

# SWEDEN

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## INTRODUCTION

The Swedish higher education system before 1977 can be characterized as heterogeneous and centralized. After the Second World War, a large variety of schools, colleges, and courses existed. Labor market and economic forces stimulated the government to introduce an ambitious policy and administrative measures that would expand the whole education system above grade 7. These measures led to an expansion of higher education that was probably faster than in any other Organisation for Economic Co-operation and Development country (Svanfeldt 1994). This expansion occurred mainly in the 1960s: at the end of this decade, there were about three times as many students in higher education as at the start of the decade. The capacity of the existing institutions was not sufficient to accommodate the student explosion. This resulted in the establishment of a parliamentary committee in 1968. The report by this committee, published in 1973, led to thorough reforms of the entire Swedish higher education system in 1977. Under these reforms, all higher education institutions became integrated into one system of tertiary-level education called the *högskola*. This is the Swedish collective name for higher education, encompassing not only traditional university studies but also those at the various professional institutes and university colleges, as well as a number of programs previously taught in other forms of the educational system. Most of the programs included in the broadened definition of higher education are under the jurisdiction of the Ministry of Education and Science, others are under the Ministry of Agriculture, and paramedical programs are under the county councils.

Between 1977 and 1993, a system of national programs existed in the Swedish higher education sector. The state determined the curricula, program length, overall aims, etc., of all higher education programs offered. The educational system was organized into general study programs, local study programs, and single subject courses. In 1993, the government decided to loosen requirements in order to allow for more variation at the local level, and thus more correspondence with the labor market. Under these reforms, institutions were allowed to develop their own programs.

With the 1993 reform of higher education, institutions were given increased autonomy in the organization of their studies, admissions, use of resources, and general organization. Under the present system, the government only specifies program lengths of degrees. Different degrees correspond to the number of “study points” needed to complete them. In figure 1, a graphical overview is presented of the Swedish higher education system. Three types of undergraduate degrees are offered. After 2 years, students earn 80 points and are eligible to receive a diploma (*Högskole*). Completion of a three-year program (120 points) is rewarded with a bachelor’s degree (*Kandidat*), and students who complete 4 years (160 points) receive a master’s degree (*Magister*). The Swedish system also offers two types of postgraduate degrees: the licentiate and the doctorate.<sup>1</sup> These are addressed in detail below. The total number of higher education students in 1996-97 was 300,380, of whom 16,550 were active postgraduate students. In this academic year, 840 licentiate degrees and 1,720 Ph.D.s were awarded (Högskoleverket 1998a). Professional degrees are also offered. The program lengths for these professional degrees vary from 1 to 5.5 years.

## TRENDS IN GRADUATE EDUCATION

Until 1969, Sweden had a *Licentiatexamen* and a traditional doctorate. The median time of study from the *kandidatexamen* or *magisterexamen* to the licentiate was about 5 to 6 years, and the time from the licentiate to the doctorate was about 5 years. This means that, after completion of the undergraduate degree, the time to completion of the doctoral program was 10 years or more.

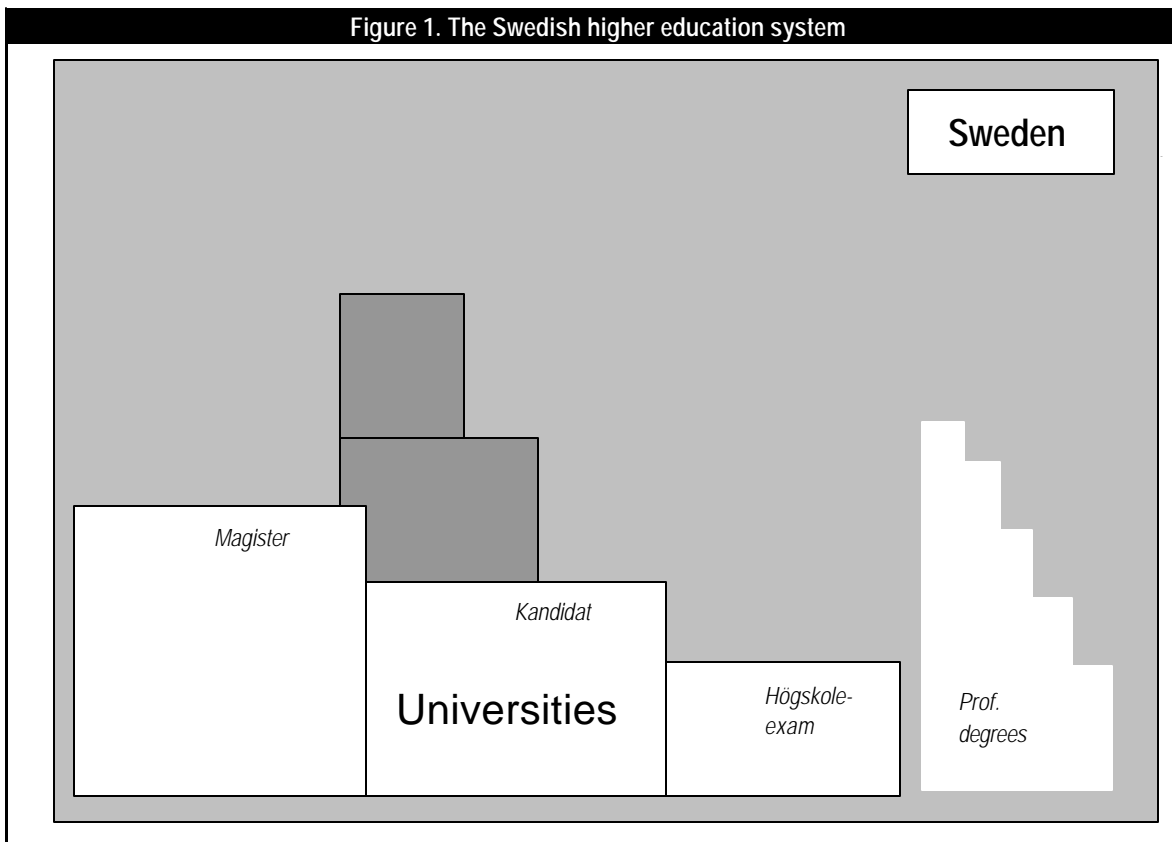
During the research training reforms of 1969, these degrees were replaced by the *doktorsexamen* with a time restriction and compulsory courses. The new postgraduate education system that was launched in 1969 had two main purposes (Zetterblom 1993):

