



Institute for Small Business Research
University of Mannheim



Rhine-Westfalia Institute for
Economic Research, Essen

Robert Strohmeier

Gender Differences in Self-Employment: Does Education Matter?

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Institut für Mittelstandsforschung, Universität Mannheim (ifm)

Forschungsgruppe Strukturbericht

68131 Mannheim

Tel. 0621-181-2788 oder -2897

<http://www.ifm.uni-mannheim.de>

Rheinisch-Westfälisches Institut für Wirtschaftsforschung Essen (RWI)

Forschungsgruppe Handwerk und Mittelstand

Hohenzollernstr. 1-3

45128 Essen

Tel. 0201-8149-268 (Dr. Welter)

<http://www.rwi-essen.de>

Abstract

This article focuses on the question, to which extent gender-specific differences in the self-employment ratio can be explained as a result of the vertical and horizontal structure of the educational system in Germany. Firstly, the influence of educational attainment and occupational skills on the entry of women and men into self-employment will be examined. Secondly we will verify the hypothesis that gender-specific differences in the choice of field of study form the main reason for the lower female self-employment rate. Finally, we will follow up the question to which extent women and men can make use of their acquired qualifications later on.

The study is based on micro data files from the German Microcensus (1991 to 1999), carried out annually by the Federal Statistical Office and covers 1% of all German households.

The findings demonstrate that a higher level of education is an important resource for female self-employment: In the period from 1991 to 1999 the growth in female self-employment was mainly due to the rising number of female university graduates. With regard to the occupational positions of female university graduates it can be asserted that those running their own businesses can be found more frequently in qualified occupations and high managerial positions than their colleagues in paid employment. Furthermore, the field of study is an important determinant for women's entry into self-employment. Areas of study that most favour the entry of women into self-employment are the so-called "integrated" ones. In contrast, women who study male-intensive as well as female-intensive branches have lower probability to switch into self-employment.

However, the gender-specific differences on the level of self-employment cannot be explained substantially by different choices in the fields of study. Assuming that women selected the same areas of study as men with the area-specific self-employed ratio remaining constant, the overall "gender gap" would not be reduced considerably. On the other hand, if women kept up their fields of study, while the female area-specific self-employment ratio increased to that of the male ratio, the female overall self-employment ratio would rise by more than 4%. Thus, for a substantial reduction in the self-employment gender gap, an adaptation of female choices in the fields of study to male ones does not seem to be an adequate measure.

Keywords: Self-Employment, Women, Segregation, Field of Study

Introduction

More and more women in Germany are starting their own businesses. In 2001 there were about 1 million female self-employed workers, which corresponds to an increase of about 30% (about 260000 women) during the last decade. Despite this excessive growth, there remains a tremendous gap between male and female self-employment. Self-employed women only represent 28% of all self-employed (Lauxen-Ulbrich and Leicht 2002). There also exists an enormous discrepancy between female and male self-employment with regard to business performance. Women-owned enterprises, in literature often characterised as “under-performed”, are mostly concentrated in industries typical for women, such as trade, restaurant or catering and personal services. Moreover, women-owned enterprises have a lower chance of surviving and growing than the men-owned ones do (Fehrenbach and Leicht 2002).

Many research studies have been conducted in the Anglo-Saxon countries with regard to the entry of women into self-employment and the determinants of survival and growth. However, these topics have not been much investigated in Germany, at least not in large and representative samples. In order to compensate this lack of research, we¹ carried out a project on female self-employment with the kind support of the Federal Ministry of Education and Research (BMBF), Germany.

Differences in the start-up behaviour of women, as well as their lower business performance, are, according to previous studies, mainly a result of the lack of human capital and of the special know-how needed for business creations. Although the differences in the educational attainment between men and women completely converged in the last 20 years, there substantial discrepancies persist with regard to the human capital of women. Therefore, the aim of this paper is to ascertain the importance of human capital for female self-employment, respectively business creation. We will analyse whether the differences in male vs. female self-employment rates are due to *vertical and/or horizontal segregation* in vocational education and fields of study. We will also try to describe a trend over the last decade.

