions. It took however well into the 1980s for universities and governments to deliberately stimulate the influx of doctoral candidates. In the current debate, the production of doctors is not only seen as a means to replenish the academic profession, but also to serve a wider array of knowledge intensive jobs in society (particularly in Germany, Netherlands). A third development that can be seen as a response to concerns regarding the sustainability of a highly skilled workforce is the recent attention to the issue of the perceived unattractiveness of the academic career.

The academic career: a problem?

In most country reports presented, the academic career and the management of human resources is considered problematic. In Germany the academic career is considered too rigid and inflexible to be attractive. In Flanders, cutbacks on resources do not make universities attractive employers. In the UK and Netherlands, the employment conditions in higher education are unfavourable as compared to other relevant sectors. In this report, several initiatives to improve the doctoral track and the academic career came to the fore.

Improving the doctoral stage

In European countries, higher education policies predominantly focussed on the first-degree level. Only relatively recently, governments are intervening in the area of doctoral studies. Both inside the academia and by governments, business communities and the public, questions have been raised about the appropriateness of doctoral education relating to such issues as quality and quality assessment, programme structure, labour-market demands, finance and internationalisation. Several European governments took stock of the concerns and gradually intervened in the area of doctoral education. Policies have been developed regarding the organisation, funding and structuring of doctoral training. These initiatives diverge across countries, but one innovation catches the eye: the rise of the graduate school. Of the countries presented, Finland, Germany, Sweden, the UK and the Netherlands have seen the development of graduate schools as a means to organise doctoral training on a larger scale and in a more programmatic way.

The graduate school potentially offers a means to more systematically address the attractiveness of doctoral positions, and to anticipate on career paths inside and outside the academia. In the UK, a new form of doctorate, the professional doctorate has been established in the early 1990s. In the Netherlands, the KNAW includes in its assessment of graduate schools the degree to which proper attention is paid to labour market perspectives of doctoral candidates.

Improving the attractiveness of the academic career

Although the attractiveness of the academic career is of concern in most of the countries presented (particularly UK, Germany and the Netherlands), hardly any concerted action has been undertaken to improve the situation. In the UK and the Netherlands, financial

support for doctoral candidates has recently been increased. In Germany, reforms are being debated to make the academic career more attractive. Element in this discussion are the strengthening of the positioning of junior staff and the role and status of the traditional privileges of the professoriate. In the Netherlands such a discussion is currently fed by the report 'Talent for the future. Future for the talents', which claims substantial investments in academic personnel.