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Editorial Note:

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Abstract

In this paper we analyze the change in effects of social origin (parents' occupational status and education) on vertical and horizontal post secondary choices of university-qualfied students in Germany. Comparing two large datasets from the German Higher Education Information System Institute (HIS) from 1983 and 1999, social origin effects on four *vertical* alternatives of post secondary education are explored by means of multinomial regression: Studying at a traditional university, studying at a university of applied sciences (*Fachhochschule*), taking up an apprenticeship in the vocational system or not continuing with further education. For those students who embark on a university education social origin effects on *horizontal* choices in the tertiary system, namely the choice of a *field of study* and a *study abroad* are analysed. Results show that the decision to continue with higher education is persistently related to social origin. Conversely, social background only plays a minor role in the choice of a field of study but affects the propensity to opt for a study abroad. The effects of *gender* on the first post secondary educational choice and on the choice of a field of study are considerable and change significantly over time.

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1 Introduction[1]

The access to higher education and the related question of equality of opportunity to higher education has been a controversial topic in Germany for the past four decades. With growing participation in higher education a tertiary qualification becomes an increasingly important stepping stone for labour market prospects and further life course opportunities. Expansion has lead to a more diverse student body that enters higher education. Unfortunately, there is a lack of detailed knowledge about the transition to higher education in Germany. The assessment of the degree and the development of social selectivity into higher education are both issues that have scarcely been addressed in the recent literature, mostly due to a lack of adequate data. We try to fill this void by analysing the effects of social origin on educational continuation using two large survey-datasets of university-qualified students from the Higher Education Information System Institute (HIS) from 1983 and 1999. The data allow us to analyse inequalities with regard to social background as well as gender and to control for relevant other variables such as grades.

In a first step of this paper we want to briefly summarize relevant empirical results dealing with educational inequalities in Germany and then characterize educational choices available to students qualified to pursue higher education. We will follow with a brief overview of some quantitative changes in the access to higher education in Germany over the last 20 years and theorize about possible changes in the effect of social background on the access to higher education in 1983 and 1999. After discussing our modelling approach we present the results of our analysis and the implications of our findings.

2 Educational inequality in Germany

Comparative research has established that Germany has a relatively high degree of educational inequality at the secondary level (Jonsson, Mills, and Müller 1996). Nevertheless, a number of studies show that educational inequalities by social background have decreased in recent decades in Germany (Henz and Maas 1995; Müller and Haun 1994; Schimpl-Neimanns 2000). The decline is substantial, but because it started from a rather high level it is likely that compared to other countries Germany still occupies a position at the upper end of the distribution of economically advanced countries ranked along the degree of educational inequality (cf. Mayer, Müller, and Pollak forthcoming). As pointed out before, there is less research on the changes of the effects of social background at the transition to higher education. In one of the few papers on this topic Mayer and colleagues (forthcoming) demonstrate that the reduction in educational inequalities at the secondary level has translated into a reduction in educational inequality in tertiary education. Interestingly, they do not find a

decline in class inequalities when looking at the subset of the population that achieved an entrance qualification to tertiary education, for male entrance qualification holders they can even see increases in class effects: The conditional logits increased in favour of the upper classes. It is important to notice, however, that they used a large dataset of pooled population surveys that only allows for the assessment of educational inequalities with respect to completed tertiary degrees but not for educational transitions. The data also did not allow for the differentiation between the two forms of entrance qualifications (*full* vs. *restricted*) nor was it possible to make claims about a time frame beyond the mid 1990's.[2]

3 Developments in access to higher education 1980-2000

As can be seen in Figure 1, embedded in the process of general educational expansion in Germany, the proportion of students[3] earning the certificate to enter higher education has steadily increased from 22,2% in 1980 to 37,2 % in 2000 (Statistisches Bundesamt 2002). The gross transition rate of these students to higher education (*Brutto-Studierquote*) on the other hand, measured as the proportion of university qualified students who are already enroled or plan to enrol 6 months after graduation has not significantly increased in the same time span.