A brief overview of research issues

First of all, we will give a short overview of different theoretical approaches and of the empirical state of the art (chapter 2). Then we will describe the used data sets (chapter 3). In the empirical part we will discuss the qualification background of self-employed women (chapter 4.1). Furthermore, we will examine the thesis, whether the “*gender gap*” in self-employment is mainly due to *gender-specific choices of major subjects* (“*horizontal segregation*”). The assumption being, that *not only the level of human capital* (Becker, Gary S. 1972), but *also the area of study* is an important predisposition to become self-employed (chapter 5). Moreover, we will examine the “*returns*” of tertiary education of men and women in paid employment and self-employment (chapter 5.3).

¹ Institute of Small Business Research of the University of Mannheim and Rhine-Westfalia Institute for Economic Research, Essen

2 Female Education and Self-Employment

Investment in higher education is a constant and long-term phenomenon in most post-industrial societies. Especially the participation of women in higher education has changed dramatically over the last decades. On an average, men are better educated than women, but these differences have converged recently. The female quota of those starting to study has increased permanently over the last ten years: in 1995 it exceeded the 50-percent threshold.

Most authors assumed that higher education is not only a crucial factor for the *success* of a self-employed person, but also for the *entry* into self-employment (Evans and Leighton 1990; Luber et al. 2000; Mueller and Arum 2003; Pfeiffer 1994). Robinson and Sexton (1994: 1) concluded that “a general education has a strong positive influence on entrepreneurship in terms of becoming self-employed and successful”.

Mueller and Arum (2003) found a strong positive correlation between tertiary education and the likelihood of becoming self-employed in a broad international comparison. The explanation of such a strong correlation for corporative states like Germany, France and the Netherlands is based on the consideration, that the entry barriers into top level professions in these countries are especially high. In addition, they showed that individuals with apprenticeship training stand a much higher chance of becoming self-employed than those without any kind of vocational training.

However, the *theoretical background of these hypotheses is not always plausible*. It is not clear at all, why and how education should be an important predisposition for becoming self-employed. Lucas (1978) regards individuals with a higher education as being able to adopt more easily to important management features through their advantageous positions as employees. He also argues that such employees have better opportunities to access start-up capital. Entrepreneurial qualities such as “initiative” and “risk-taking” rise with the level of education (Lageman et al. 1997:72). Moreover, higher education is seen to be essential for motivation, self-efficacy, discipline and problem solving skills (Cooper et al. 1994).

Nevertheless, the positive impact of human capital could not be replicated in all studies and for all countries. Country specific characteristics such as the *economic or political framework, as well as institutional regulations* seem to be very important. So, the higher self-employment rate in the United Kingdom is not only due to individuals with a higher but also to those with a low qualification level (Luber 2002, Lohman et al. 1999:10). For this reason some researchers suggest the opposite. They argue that, above all, social and economic status resulting from self-employment (e.g. “being ones own boss”) is attractive for individuals without any kind of formal qualification because of a lack of other alternatives (Collins and Moore 1970, Vonderach 1980).

Most of the studies discussed earlier concentrate on self-employed men (Luber 2000, Strohmeier und Leicht 2000). Only a few have examined gender-based differences regarding entry into self-employment. According to these findings, the reasons for women to start their own

businesses seem to be quite different than those of their male counterparts (Bryson 1998). Compatibility of family work and paid work, as well as non-pecuniary factors, like flexible working hours and independence, are crucial for women to choose self-employment (Lohman and Luber 2000, Georgellis and Wall 2000, Carr 1996). Finally, the chances of women entering self-employment are much lower than those of men, even when controlling for various factors (Lohman and Luber 2000, Bryson 1998).

2.2 Gender based fields of study and occupation

The discussion of the role of “human capital” on start-ups and self-employment concentrates mainly on vertical aspects of employment structure, or on the *level of formal qualification*. We will, however, focus on other aspects of human capital: The choice of the major subject and the horizontal gender segregation in the education system. While nowadays almost no deviation in the number of female graduates from high schools and/or technical schools exist in comparison to men, substantial differences in the choice of fields of study remains.

A considerable gender segregation with respect to the field of study can still be observed at the universities or technical colleges. The highest proportion of women major in education, followed by humanities and arts. Although the quota of women studying natural science and engineering has slightly increased, it remains very low (21%) (Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung 2000, Bildungsbericht 2002).

Likewise, the market for vocational education in the dual system shows an extremely gender-based segregation into women-dominated and men-dominated occupations. Only a small percentage of the 331 (about 12%) recognised professions is occupied by both genders.