- to shorten the time spent in graduate studies by introducing courses instead of literature studies, improving supervision of thesis work, and reduc-

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<sup>1</sup>Throughout this report, we use the term “postgraduate” to refer to students in either licentiate or doctorate programs.

Figure 1. The Swedish higher education system



SOURCE: Statistiska Centralbyrån (1997). *Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.*

ing demands on the thesis so that completion of the dissertation was seen as a career step instead of a life-long project; and

- to bring graduate education in Sweden closer to what was considered an international norm: the Anglo-Saxon Ph.D.

Since the 1969 reforms, the formal length of the program from enrollment to completion of dissertation has been 4 years. The average length of study, however, is still higher. For those who took the *doktorsexamen* in 1994, the program took an average of 7 years from admission to research training to thesis defense (Kyvik and Tvede 1998).

Across different faculties, however, there are large differences between lengths of study. The average duration of study in the humanities and social sciences, for instance, is considerably longer than in engineering, the natural sciences, and medicine.

In figure 2, the numbers of postgraduate students and degree recipients are presented by discipline from 1980 until 1996. The large difference between the pro-

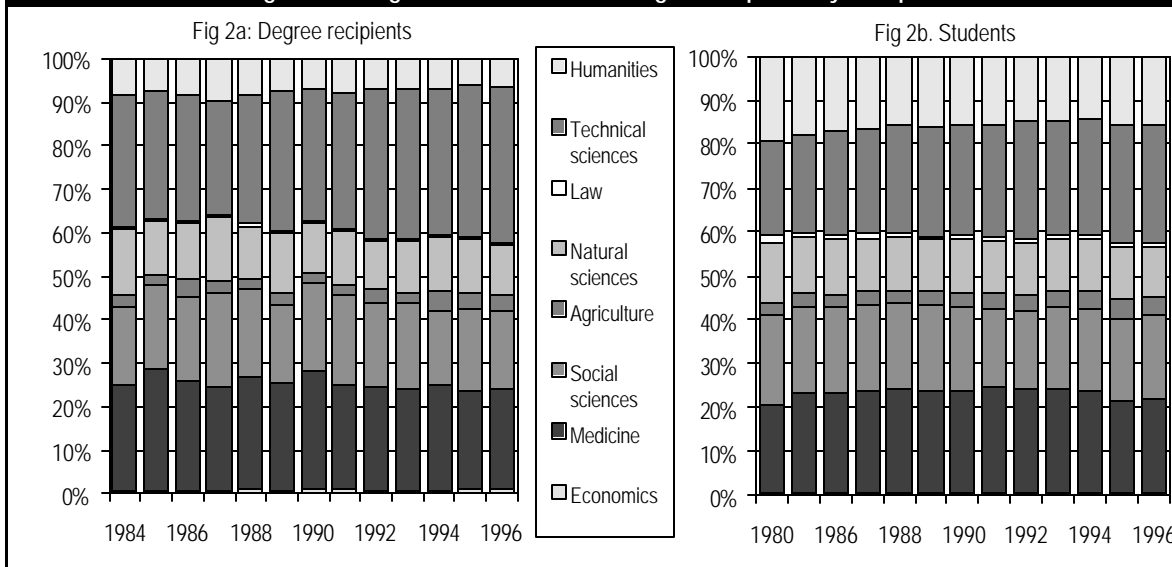
portion of students and the proportion of graduates in certain fields indicates that a high percentage of graduate students do not complete the program or complete it more slowly; for example, compare the data for students in the social sciences versus those in the natural sciences.

