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Gender Equality in Swedish Higher Education: Patterns and Shifts

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In most European countries, more women than men attend undergraduate Higher Education (HE) and more women than men obtain degrees. In Sweden the proportion of female students has long been in the vicinity of 51–60%. The number of doctoral entrants and degrees meet a "balanced gender criterion," defined as no sex constituting more than 60% of the population. Still the unequal gender structure of higher positions persists: men tend to hold the top positions, especially as professors. Explaining this inertia is the main theme of this article. Differences between horizontal and vertical analyses are focused on, and changes due to gender balance during 1999–2007 are shown. Variations in career patterns over research areas are highlighted. Finally, hypotheses are formulated and approaches for further studies on gender balance in HE are discussed.

Keywords: academic career, equality in education, higher education, discrimination

The Swedish debate about gender equality within Higher Education (HE) has primarily focused on the fact that in the senior positions of academia, women have been underrepresented in numbers compared to men (Kyndel, Lindberg, & Riis, 2003). But today more women than men attend undergraduate HE, and more women than men receive degrees from such studies, and in recent years the debate has embraced this fact, too (Regeringen, 2009). In Sweden the proportion of female students has been in the vicinity of 51–60% for more than a decade (professional education of, for example, nurses, teachers, and social workers recruiting many women, were already included in the Swedish university organization in 1977). Indeed, the number of doctoral entrants and the number of doctoral degrees meet a *balanced gender criterion*, defined as no sex constituting more than 60% of the total numbers of individuals. This 60/40 criterion is official Swedish gender policy. These are indisputable facts, at least in Sweden. However the unequal gender structure of higher positions (post-doctoral fellows, senior lecturers, professors) persists. Men tend to hold the top positions in HE, especially at the professor level. Explaining and understanding this state of affairs is one of the main themes in a research project on gender equality in Swedish HE, and this is also the first aim of this article. The second aim is to present a grid for categorizing

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and discussing theoretical explanations of persisting unequal gender balance and in that way identify underresearched questions about gender equality in HE. For the empirical work in this article, a statistical definition of gender equality is used and the 60/40 criterion mentioned above is applied. A case falling within this criterion we consider to be gender balanced; a case or a situation falling outside of it we consider to be gender imbalanced.

In the mid-1990s Riis and Lindberg (1996) presented a study showing how male and female applicants' qualifications were assessed when they competed for positions at Swedish universities. The point of departure was the rather common belief at the time that discrimination of female applicants did in fact occur and was especially frequent in connection with recruitment, that "a number of studies" had shown this (e.g. Brinck & Ryd, 1994), and that female applicants were being discriminated through linguistic manipulations made by the (male) experts (Fürst, 1988). The period studied by Riis and Lindberg was 1982–1994, and the material drawn from was written expert assessments of applicants' qualifications and official records from appointment committees. This source material was collected from the documentation of 311 staff appointments. The main results were:

- Females were found among the applicants in 4 cases out of 10.
- When women and men competed, women were 22% of the applicants but 31% of the appointed scholars.
- A critical test of judgments used on experts' assessments of female and male qualifications showed that systematic differences could not be detected in the experts' use of language in the written assessments. Each expert was consistent and applied the same linguistic measuring rod for female and for male applicants.
- Academic positions and their holders were still organised in the form of a gendered pyramid. At the top were full professors, most of them men. Below were postdoctoral fellows and associate professors, most of them men, but with the number of females rising steadily. At the bottom were junior lecturers, where there were a large number of women.
- Studies showing that discrimination was an ongoing activity within this phase of the recruitment process could not be found. The very few existing—and small—empirical studies showed that females came out quite well when they competed with males for posts at universities.

Riis and Lindberg's conclusion was that the valuation of applicants to teacher positions within the academic recruitment system was not the critical point for gender equality within Swedish HE. These results refuted the widely spread belief of the opposite.

Since 1996, quite a lot has happened. Swedish HE has been expanded. A reform to promote senior lecturers to professors was launched in 1998. The gender equality work has continued via changes of the HE ordinances and through various concrete efforts within the universities. Gender equality has probably also improved spontaneously as more women who are able to pursue academic careers also choose to do so. Several studies focusing on gender equality within HE were conducted in the late-1990s. Two of them have had more impact on the academic debate than others: Husu (2001) pointed to the existence of subtle mechanisms of discrimination in Finland's HE, and Wennerås and Wold (1997) showed that female applicants to the Swedish Medical Research Council, in order to be considered competent at the same level as men, needed 2.5 more publications than male applicants.