2.3 Gender Differences in the Labour Market for Academics

We will pay special attention to *highly-qualified women*, i.e. those with a degree from a university or technical college. We will analyse the importance of discrimination effects in the job market on the entry into self-employment. During the crisis in the labour market during the nineties, those with tertiary education were the winners of structural changes and formed the only labour market group gaining new jobs (Reinberg 1998). However, despite this positive development, women have had substantial disadvantages: They were more frequently unemployed and had to accept jobs beneath their qualifications. Although in 2000 the unemployment ratio of university graduates in West-Germany was low (2.6%) compared to the total (7.7%), the percentage of unemployed women (3.7%) was much higher than that of men (2.5%) (IAB-Zahlenfibel 2003).

However, this is not a result of women choosing different fields of study than men. The statistics show that women with degrees in typically men-dominated fields, such as mechanical engineering, electro-technology, architecture or computer science faced more disadvantages. In 2000 twice as many female engineers and computer specialists were unemployed (6.6%) as their male counterparts (3.2%) (Plicht, Schreyer 2002).

According to Büchel and Weißhuhn (1998), the high inflow of female academics into the labour market goes hand in hand with an increase in jobs with low qualification requirements. Analysis based on Socio-Economic Panel (SOEP) shows that since 1984 the occupation situation for female academics has become substantially worse. In 1995 about 26% of female employees in Germany with a university degree worked in positions below their level of qualification, while only 6% of male graduates did.

3. Data, Variables and Methods

Our analysis is based on the “Scientific use files” by the “German Microcensus” (1991 to 1998), carried out annually by the Federal Statistical Office and covers 1% of all German households. These surveys provide detailed information on the social and economic situation of the population and allow the comparison of the educational achievement of individuals, especially with regard to various fields of study. In order to measure “educational levels”, we have used five categories that distinguish hierarchical levels of educational attainment. In addition, we have used class position and have coded it with the EGP class scheme (Erikson/Goldthorpe 1992) to measure the achieved social status. In the seven-class version of the EGP scheme we have mainly applied class I (higher-grade professionals) and class II (lower-grade professionals) to measure the likelihood that holders of different educational credentials enter these classes compared to the probability for other classes.

In order to analyse returns to tertiary education, we have employed logistic regression models, using categorical variables coded as service class I, service class II and other classes as dependent variable.

Table 1. The EGP class scheme

Class	Description
I	Higher-grade professionals and administrators, officials in the public sector
II	Lower-grade professionals, higher-grade technicians, lower-grade administrators and officials, managers in small firms and services and supervisors of white-collar workers
III - VII	Routine non-manual labor in administration, commerce and services, skilled manual workers, unskilled workers including agricultural labourers

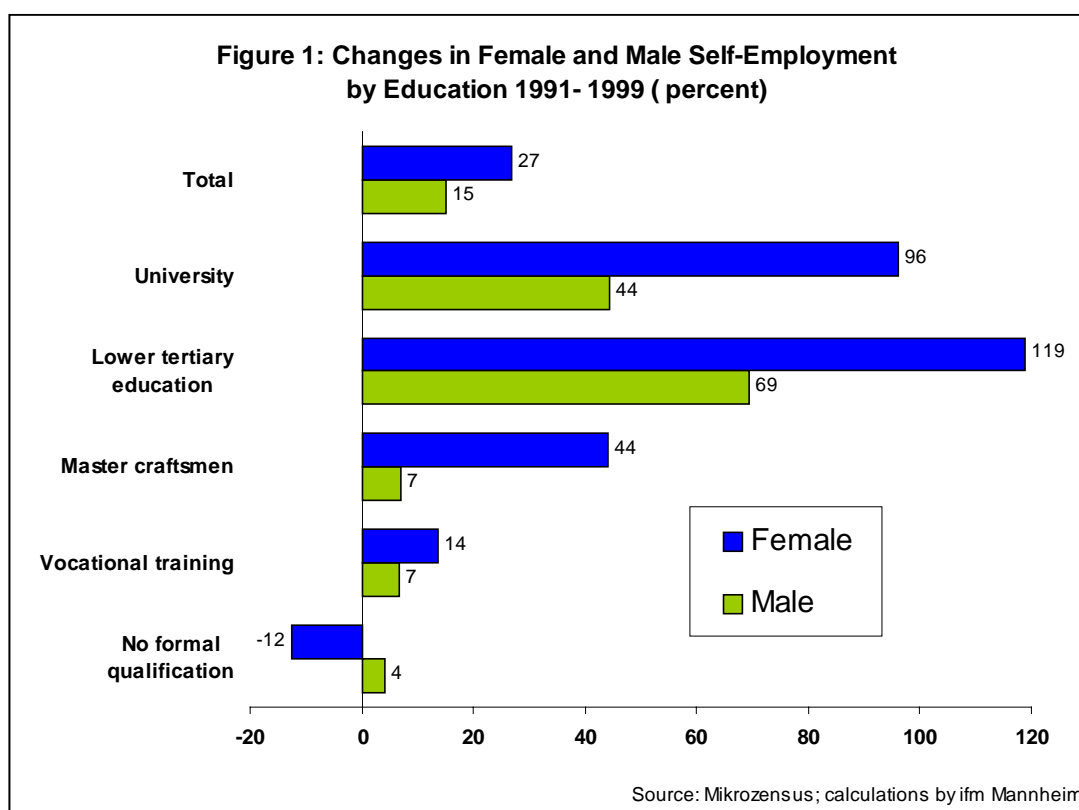
4. Education and Self-employment: Vertical segregation