Since the mid-1980s, the licentiate degree has been reintroduced as an intermediate qualification in postgraduate education. The standard time for completing this new degree is 2 years. The request for the new licentiate came primarily from engineering faculty, in which field a licentiate can be regarded as adequate preparation for work in industry. Most holders of licentiate degrees are in the technical sciences (computer science, mechanics, engineering, architecture, etc.) (figure 3).

As shown in figure 4, the number of licentiate and doctoral students has gone up considerably since the early 1980s. Also, although there is still a big difference between the number of students who enroll and the number of students who actually complete postgraduate studies, the difference has declined relatively.

The doctoral degree program in the current higher education system officially takes approximately 4 years

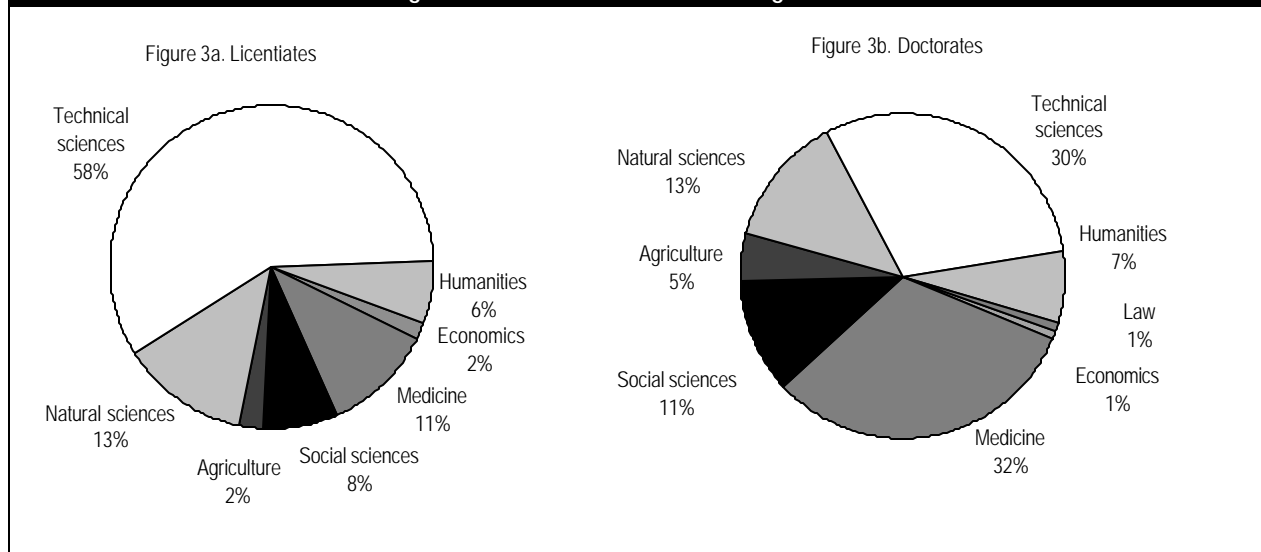
Figure 2. Postgraduate students and degree recipients by discipline



NOTES: Natural sciences includes physical, chemical, biological, and mathematical sciences. Technical sciences include engineering, mechanics, computer sciences, and architecture.

SOURCE: Statistiska Centralbyrån (1997). Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.