In 2003, Kyndel, Lindberg, and Riis published a bibliography on Nordic studies on gender equality in HE. Starting from a truncated search (criteria: higher education, university, women, sex, gender, equality), 677 books and reports were listed, of which 158 were annotated. Only about one sixth out of the 158 publications presented a theoretical base, built upon weighty empirical work, and seemed to have undergone peer-review. Of the 158 items were around 60% classified as "grey literature," that is they were reports with a local genesis. The driving force behind these texts was often the need within a university to further the local debate on gender equality, and as such they probably served their aims well. A typical such text starts by giving some statistics on the national situation as well as the local situation, with statistics cast in the vertical mode, showing a gendered pyramid. The author(s) then go on to present the outcome of interviews with (a small number of) female lecturers and/or post-doctoral fellows and/or doctoral students. The text concludes by stressing the importance of increased consciousness in gender matters and the need for more money.

In this article a number of circumstances, other than those concerning recruitment, are analysed, with the assumption that they contribute to the fact that change in the gender structure of higher positions occurs at a very slow pace or not at all. The materials used are: (1) the aforementioned bibliography covering 1995–2002 (Kyndel, Lindberg, & Riis, 2003), and (2) analyses of available national statistics on Swedish HE. Transition rates (from undergraduate studies to doctoral studies, and from doctoral studies to employment and career within HE) change over time, but also over national research areas (Lindberg, Riis, & Silander, 2005). The research focus in this article is on horizontal states and changes rather than vertical ones, since the former is seldom investigated, and since we believe gender equality to be a complex phenomenon in need of multidimensional scrutinization.

Horizontal Versus Vertical Analysis

The imbalanced gender situation can be described as both vertical and horizontal. Vertical because the women are found in the lower levels of the academic hierarchy and the men in the higher levels. This general picture of women in HE forming a narrowing gendered pyramid shows that women are well represented on undergraduate and post-graduate levels, but less well represented in the two permanent top positions: senior lectureships and professorships (see Figure 1).

The Swedish debate and research have mainly focused on vertical imbalance (Brinck & Ryd, 1994; Kyndel, Lindberg, & Riis, 2003; SOU, 1995: 100). However, the imbalanced gender situation is also horizontal, as men and women are present to a different degree in different areas of HE. Figure 1 shows only the accumulated situation, but tells nothing about the variations between the different faculties/research areas. Focusing on vertical changes provides explanations placed only at an organizational level. This may impede the understanding of a multifaceted phenomenon, and can lead to contra-productive political measures. Figure 2 shows the distribution of male and female lecturers over faculties/research areas in 2007.

The gender balance varies greatly according to faculty/research area studied. A horizontal analysis can thus uncover the simplified picture produced when only vertical statistics are used.

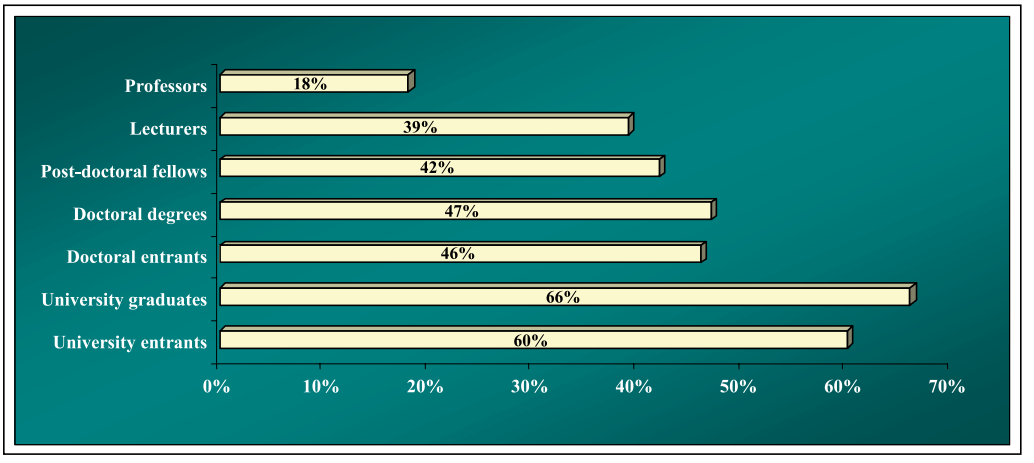

Figure 1. Women in Swedish higher education positions, 2007.
Source: National Agency for Higher Education (Högskoleverket) (2010). Statistics Sweden 2008a: UF 23 SM 0801. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.