In the first step we will regard the quantitative development and gender differences in self-employment by educational attainment. Thereby building different kinds of measures to demonstrate the development of female self-employment. *Firstly*, we will look at the changes in the numbers of the self-employed according to their educational level. *Secondly*, we will consider the self-employment rate as a percentage of the total employment.

Development:

According to the data of the Microcensus, the number of women who were self-employed in their first jobs increased by 27 percent between 1991 and 2001, while total female employment increased by only 15 percent (See figure 1.). More important, however, was an enormous increase in the number of women with higher education levels. The number of highly-educated self-employed women has more than doubled between 1991 and 2001. In contrast, the number of self-employed men increased only by 51 percent over this eight-year-period.

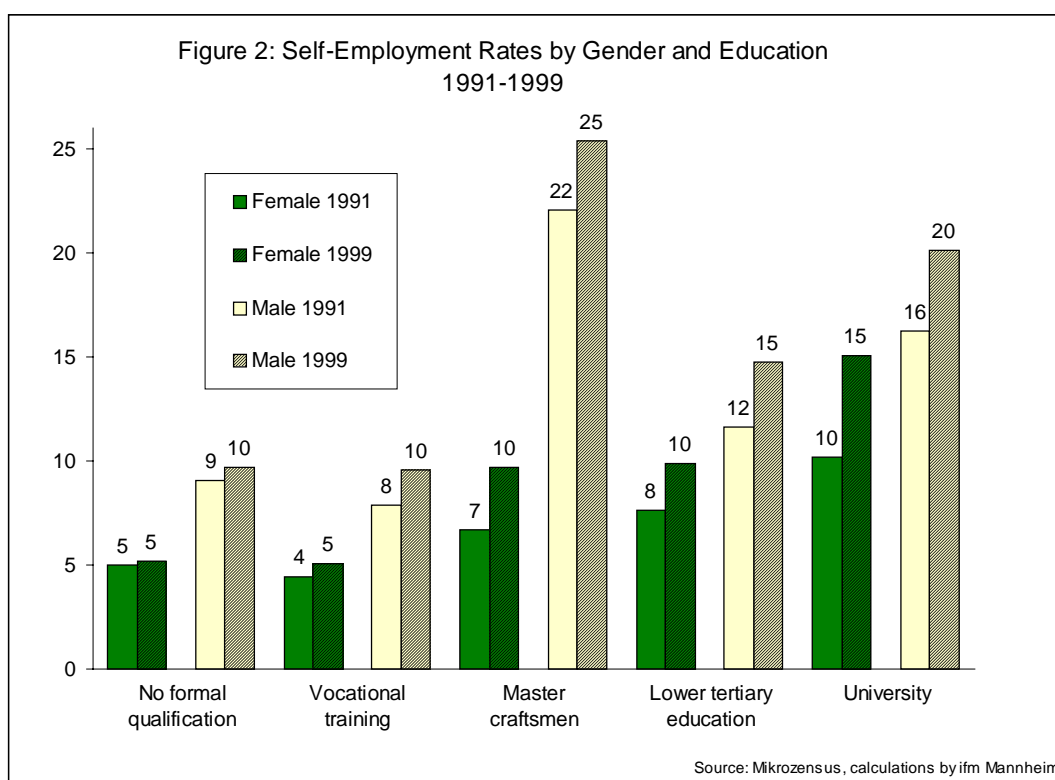
Compared to the high rates of highly-educated women, the number of those with lower levels of education rose comparatively moderately. During this period an enormous rise in the number of self-employed women (in comparison to those of men) with almost all kinds of educational backgrounds can be observed, but this particularly for women with a master craftsmen degree²: The rate of female entrepreneurs in this group rose by almost 44%. However, these findings could not be replicated for those women without any kind of vocational training or degree.