Figure 3. Licentiate and doctorate degree awards



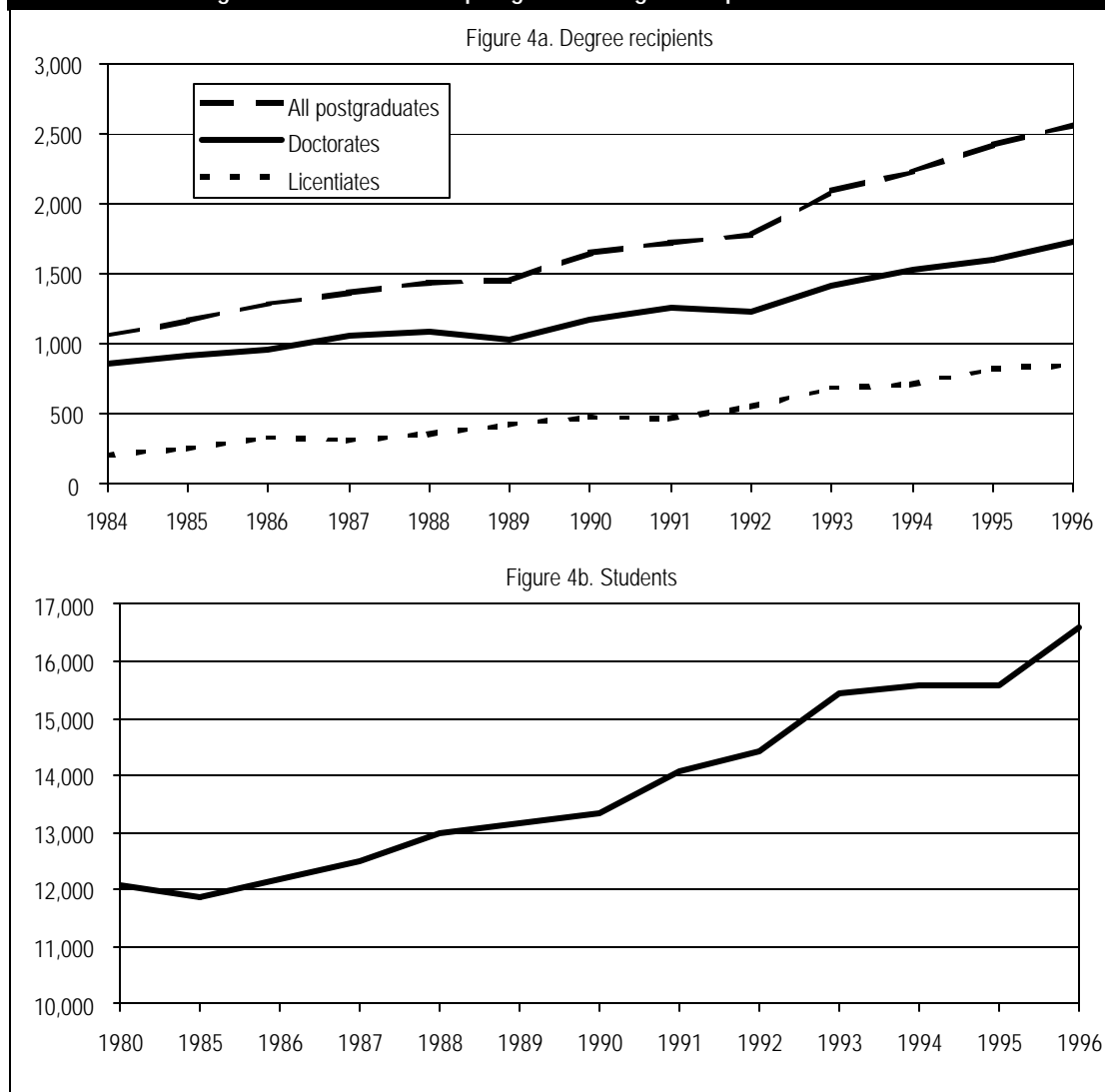
NOTES: Natural sciences includes physical, chemical, biological, and mathematical sciences. Technical sciences include engineering, mechanics, computer sciences, and architecture.

SOURCE: Statistiska Centralbyrån (1997). Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.

to complete, which equals 160 study points. All graduate programs provide in-depth study in the field, training in methodology, and research experience. Required courses take about 1.5 years (60 points). The student, together with an advisor, decides upon a study plan and a topic for the dissertation during the first year; this must be approved by the department. Doctoral dissertations are usually writ-

ten in Swedish or English, but may also be written in other languages. All postgraduate students receive individual tutoring. Dissertations must be defended in public before a committee. The thesis may be published as a monograph or as a composite dissertation consisting of a number of research papers and a summary.

Figure 4. Total number of postgraduate degree recipients and students



SOURCE: Statistiska Centralbyrån (1997). *Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.*

The participation of women in graduate education in Sweden shows a consistent growth during the last decades, although the proportion of female students is higher than the proportion of female graduates (figure 5 and table 1).

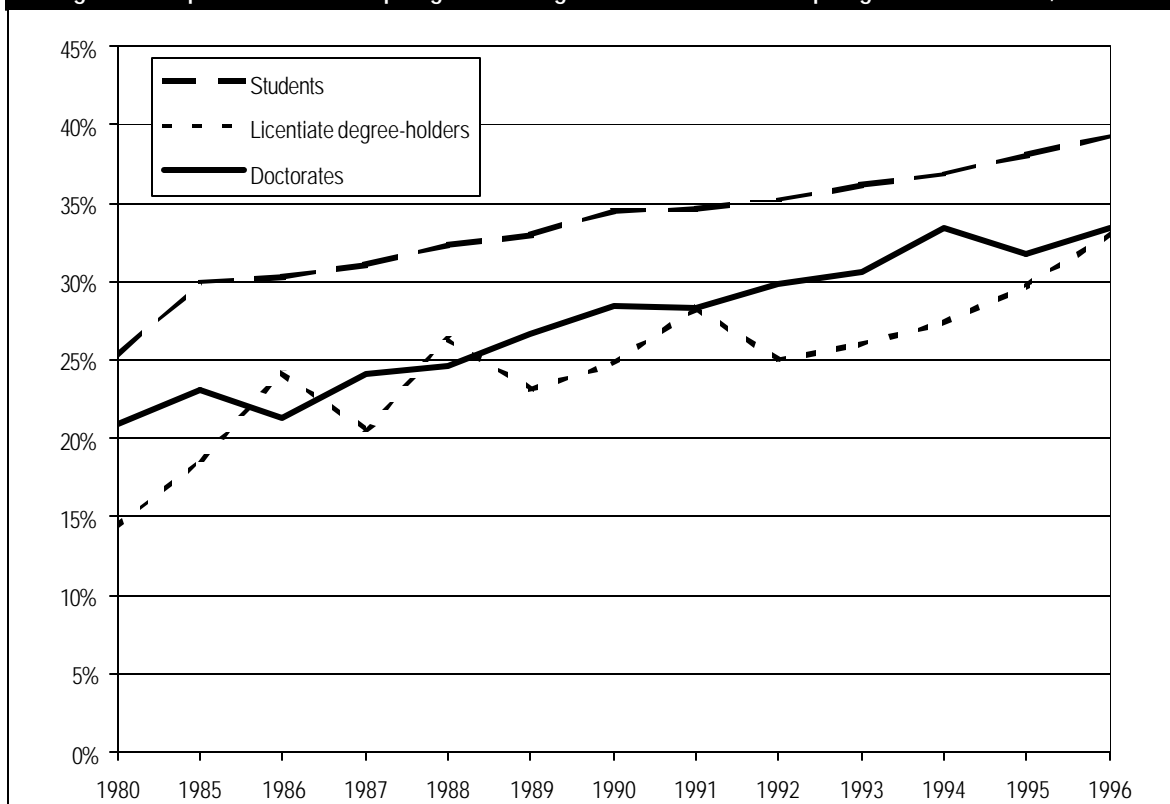
In the 1980s, the balance of the two main activities of the education sector—providing undergraduate education and conducting research—has shifted more toward research. During this decade, government appropriations for undergraduate education decreased from 40 to 30 percent of the total budget for universities and university colleges. During the same period, government grants for research and postgraduate education increased; even greater increases were seen in the funding from other sources.