Table 1 shows that there are substantial differences from one research area to another. "Other research areas" (mainly health science), humanities, veterinary medicine, agricultural science, and odontology have relatively high proportions of women. Areas such as

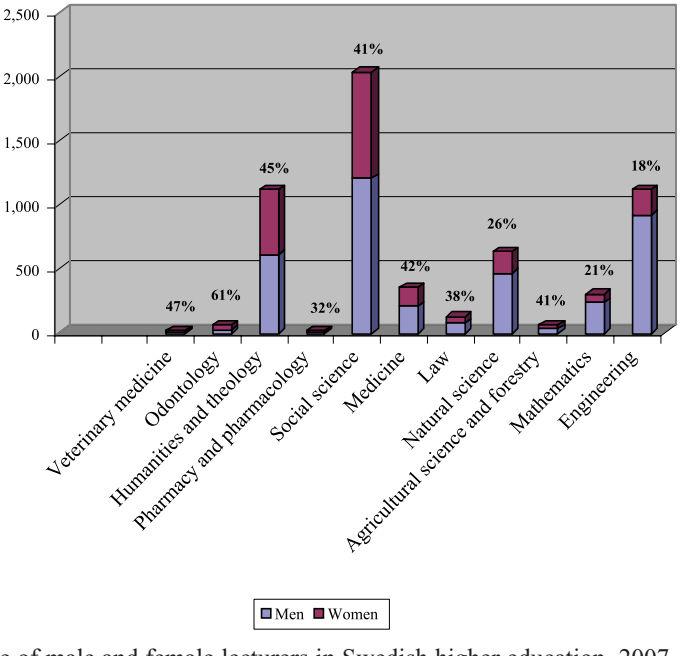

Figure 2. Share of male and female lecturers in Swedish higher education, 2007.
Source: Statistics Sweden 2008a; Statistical Messages UF 23 SM 0801 Table 5. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.

Table 1
Percentage of Women in Swedish Higher Education Positions Over National Research Areas 2007.

	Post-doctoral fellows		Senior lecturers		Professors	
National research area	Total	% women	Total	% women	Total	% women
Pharmacy and pharmacology	–	–	19	32	21	19
Humanities and theology	88	50	1,119	45	525	29
Mathematics	17	6	306	21	132	7
Medicine	170	56	359	41	836	17
Natural science	229	31	635	26	705	14
Odontology	5	60	64	61	56	23
Other research areas	37	62	528	75	123	57
Law	–	–	126	38	73	25
Social science	94	53	2,032	41	635	21
Agricultural science and forestry	44	59	61	40	135	18
Engineering	213	24	1,121	18	799	8
Veterinary medicine	9	77	17	47	36	28
Total	907	41	6,397	38	4,081	18

Source: Statistics Sweden, 2008a: UF 23 SM 0801. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.
Note. The totals contain a small number of persons (1, 10, and 5, respectively) not coded on national research areas.

engineering and mathematics are highly dominated by men. The vertical differences in favor of men remain, except for mathematics and "other research areas," and possibly also pharmacy. For the first two, the proportion of female lecturers exceeds that of female post-docs. However, each research area consists of many sub-fields/disciplines. If we break down the statistics into disciplines, we find even more obvious gender differences: women make up only low percentages in statistics, informatics, and economics (not shown in Table 1). Taking the economic sciences into consideration, we find that women are well represented only in business economy, and within the social sciences women are well represented in all large disciplines except political science (not shown). Within social sciences (as a national research area) women hold around one quarter of the senior positions (not shown).

To sum up, vertical and horizontal analyses yield two different pictures. Taken together, the analyses above indicate that attempts to explain the status of gender differences must take separate hypotheses into consideration.