*Self-employment rate*

Our results demonstrate that the inflow from female university graduates into self-employment occupies an outstanding place in the overall development of self-employment. This trend is accompanied by a profound shift in the social structure of female self-employment. However, this perspective does not take into account the general change of the

² including technicians and advanced vocational training in the former GDR

female workforce, nor the total change in female educational attainment. The general inflow of highly educated women into the labour market implies, *ceteris paribus*, an increase in academic self-employment.



As shown in figure 3, the female self-employment quota rose from 5.2% in 1991 to 6.4% in 1999. However, the gender-gap in self-employment could be only slightly reduced, because the share of male self-employment also rose from 10.8% in 1991 to 13.2% in 1999.

The female self-employment rate went up between 1991 and 1999 in almost all educational attainment groups, but there are substantial differences between these groups. The largest increase over the last decade took place within the group of female academics: the share of self-employed women increased from 10 per cent in 1991 to almost 15 per cent in 1999. All in all, there is a strong correlation between the educational level and self-employment rates. Considerable gender differences in self-employment rates can be found in masters craftsman and technician education groups: The self-employment quota of men is 25.4% while that of women is only 9.7%.

5. Tertiary Education and Self-employment: Horizontal Segregation

Although numerous studies deal with the relationship between human capital and self-employment, they have focussed only on the *level*, but not on the characteristics of human capital or on the different fields of study (*horizontal segregation*). We have assumed that the subject of study provides individuals with specific resources, with cultural, economic, communicative, and technical know-how, which are strongly related to the positions in the labour market and the entry into self-employment.

5.1 Highly Educated Women and Importance of Field of Study

Despite the fact that gender differences in educational attainment in Germany have narrowed over time, the women's choices of fields of study differ considerably from those of men. In the following analysis we will concentrate on highly-qualified women and look at the horizontal segregation and its impact on self-employment.

Empirical findings

Table 1 shows that there is an increase in self-employment in all fields of study, but there are also huge differences in this development between various fields. Although in 1996 only 1 out of 4 academic self-employed women had a degree in medicine, a rapid growth in the number of self-employed women with a degree in medicine took place in only five years, accounting thereby for almost 84%.

Besides, there was an enormous and constant rise in the number of women studying jurisprudence. Just 5 thousand women worked on their own account at the beginning of the nineties, only five years later there were already 12 thousand, corresponding to a relative increase of almost 173%. A similar development can be stated for female graduates in Economics.

Table 1: Changes in Female Self-Employment by Fields of Study 1991-1996

Major	Total Employment		Self-Employment							
	Distribution in %		Changes 91-96		Distribution in %		Self-Employment Rates		Womens's Quota in Self-Empl.	
	1991	1996	in 1.000	in %	1991	1996	1991	1996	1991	1996
Agronomy	2	1	1	59	1	1	8	11	13	15
Natural Science	14	14	10	73	12	11	8	9	10	10
Business Administration	5	7	9	232	3	6	6	9	10	18
Public Administration	4	4	2	140	1	2	3	5	18	24
Law	3	3	8	173	4	6	12	21	10	21
Social Science	4	4	2	60	3	3	8	9	22	22
Medicine	10	10	27	78	30	28	28	36	27	34
Education	35	33	12	76	13	12	4	5	61	62
Humanities	10	10	13	114	10	11	9	14	50	59
Psychology	1	1	3	63	5	4	30	34	62	53
Arts	4	4	12	104	10	10	24	33	46	51
Other Majors	8	8	5	57	8	7	9	11	25	30
Total	100	100	103	89	100	100	9	12	23	28