In comparing the Swedish model with other systems of postgraduate education, a shift can be discerned from the apprenticeship model (e.g., of Germany) to the professional model (e.g., of the United States). Since the reforms of 1969, a considerable proportion of the current licentiate and doctoral programs have consisted of coursework and participation in seminars in the field or related areas. Research and dissertation work are mainly carried out in the final stages of the program.

## DOCTORAL REFORMS

As part of larger reforms in higher education in its entirety, graduate education has changed considerably since the Second World War. The doctoral education program introduced in 1969 was designed to boost the num-

**Figure 5. Proportions of female postgraduate degree-holders and female postgraduate students, 1980-96**



SOURCE: Statistiska Centralbyrån (1997). *Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.*

**Table 1. Number and percent of new female postgraduate students by major field**

Field	1986-87		1989-90		1992-93		1995-96	
	Total number	Percent of women	Total number	Percent of Women	Total number	Percent of Women	Total number	Percent of Women
Total.....	2,260	32	2,450	34	3,470	35	3,100	40
Humanities.....	280	43	270	45	410	48	340	53
Social sciences.....	340	38	370	34	560	41	470	46
Medicine.....	490	37	560	38	760	41	780	48
Mathematics/natural sciences.....	220	27	300	35	390	38	310	39
Technology.....	570	21	570	20	780	24	760	24
Technology/natural sciences.....	120	28	120	26	160	32	150	32

SOURCE: Högskoleverket (1998b). *Women and Men in Higher Education*. Högskoleverkets Reports 1998:13 R.

ber of candidates, lower the average age of the candidates, and increase completion rates. This policy, however, did not lead to the expected results. In the 1980s, there were increasing concerns about the quality of Ph.D. education in Sweden. This resulted in a strategy focusing more strongly on quality and loosening the rigid formal requirements that gave priority to quantitative performance (Bleiklie 1993). In this period, government grants for Ph.D. education were increased, and doctoral students were provided an additional year of government support. The basis of most current reforms in postgradu-

ate education can be traced back to the change of government in 1991. In the 1990s, education at all levels has become more decentralized. The new research policies introduced in 1993 involve changes designed to increase flexibility, efficiency, and competitiveness. Traditionally, Swedish researchers were supported by the government through basic research grants given to universities, personal grants from research councils, and grants from various applied science funding organizations. Additional sources of funding have been introduced to increase opportunities for supporting research in areas that are al-

ready on their way to becoming world class. Instead of focusing on specific fields, support is concentrated on specially gifted individuals and outstanding research environments.

The priorities of the new research policies, as described in the *1993 White Paper on Research* (Swedish Ministry of Education and Science 1993, p. 170), are:

- to strengthen links between universities and industries, and
- to increase efforts to promote concentrated and major world-class research projects.

## STRENGTHENING LINKS BETWEEN UNIVERSITIES AND INDUSTRIES

A major share of government spending on research is directed to universities, and not to specific research institutes. This university-focused orientation may cause problems in the exchange of knowledge between the university and business sectors. Therefore, a program to widen and deepen contacts between universities and industry is being introduced. This program consists of, among other things, an increase in the number of Ph.D.s in industry, the establishment of special research companies connected to the universities, and the introduction of special postgraduate programs in industry. The new research policies adopted in 1993 state that the new projects should include the training of young researchers.

## PROMOTING CONCENTRATED AND MAJOR RESEARCH PROJECTS

For efforts to promote concentrated and major research projects, 10 billion SEK—to be used over a period of 15 years—has been allocated to promote internationally competitive research programs. This sum has been divided among three areas: 60 percent to strategic research (support for technical, scientific, and medical research); 25 percent to strategic environmental research; and 15 percent to research in the humanities and social sciences (Swedish Ministry of Education and Science 1993). Furthermore, special “centers of excellence” have been established at universities and university colleges. These centers are financed by the Swedish Industrial and Technical Development Administration.