Changes – Different Explanatory Powers in Different Dimensions

All in all, there is a change towards gender balance during the period studied (1990–2007[1]). The female percentage increased on all levels and in a majority of areas (see Table 2).

[1] For Table 5 data is available only up to 2003/2004.

Table 2
Percentage of Women in Swedish Higher Education Over Type of Employment/Degree Over Time

Type of employment/degree	1990 (%)	1995 (%)	2002 (%)	2005 (%)	2007 (%)
Professors	6	8	14	17	18
Senior lecturers	18	22	31	36	39
Post-doctoral fellows	22	27	38	**41**	**42**
Doctoral degrees	28	33	**44**	**45**	**47**
Doctoral entrants	35	**40**	**48**	**49**	**46**
University graduates	64	**59**	63	65	66
University entrants	**57**	**58**	61	57	57

Source: Statistics Sweden, 1995: U23 SM 9501 (Table 1a); Statistics Sweden, 2001: UF 21 SM 0101 p. 19 and Table 1; Statistics Sweden, 2002a: UF 23 SM 0202; Statistics Sweden, 2002b: UF 21 SM 0201 (Table 1 & 8); Statistics Sweden, 2003a: UF 20 SM 0301; Statistics Sweden, 2003b: UF 23 SM 0301; Statistics Sweden, 2008a, 2008b, 2008c; Högskoleverket, 2010. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.
Note. Figures in bold indicate a gender-balanced state in the lower part of the pyramid.

The bold figures in Table 2 indicate a gender-balanced state in the lower part of the pyramid (in the figure represented horizontally). The change is stepwise over time. However, the changes seem to be greatest at the top of the pyramid, and equilibrium seems to be reached at the bottom. Since this equilibrium appears to be relatively stable, and since the doctoral degree, in practice if not formally, is a necessary prerequisite for higher positions in the academic world, the figure of 47% doctoral degrees in 2007 was chosen for a further analysis along the horizontal dimension.

The nicely gender-balanced 47% of female PhDs shown in Table 2 were built up by a number of asymmetrical conditions, and this is revealed in Table 3. First, 5 areas out of 12

Table 3
Doctoral Degrees 2007: National Research Area Over Sex

National research area	Men	Women	Total	% women
Other research areas	14	72	86	84
Veterinary medicine	10	17	27	63
Pharmacy and pharmacology	15	11	26	42
Odontology	10	19	29	66
Medicine	318	461	779	59
Social science	188	197	385	51
Humanities and theology	100	139	239	58
Forestry, agricultural science and rural planning	27	22	49	45
Law	10	7	17	41
Natural science	274	202	476	42
Engineering	458	169	627	27
Mathematics	51	16	67	23
Total	1,475	1,332	2,807	47

Source: Statistics Sweden, 2008b: UF 21 SM 0801. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.

are not gender balanced. Second, 3 of these, small in figures, are dominated by female holders of doctorates, whilst in 4 of the areas, almost 40% of all PhD degrees are held by males (not shown). Third, and last, research areas with relatively good research funding, engineering, and natural science, with medicine being the exception, are dominated by male PhDs. However, in 2007 the natural sciences had reached a state of gender balance, which was not the case in, for example, 2002 (not shown in Tables).

So far teacher training, that is education as a research area, has not been included in the Tables and Figures. The reason for this is that most statistics regarding the years studied are based upon traditional disciplines and teacher training (education) is not registered as a separate area. In the statistics behind Figure 3, for example, education is registered under social science. Now, what can be revealed if the changes over time are simultaneously viewed vertically and horizontally? Table 4 illustrates this.

The horizontal dimension of changes between 1993 and 2007 shows remarkable differences in the post-doctoral fellow category. It should be kept in mind, however, that this group is small in numbers compared with the other two, and that the positions are short-term contract posts (2–4 years). The overall proportion of women increases with time, but this impression partly dissolves for professors and lecturers, where both increase and some decrease and some status quo can be seen. In 1998, the government launched a reform to promote merited senior lecturers to professor's rank. In an evaluation of this reform, made by the Swedish National Agency for Higher Education (Högskoleverket, 2003), it is concluded that for the period 1998–2002 no appreciable effects in any direction were found on gender equality.