Source: Microcensus Scientific Use File

Table 2: Changes in Male Self-Employment by Fields of Study 1991-1996

Major	Total Employment		Self-Employment					
	Distribution in %		Changes 91-96		Distribution in %		Self-Employment Rates	
	1991	1996	in 1.000	in %	1991	1996	1991	1996
Agronomy	3	3	5	42	3	3	16	19
Natural Science	41	42	79	65	31	36	11	15
Business Administration	9	10	23	70	9	10	14	17
Public Administration	6	6	4	64	2	2	5	6
Law	5	5	4	9	11	8	31	30
Social Science	4	4	9	61	4	4	13	17
Medicine	7	7	24	26	24	21	47	49
Education	11	10	7	67	3	3	3	5
Humanities	5	5	6	50	3	3	8	11
Psychology	1	1	4	134	1	1	22	36
Arts	2	2	9	68	3	4	26	33
Other Majors	7	7	6	23	7	6	14	15
Total	100	100	179	46	100	100	14	17

Source: Microcensus Scientific Use File

Women caught up with men not only in the traditional professions, but also in the typically female subjects like humanities, arts and education. Overall, the number of female self-employed with these educational attainments rose by 22 thousand.

Self-employment rates

It becomes evident from table 1 and 2 that self-employment rates of female and male graduates are strongly related to the different choices of fields of study in the tertiary education. Whether someone becomes self-employed or an employee, depends crucially on the academic subject he or she studied. Self-employment rates increased in almost all fields within 6 years (1991-1996), although with substantial differences.

At the top of all study fields we find women graduates of medicine with a self-employment rate of 38 %, which is an increase of 8 % in a six-year-period. However, up to now the male counterparts still have a much higher rate of self-employment (49.1 %) than women³. So, over time, self-employment in these traditional professions has become increasingly female. This also indicates also an increase in the women's quota of self-employment from 25.2% in 1991 to 32.4% in 1996.

³ However, this rate didn't rise in the observed six-year-period.

We find women with a degree in law in a similar catching up process. While the self-employment rate for women almost doubled within the regarded period (from 11.8 % in 1991 to 21.2 % in 1996), the rates of their male counterparts decreased slightly (from 31.2 % in 1991 to 30.1 % in 1996). In addition, the share of women among self-employed lawyers doubled in this period from 9.8 % to 21.4 %. Favourable opportunity structures for women to start businesses can also be stated for those with a degree in Psychology (34%) and Arts (33%)⁴.

What about the women dominated fields of study? About 40% of the female university graduates have degrees in humanities or education, while only 15 % of men studied in these fields. On the other hand, women are underrepresented in most technical-oriented fields of study. Our findings demonstrate this gender-specific characteristic: While 42% of the overall male labour force (dependent and self-employed) has a university degree in Engineering or Natural Science, this is the case for only 15 % of the women.

We have used a three-fold classification based on 79 fields of study which separates male-dominated and female-dominated majors. Integrated fields of study are such were the share of female academics (in the labor force) diverges by 15% from the total average (Hakim 1998). Our calculations show that the most favourable fields of study for women to enter self-employment are the “integrated” ones. In contrast, women who study female-dominated as well as male-dominated subjects have a lower probability to work self-employed.

Table 3: Self-Employment Rate by Field of Study and Gender

	1991	1993	1995	1996
	Women			
Female Majors	6.9	6.7	8.5	10.0
Integrated Majors	12.5	16.0	15.8	15.7
Male Majors	4.4	6.5	7.8	6.6
All Majors	9.3	11.1	11.9	12.4
	Men			
Female Majors	9.2	10.8	12.0	13.5
Integrated Majors	19.1	21.2	22.3	21.8
Male Majors	9.0	11.2	11.7	12.3
All Majors	14.3	16.2	17.2	17.2

Source: Microcensus Scientific Use Files

5.2 Gender Gap in Self-employment: Does Field of Study Matter?

Women study other subjects than their male fellow students. As shown, the fields of study have an important influence on the chances of becoming self-employed. Therefore, the ques-

⁴ However, the share of women in these subjects was already above the fifty percent threshold in 1991.

tion arises whether the gender-gap in self-employment is an effect of the gender-specific choices of field of study? What if women would major proportionally in the same fields of study as men? *Firstly*, we will follow the question whether the gender-gap could be reduced if women selected the same areas of study as men. Hereby we assume constant area-specific self-employment ratios for women. In order to answer this question, we will compute a simple shift analysis, using all 79 fields of study in the data sets⁵ (see Appendix A1).