Further policy measures focus on flexibility, recruitment, and internationalization. Flexibility is considered necessary to develop creative research environments and to cope with the rapid advancement of knowledge. Increased autonomy and pluralism within the university system should create opportunities to achieve this. The recruitment of additional researchers is important both for the development of Swedish industry and for the promotion of quality in university education and research. A specific program has been introduced to support the recruitment of women into higher education and research. Finally, a number of measures have been undertaken to extend international relations in Swedish research.

During the 1980s, there were discussions as to whether there was a need for a special agency at the faculty level for planning and leading research training on the model of American graduate schools. However, these suggestions didn’t receive strong support at the universities, and some institutions have developed their own agencies for research training. The discussion about an agency at the university or faculty level was renewed by the *1993 White Paper on Research*.

The reforms presented above should lead to the creation of a higher education structure that can deal with future challenges. Following the creation of such a structure, the transformation of Sweden’s educational and research systems is to be carried out in a project entitled “Agenda 2000, Knowledge and Competence for the Next Century.” This project maps out a strategy to link together policies for schools, universities, and research. It is based on the belief that governments and parliaments should not interfere with educational and research systems by regulating and deciding on minor details, but should concentrate instead on encouraging individuals to strive for excellence.

## PATTERNS OF SUPPORT

Before the 1980s, postgraduate students were financed out of the research appropriation to which each university faculty was entitled. The way the money was spent was decided by the faculty board of the individual institution. The board could decide to spend it on positions for postgraduate studies or on fellowships. The students with posts were to spend the majority of their time on research, but could combine this with teaching. Fellowship-holders could combine research studies with a job on a research project or a part-time job as a teaching or administrative assistant. Another possibility for financing

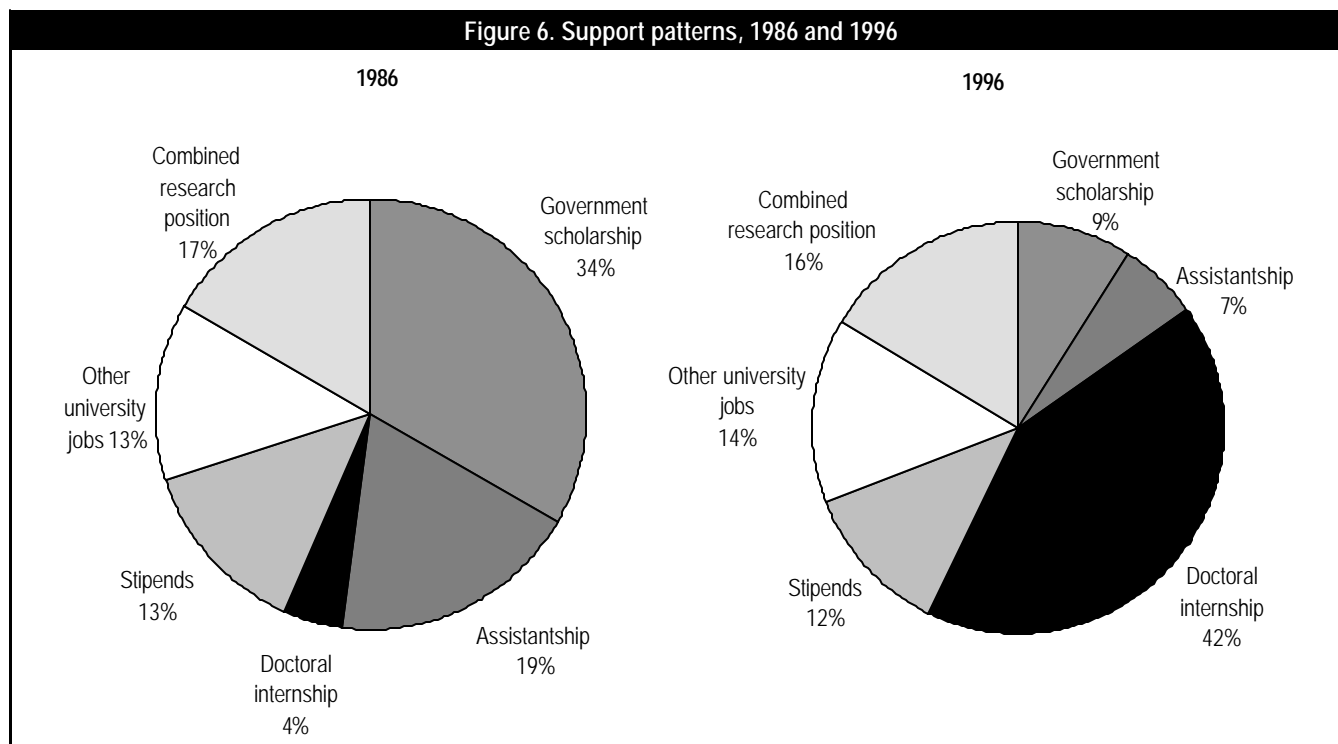
postgraduate studies was to combine one's studies with research on a project funded by external sources or by one of the research councils. Some educational institutions required that students participate in teaching and administration. Although there were great differences across faculties in the application of the regulations, postgraduates typically were either required to work as teaching assistants or volunteered to use about 20 percent of their time for teaching. This was paid work in addition to the normal sources of financial support they received.