From the Tables above, three lines of development can be observed since the early-1990s. In the first is a group of research areas where the share of women remains at a very

Table 4
Percentage of Women in Swedish Higher Education in 1993, 1999, and 2007: National Research Area Over Type Of Employment

National research area	Post-doctoral fellows			Lecturers			Professors		
	1993	1999	2007	1993	1999	2007	1993	1999	2007
Humanities and theology	**46**	**45**	**50**	37	39	**45**	15	24	29
Law	33	100	–	23	25	38	16	16	25
Social science	23	**47**	**53**	24	28	**41**	9	13	21
Medicine	34	**45**	**56**	26	38	**41**	5	10	17
Odontology	29	**58**	**60**	32	27	61	16	13	23
Pharmacy and pharmacology	14	100	–	31	32	32	0	8	19
Natural science	16	35	31	15	16	26	4	10	14
Engineering	12	27	24	7	10	18	3	5	8
Agricultural science	27	36	**59**	24	30	**40**	7	20	18
Forestry	11	32	–	6	3	–	2	11	–
Veterinary medicine	**43**	**47**	**47**	36	**52**	**47**	12	15	28
Total	24	38	**42**	21	25	39	7	12	18

Source: Statistics Sweden, 1994: U 23 SM 9401; Statistics Sweden, 2000: UF 23 SM 0001; Statistics Sweden, 2008a. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.

Note. Numbers in bold (20 out of 103) fall within the 40/60 gender balanced interval.

low level and where little change seems to take place. Such areas include mathematics and engineering, the latter of which, the third largest research area in Swedish HE, remains almost unchanged during this period, even if the little appreciable change visible is in favor of women. The second line of development is in a group of research areas where it is possible to see a change, especially in the social sciences. Last, there is a group in which obvious change has taken place, with women holding the majority of the new doctoral degrees in 2007. Two such areas include medicine and "other research areas" (i.e., healthcare).

To sum up this section, the proportion of female undergraduate students has remained stable for several years. Within mathematics and engineering, the share of women remains low and relatively stable. Within other subject areas, change over time can be noticed, however at varying paces. Stability at a low level seems to be the state at the base of the pyramid in the national subject areas of engineering and mathematics (doctoral degrees) and among professors of law. Changes in the category of senior lecturers are small, and in some cases even reversed. In the category of post-doctoral positions the change towards increasing proportions of women is remarkable, and this holds true even in engineering and natural sciences from 1993 to 1999, but not from 1999 to 2007.

Imbalanced Career Patterns: Different Opportunities for Doctoral Studies Depending on Research Area

The likeliness of continuing from undergraduate studies to doctoral studies is highly dependent on field of study and sex of student. The percentage of undergraduates going into doctoral studies is highest in the field of natural science and lowest in the fields of education, fine arts, and health science (Table 5). Overall, female transition rates are substantially lower than those of men, 5.3% among women and 9.7% among men. It is notable that within engineering in 2007, the transition rates to doctoral studies are almost identical for men and women.

Table 5
From Undergraduate to Doctoral Studies: Transition Rates Over Sex

Field	Number of undergraduate degrees 1995/96–1999/00		Percent started doctoral studies up to year 2003/04	
	Women	Men	Women	Men
Humanities and theology	7,375	3,466	10.0	18.3
Social science and law	25,703	18,926	4.6	6.5
Education	28,515	7,782	1.1	3.5
Natural science	4,817	3,305	30.7	4.1
Engineering	7,142	25,749	9.3	9.1
Agricultural science and forestry	841	1,010	13.4	9.7
Medicine and odontology	3,545	2,904	12.8	17.1
Health and caring science	22,329	2,978	2.4	3.8
Fine arts	1,382	988	1.2	2.0
Other	50	61	2.4	13.1
Total	99,454	65,540	5.3	9.7

Source: National Agency of Higher Education (Högskoleverkets årsrapport), 2005. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.

A sizeable undergraduate area consisting of mostly female students is teacher education. These students' opportunities for doctoral studies are generally small, and female transition rates are not only lower than that of men, but extremely low in general (Statistics Sweden, 2008b).

Men and women spend almost the same time in doctoral programs (not shown in the Tables). There are differences between research areas, but not between sexes.