Our findings do not support this thesis. Assuming that women selected proportionally the same areas of study as men (with the area-specific self-employed ratio remaining constant), the overall “gender gap” would not be reduced considerably. Insofar we have to ascertain that the propensity to switch into self-employment is higher for men than for women, independent of their fields of study.

Hence we can raise another question: What would happen, if women kept up their areas of study, while female area-specific self-employment ratio would rise to that of men? As calculations show, the number of self-employed women would increase by nearly 40% and the women overall self-employment ratio would rise by more than 4%.

As a consequence, an adaptation of female choice of areas of study to those of men does not seem to be an adequate measure for a substantial reduction of the gender gap in self-employment.

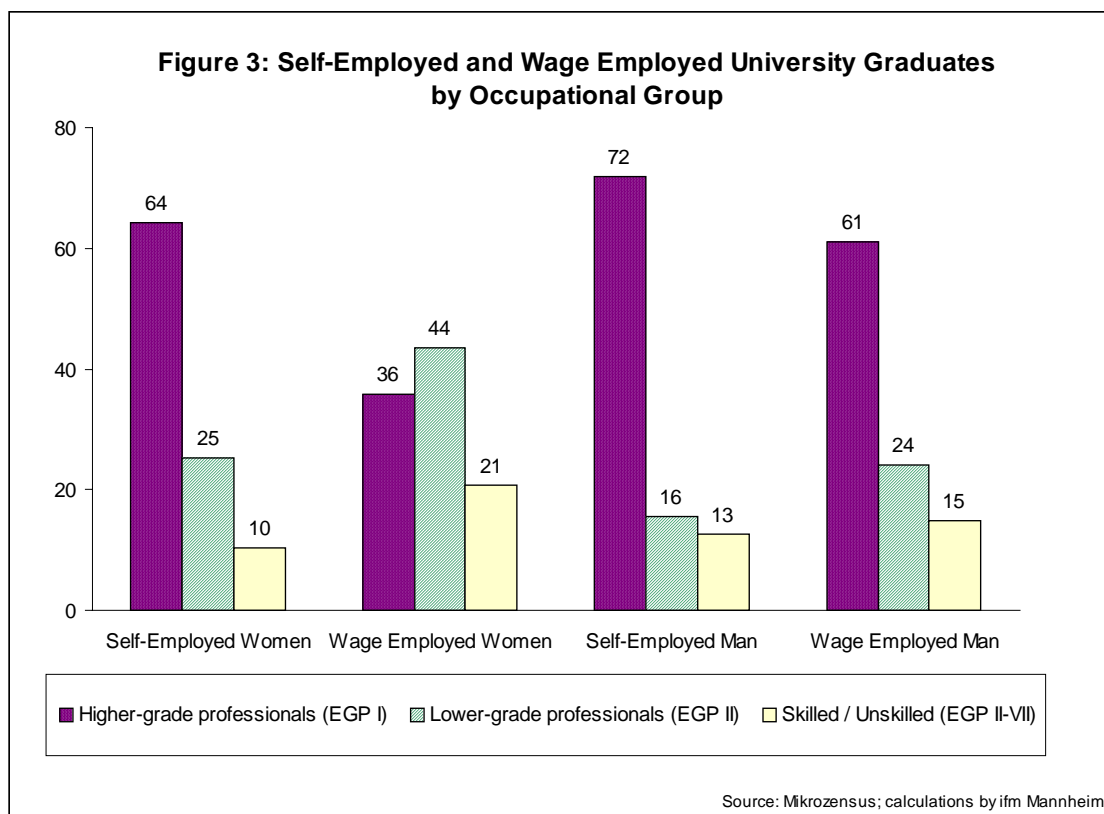
5.3 Returns to Tertiary Education for Employed and Self-employed Persons

According to previous studies, men are more likely to be employed in service class I (higher-grade professionals and leading positions) compared to women with the same educational level. In the following chapter we will examine this thesis for both groups, for the wage employed and the self-employed. Highly educated women try to diminish disadvantages in wage-employment through moving into self-employment, because self-employment provides them with much greater autonomy and self-determination – so our hypotheses.