In 1982, the system for financial support of postgraduate students was changed from study grants to what is called *doktorandjänster*. These are doctoral internships by which students are temporarily employed at the university with full benefits and a salary corresponding to a starting salary in the public sector. Another way of funding students is the *utbildningsbidrag* (stipend), which gives students a lower gross income and poor benefits. In addition, some students finance their studies through work, loans, or scholarships. In 1994, of those who received funding for doctoral studies, 59 percent had a *doktorandjänst*, 16 percent had an *utbildningsbidrag*, and 25 percent used another funding mechanism. Figure 6 shows that the proportion of postgraduate students supported by a *doktorandjänst* has grown rapidly from 1986-96, mainly at the expense of government scholarships and assistantships.

The availability of financial support varies by discipline. In figure 7, different types of financial support are presented for the different disciplines.

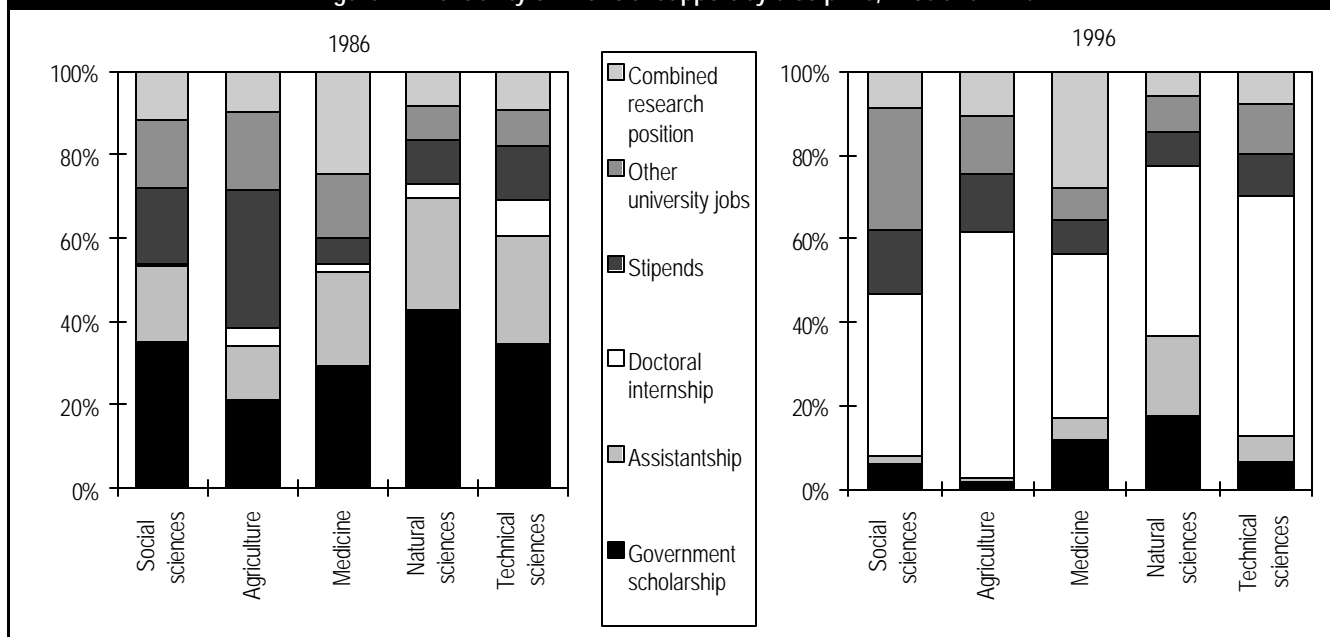
Funding has had a considerable impact on postgraduate completion rates (Zetterblom 1993). Completion rates differ greatly across groups of postgraduate students with different amounts of financial support. In the fields with the lowest rates of completion, the humanities and social sciences, about half of the students received no financial support from the university. In the natural sciences, the corresponding figure is only a fourth. With the exception of students in the clinical subjects of medicine, the completion rates were low among students who received no support. In the humanities and social sciences, the completion rate of this nonsupported group was about 5 percent; for the group most favored with study support, this proportion was 40 percent (table 2).

Various reasons may explain the differences in completion rates between groups with different amounts of study support. Of great importance seems to be the opportunity to perform research work on a full-time basis. In addition, the requirement of yearly applications for grants or assistantships stimulates substantial progress in their studies.