The low percentage of women continuing on to doctoral studies is indicated in Table 6, where the number of undergraduate degrees is compared to the number of new doctoral students within a year and per field of studies.

The fields dominated by women at the undergraduate level, such as the humanities and social sciences/law/education, with a total of 31,000 undergraduate degrees issued every year, have few doctoral students (Table 6). Fields that are relatively smaller, and dominated by men on the undergraduate level, such as natural science and engineering, with a total of 12,000 undergraduate degrees a year, have much larger numbers of doctoral students. The chance of a graduate entering doctoral studies is about five times higher in engineering and the natural sciences (1 out of 9) than in the humanities/theology and social science/law/education (1 out of 45).

So far, we have shown that opportunities for doctoral studies vary with research areas. Figure 3 summarises our analysis of the differences in relationships regarding research areas, research opportunities, and sex.

Figure 3 shows that the four largest areas in undergraduate studies are within the social sciences and engineering, with female students heavily dominating the first of these. As mentioned, teacher education is not shown separately in Figure 3, but we know (e.g., through Statistics Sweden, 2008b) that this is one of the largest undergraduate areas. At the same time, the opportunities for doctoral studies are the smallest in teacher training. The best possibilities for doctoral studies are in medicine and natural science, which have

Table 6
Number of Undergraduate Degrees 2006/2007 by Field of Studies, Compared to Number of New Doctoral Students 2008

Field of studies	Number of undergraduate degrees	Women (%)	Number of new post graduate students	Women (%)
Humanities and theology	3,558	69	197	61
Social science and law	27,304	63	489	53
Education	9,796	81	–	–
Natural science	2,563	64	459	48
Technology	9,498	29	894	27
Medicine and odontology	2,006	69	887	58
Health and caring sciences	11,851	87	–	–
Agriculture and forestry	341	68	–	–
Fine art	774	57	–	–
Other	84	77	–	–

Source: Statistics Sweden, 2008b: UF 21 SM 0801, Statistics Sweden, 2008c: UF 20 SM 0801. Statistics obtained and used in accordance with the Swedish constitutional principle of public access to official records.

Note. Numbers for undergraduate studies and for post-graduate studies in Education, Health and caring sciences, etc. are not comparable.