We have measured achieved social status with the EGP class scheme (as described in “data and methods”) and have concentrated on women entering into service classes I and II.

Figure 4 reveals clear disadvantages for highly educated female employees as compared to their male counterparts. In contrast, there are no gender-specific disadvantages in self-employment. Those women running their own businesses were found more frequently in qualified occupations and upper managerial positions than female employees. Therefore, we argue that self-employment for female academics is an opportunity to reach highest social positions. Another interpretation of these findings is, that women become self-employed to escape inadequate work. It should be stressed, however, that analysis of cross-sectional in contrast to longitudinal data does not make possible the observation of changes in inflow.

⁵ Logistic regression model leads to the same results



We calculated both bivariate and multivariate statistical models. Use of multivariate models is necessary to control other factors, especially fields of study and institutional differences. Our empirical findings of logistic regression models confirm the results already obtained from bivariate methods (Table 4). We have found a clear disadvantage-effect for female employees. The odds-ratio to work in service class I is doubled for men compared to women, even when controlling for fields of study and institutional factors. In contrast, no kind of discriminating effect in self-employment with regard to gender can be observed.

Table 4: Gender-Effects in Logistic Regression models: Likelihood of Entering Higher-Grade Professions (EGP I) in Wage- and Self-employment:

	Logit - Coefficient	S.E.	Sig.	Odds-Ratios
Wage Employment				
Model 1*	1,03	0,025	0,000	2,79
Model 2**	0,68	0,029	0,000	1,97
Self-Employment				
Model 1*	0,34	0,064	0,000	1,40
Model 2**	0,05	0,087	0,549	1,05

* Model 1: gender effect of entering EGP I without controlling for other variables

**Model 2: (net) gender effect of entering EGP I, controlling for majors and institutional factors

6. Summary

This contribution deals with the question, whether and how education resources have an impact on female self-employment. Prior research mostly examined the influence of the level of formal education on the entry into self-employment (*vertical segregation*). We have assumed that considerable gender differences in self-employment are mainly due to the specialisation within the fields of study (*horizontal segregation*).

According to our results, higher education is, among other factors, an extremely important resource for the entry into the self-employment. Thus, the boom of self-employed women between 1991 and 1999 was mainly due to the increase in the number of female academics. The number of self-employed women with university degree more than doubled in this eight-year-period.

The statistics support the hypothesis that the likelihood whether a female academic becomes self-employed depends crucially on the choice of her field of study. While 36% of the medical students set up for themselves, only 4.7 % of the persons who major in education work on their own account. The most favourable fields of study for women to enter self-employment are the so-called “integrated” ones, like jurisprudence, medicine or business administration. In contrast, women who studied male-intensive as well as female-intensive branches have much lower chances of becoming self-employed.

However, the field of study is not an explanatory factor for *gender differences* in self-employment. If women were to select the same areas of study as men, the “gender gap” would not be reduced. On the other hand, if women kept up their fields of study, while the female area-specific self-employment rate would increase to the men’s rate, the gender gap would go back by more than 4%. Thus, to reduce gender-based discrepancies in self-employment, it is more important to increase institutional opportunities for women and their inclination to start-up businesses. An adjustment of female fields of study to that of men does not seem to be an adequate measure.

Furthermore, our findings demonstrate that highly educated women have much better chances to enter higher-grade professions and leading management positions in self-employment than in paid employment.

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Appendix 1:

Shift-Analyses: Major Distribution of Men on Self-Employment Rate of Women and Vice Versa (using all 76 Majors)

	Total Employ- ment (in 100)	Distri- bution Men	hypothetical Number Women	Self- Employ. Rate Men	Self- Employ. Rate Women	Hypothetical Number of Self-Employed Women	
						1. Distributon of Men and SER of Women	2. SER of Men and Distrib. of Women
Major 1: Agronomy	176	1,7	297	21,4	8,0	24	38
Major 2: Horticulture	52	0,4	74	21,0	17,6	13	11
Major 3: Silviculture	14	0,5	88	8,0	21,4	19	1
.....							
Major 74: Law	580	4,6	802	30,1	21,2	170	175
Major 75: Arts	279	1,0	182	21,6	27,4	50	60
Major 76: Other Majors	1090	6,2	1088	15,3	12,2	133	167
Total	17544	100,0	17544	17,2	12,4	2024	2936
hypothetical self-employment rate 1996:						11,5	16,7