SOURCE: Statistiska Centralbyrån (1997). *Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.*

Figure 7. Availability of financial support by discipline, 1986 and 1996



SOURCE: Statistiska Centralbyrån (1997). *Universitet och högskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96, and 1996/97. Örebro.*

Table 2. Proportion of students with a doctoral degree after 13 years (admitted in cohorts of 1972-73 to 1977-78), by field

Field	Regular support ≥ 3 year	Regular support < 3 years	No study support	Total
Humanities.....	41	24	6	18
Social sciences.....	40	23	5	19
Natural sciences.....	71	39	20	50
Medicine, theoretical.....	82	45	56	67
Medicine, clinical.....	70	66	59	63
Engineering.....	57	27	18	36

SOURCE: Zetterblom, G. The Development in Graduate Education in Sweden. Paper presented at the Sixth CHER Conference, July 1-3, 1993, Stockholm.

In 1998, the rules for funding postgraduate studies were modified. Now, only applicants employed in a postgraduate post or awarded a study grant may be admitted to postgraduate training. In other cases, the applicant must have guaranteed study funding for the whole period of study.

## EMPLOYMENT PATTERNS

The rapid growth of postgraduate students in the 1960s raised concerns about the opportunities for gradu-

ates to find suitable employment in the future. A government committee set up to develop a system for quantitative planning proposed an elaborate system for balancing supply and demand in postgraduate education. The plans to implement such a system, however, were cancelled, as the rising growth of postgraduate students appeared to be temporary. In the 1980s, the attention given to the relation between the labor market and postgraduate education was based on more qualitative considerations. In the last decade, government policy has mainly been directed at stimulating cooperation between industry and research to train high-quality researchers.

There is little quantitative information available on employment of Ph.D.s in Sweden. We therefore give some rudimentary figures. Statistics show that almost all of the new doctoral degree-holders from 1991-92 were employed in 1994 (Kyvik and Tvede 1998). Fourteen percent were unemployed during parts of this period from 1991-94. There are large differences in the percentages of postgraduates from different disciplines who are employed by universities. Around 1980, over 50 percent of all Ph.D.s in the social sciences were employed by a university. The corresponding rates for recipients of doctorates in the humanities and natural sciences are between 40 and 50 percent. The smallest proportion of postgraduate degree-holders employed in universities can be found within the clinical subjects of medicine (Zetterblom 1993).



## PATTERNS OF INTERNATIONAL MOBILITY

In the 1980s, most Swedish universities developed their own plans of action to set priorities for internationalizing curricula and research networks. In 1993, however, the Royal Swedish Academy of Sciences stated that too few researchers—including postgraduate students—engaged in research stays abroad and that this situation should be changed. The government supported this view and recommended the use of existing bilateral agreements, programs, and networks; it also advised that special attention be given to the development of shorter courses, summer schools, etc. In addition, the universities themselves were expected to be responsible for enhancing the internationalization of research training.

A general trend toward the internationalization of education and research can be detected in Sweden. For example, the proportion of Ph.D. graduates in Sweden with a first degree from another country grew from 3 percent in 1973-74 to 19 percent in 1993-94. In 1994, there were almost 1,000 incoming people—both tempo-

rary and permanent residents—with postgraduate education in Sweden, compared to 340 persons outgoing. For outgoing students, the United States seem to be the most popular country to stay abroad. In addition to language reasons, students claim that the best research environments in their fields are in the United States. In Europe, the United Kingdom, Germany, and France are the most popular countries. Only 3 percent of the students going abroad chose to study in Africa, Asia, or Latin America.

With respect to the internationalization of research training, the regional cooperation between the Nordic countries in postgraduate education is especially remarkable. In 1990, the various Scandinavian countries tried to further their cooperation by establishing the Nordic Academy for Advanced Study. This organization currently funds approximately 6,000 research students and researchers involved in cooperative Nordic projects. The objective of this cooperation is that the Nordic countries function as one common research training region. Graduate students will thus have the opportunity to make use of courses in countries other than their home country.



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## REFERENCES

- Bleiklie, I. 1993. Norwegian and Swedish Graduate Reform Policies. Paper presented at the Sixth CHER Conference, July 1-3, 1993, Stockholm.
- Högskoleverket (National Agency for Higher Education). 1998a. *Swedish Universities and University Colleges 1997*. Short version of annual report.
- . 1998b. *Women and Men in Higher Education*. Högskoleverkets Reports 1998:13 R.
- Kyvik, S., and O. Tvede. 1998. The Doctorate in the Nordic Countries. *Comparative Education* 1: 9-25.
- Statistiska Centralbyrån. 1997. *Universitet och hogskolor Forskarutbildning: Nyantagna, registrerade och examinerade lasaret 1993/94, 1995/96 and 1996/97*. Örebro.
- Svanfeldt, G. 1994. Higher Education Policy in Sweden. In L. Goedegebuure et al., eds., *Higher Education Policy: An International Comparative Perspective*. Oxford: Pergamon Press.
- Swedish Ministry of Education and Science. 1993. *Knowledge and Progress: A Summary of the Swedish Government's Bill on Higher Education and Research (White Paper on Research)*. Government Bill 1992/93. Stockholm.
- Zetterblom, G. 1993. The Development in Graduate Education in Sweden. Paper presented at the Sixth CHER Conference, July 1-3, 1993, Stockholm.