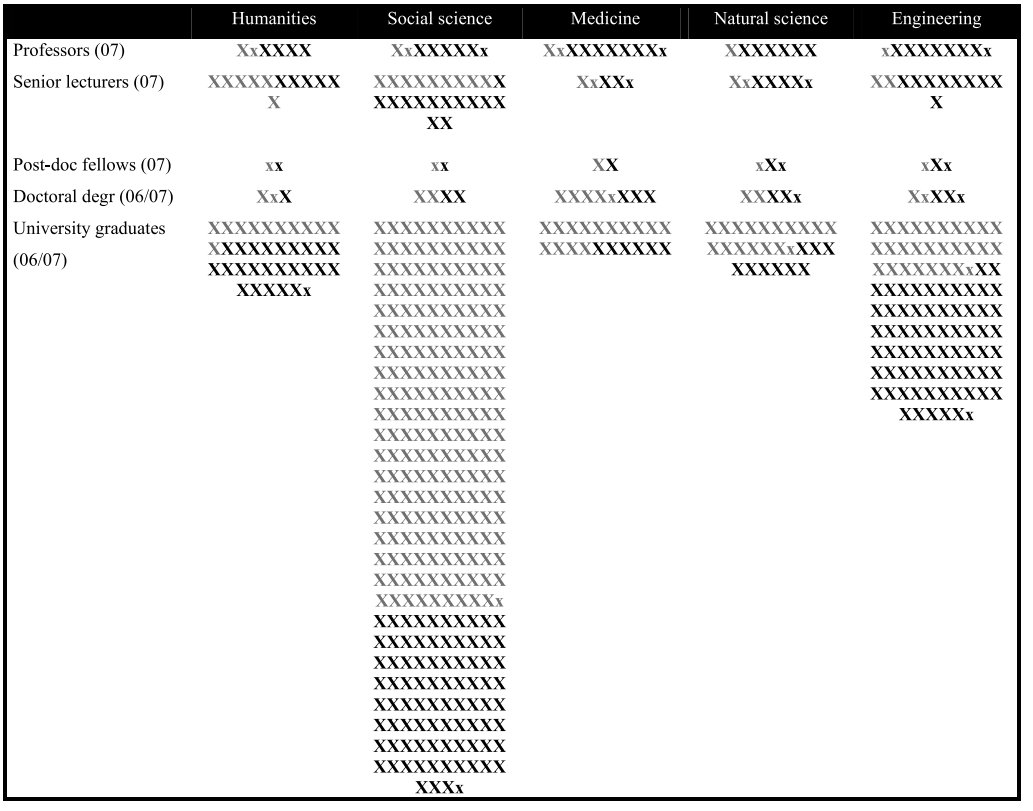

Figure 3. Men and women in selected areas, 2007.
Note. Large X represents ca 100 persons; small x represents ca 50 persons; grey X represents women and black X represents men.

relatively few undergraduate students, as well as in engineering. The transition rates within the university system as a whole are high in medicine and natural science, but even in these two areas the transition rates are clearly higher for men than for women. In engineering, there is an unequal gender distribution, but Figure 3 indicates a higher transition rate for women than for men. However, it should be noted that a substantial proportion of post-graduates in medicine are recruited from the natural sciences and the same is true, though to a lesser degree, for the engineering sciences.

Summary of Empirical Findings

The empirical results so far, and the conclusions drawn from them, can be summed up as:

(1) The gender balance varies greatly with research area. The horizontal analysis shows a different and a more complex picture compared with one composed of vertical statistics only.
(2) There is a change towards gender balance over the period studied (1990–2007). However, research areas such as mathematics and engineering remain without

much change, with the interesting exception of transition rates to doctoral studies in engineering.

(3) A set of theoretical concepts is needed to meet reasonable demands of symmetry for the category of sex in relation to the varying conditions of the research areas. This also calls for intersectional analyses.

(4) The opportunities for doctoral studies differ from one research area to another. The largest areas within undergraduate studies are social science, engineering, education, and healthcare. Female students heavily dominate in social science, education, and healthcare. The best chances for doctoral studies are in medicine, engineering, and natural science and the chances for an academic career are large or very large (natural science and medicine).

(5) Entrants to doctoral studies in medicine and natural science are gender balanced (as they are in social sciences). In engineering there has long been a gender imbalance, but in 2003/2004 there was a break in favor of balance. Education is a large undergraduate area, consisting of a majority of female students, where the possibilities for doctoral studies are small and transition rates extremely low, and, in addition, favoring men over women. Transition rates are, overall, substantially lower for women than for men.

(6) Women and men spend almost the same amount of time in doctoral programs. There are differences in this respect between research areas but not between sexes.

Theoretical Explanations of Gender Inequality in Higher Education

The analysis in the three previous sections indicates that the two hypotheses most common in the Nordic countries (cf. Kyndel, Lindberg, & Riis, 2003; Lindberg, Riis, & Silander, 2005) are the discrimination hypothesis and the lag hypothesis. According to the discrimination hypothesis, the organization of HE, and (male) individuals within HE, actively or passively treat female applicants, students, and colleagues differently than males because of sex. The lag hypothesis, on the other hand, assumes that women's underrepresentation is the consequence of circumstances in history and that more women will "naturally" enter HE and stay there when given the formal opportunities to do so. Neither the discrimination hypothesis nor the lag hypothesis can on their own merits explain the state of gender balance within Swedish HE. Nor can any of the hypotheses be totally rejected. In this article, the discrimination hypothesis is combined with a certain lag hypothesis, which states that women's choices can explain the state of gender imbalance within the top positions of academia. In the following, a structure that takes both the discrimination and the self-selection hypothesis into account is presented. Such a combination should lead to research designs suited to treat the empirically complex phenomenon of gender equality. Thereby the grid shown in Figure 4 would hopefully also yield theoretical development of the field, and our next empirical study will have this grid as its point of departure.

Explanations Stressing Norm-Directed Self-Selection Within Academia (Square 1)

Hypotheses explaining female underrepresentation in the academic world as a consequence of their own choices are found in the first square of Figure 4. The most usual metaphor is HE as a *leaky pipeline*. The idea is that the more women enter the system, the more women can also come out of the system (Schiebinger, 1999). A small recruitment base thus

	Within academia	Outside academia
Norm-directed self-selection	**(1)** **North west (NW)** Women choose not to prioritize their academic careers (individual level)	**(3)** **North east (NE)** Women choose to prioritize family over career (individual level)
Discrimination	**(2)** **South west (SW)** Women in academia are discriminated against (organisational level)	**(4)** **South east (SE)** The conditions for the system of higher education are discriminatory against women (system level)

Figure 4. Categories of explanations for the low representation of women in higher education.

explains the low number of women in higher positions. The women themselves do not choose an academic career and the low number of women in higher positions is looked upon as a consequence of individual choices and, to a certain degree, of historical heritage. This leaky pipeline hypothesis has been criticized from various viewpoints, including the deterministic element of the metaphor and thus its limited interplay with the lag effect (Allen & Castleman, 2001; European Technology Assessment Network [ETAN], 2000).

Explanations Concerning Discrimination Within Academia (Square 2)

This is another group of explanations found on the organizational level. The underrepresentation of women at higher positions is seen as a consequence of overt or covert discrimination. A frequent metaphor is that of an invisible *glass ceiling*, which stops female academics from getting to the top positions (Morrison, Randall, & van Velsor, 1987). Other closely related metaphors are *subtle discrimination* (Benokraitis & Feagin, 1995; Caplan, 1993), *chilly climate* and *old boys' network*. The latter hypothesis is closely related to the idea of homo-sociality (Lindgren, 1996). The contractual discrimination explanation, launched by the European Technology Assessment Network (ETAN) (2000) also belongs to this group. The ETAN defines contractual discrimination as "men [being] more likely to have tenure; women [being] more likely to be on short-term and part-time contracts" (p. 22).[2]

Explanations Regarding Norm-Directed Self-Selection Placed Outside Academia (Square 3)

Women's underrepresentation is often explained in terms of their choice to give more time to family and child-upbringing. However, this explanation is not specific for academia but seems valid for society as a whole. The traditional female role in society,

[2] Figures in Table 4 point to contractual discrimination as a possible explanation.

with responsibility for home and family, is perhaps still the most commonly held belief regarding the reason for the low proportion of women in higher positions within academia, as well as for the shortage of female managing directors and heads in trade and industry. However, there are studies showing contradictory results and findings indicate that the relation between the academic career and family is complex (Fox, 2005; Sonnert & Holton, 1995). Some show that small children have an influence on achievements, for example publication rates (e.g., Kyvik & Teigen, 1994). Other studies suggest that family has a limited impact on academic careers (Cole & Zuckerman, 1987).

These three groups of explanations, and their corresponding hypotheses, are frequently used in research on gender equality in HE. Taken together they contribute to the understanding of the underrepresentation of women in higher positions in academia. The claims of the hypotheses, however, seem to be somewhat overstated.

Another approach to studies within the category of norm-directed self-selection outside academia (square 3) would create more symmetry in the understanding of female doctors' career patterns. For example, where do all the female (and male) academics with a doctoral degree go, who do not opt for a career within HE? Can their careers be understood not so much as a consequence of being assumed to be "losers" (and sometimes even discriminated losers) in academic competition for higher positions, but as a mark of an overall transition of scientific research from the ivory tower to industrial research and development (Merton, 1966; Ziman, 2000)? Is it, perhaps, conceivable that the industry offers better working conditions and more challenging research possibilities? The figures from national statistics on Swedish HE, especially those on the number of doctorates and higher positions, indicate that these questions may serve as a starting point for a complementary hypothesis.

Discrimination Explanations Focusing on Circumstances Outside Academia (Square 4)

Still another set of explanations—seldom articulated—takes into consideration the construction of the system for research and teaching and the effects of policy decisions on HE, and their impact on gender balance. This kind of explanation is not found at an organizational level, but at a system level. This is the point from which we intend to take our research further.

Women and men, the choices they make, and the organizations they belong to are always situated in a context constituted by politics, in this case Swedish policies on HE. The way HE is constructed also exerts an influence on the gender balance and the career possibilities for women and men. Studies of gender in HE might therefore do well to focus also on how the educational system is constructed and who the "constructors" and "framers" of gender balance in HE are.

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