Figure 1: Development of *Studienberechtigte* 1980-2000, measured as the proportion of the age group 18-21 who earned the certificate to attend higher education
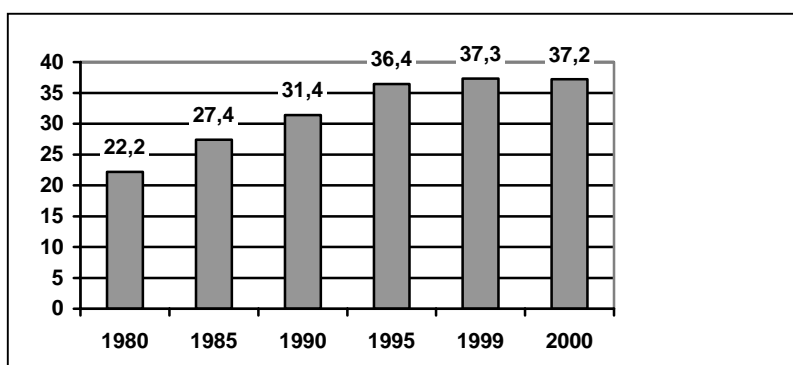
Source: Kennzahlen der Reihe Bildung und Kultur des Statistischen Bundesamts (2002)

In 1976, 83% of the students did enrol in higher education. This percentage decreased to 72% in 1983, and fluctuated around 70% from 1983-2002. The relatively sharp drop in the early 1980s might have been due to worsening labour market prospects for university graduates in the 1980s, as well as

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[2] Mayer et al.'s pooled dataset consists of four different datasets that were collected from 1976-2000. Considering that a tertiary degree usually takes an average study time of 4-7 years and that the analysis allows to look at completed degrees only nothing can be said about a time trend beyond the mid 1990s.

[3] Measured as the proportion of students who earned the qualification to enrol in higher education in the age group 18-21. Starting in 1996 the age range was broadened to 18-24 to account for a prolonged age-period in which the initial enrolment in higher education takes place.

the fact that the federal student financial assistance scheme (*BAföG*) was changed from a partial stipend-partial loan system to a full loan system from 1983 to 1990.[4]

After 1990 a partial stipend system was re-established even though the overall percentage of students receiving financial assistance, remained relatively low. A paper by Steiner and Baumgartner (2004) that uses data from the German Socio Economic Panel demonstrates that the change in the student aid programme in 1990 has not led to increasing enrolment rates.

Table 1: Proportion of *university qualified students* who are enroled or *who plan to enrol* in higher education, 6 months after graduation (calculated by HIS 1986, 2004)

Year	Gross proportion of all *Studienberechtigte* in Higher Education	already enroled	planned
1976	83%	-	-
1978	79%	-	-
1980	80%	-	-
1983	72%	-	-
1990[a]	76%	43	33
1992	74%	41	33
1994	71%	39	32
1996	66%	36	30
1999	66%	38	28
2002	73%	38	35

[a]East Germany is included from 1990-2002

Source: (Durrer-Guthof and Schaeper 1986: 34) and (Heine et al.2004: 15)

There are only rough descriptions available of the development of enrolment rates by social back-ground over this time span. Using occupational position as a measure for social background, a general propensity of upper service class offspring towards more higher education can be observed. The pro-portion of students whose father is a civil servant and who enrol in higher education has increased from 44% in 1986 to 73% in 2000, meanwhile the increase for students with a working class father has been only moderate, from 7 to 12 % in the same time span (Heine 2002: 64).[5] This result has commonly been interpreted in Germany as an increase in the relative chances for upper class stu-dents to take up higher education. However, the numbers are based on bivariate correlations neglect-ing important other variables like GPA. And these numbers also reflect the change of the social composition of the student body over the last decades due to educational expansion of parents' gen-eration. In 2000, 49% of students enroled at traditional universities had a parent with at least a tertiary degree as opposed to only 31% in 1985. During the same time, the percentage of students with

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[4] BAFÖG (Berufsausbildungsförderungsgesetz) was first introduced by the federal government as a full stipend for students who needed financial assistance in 1971. From 1974 up to 1981 the 100% stipend was successively replaced by a partial stipend-partial loan system.

[5] In these calculations that are based on aggregate data from the German "Statistisches Bundesamt" East German students are included in 2000

parents who hold an apprenticeship-degree from the vocational system has decreased from 40% in 1985 to 25% in 2000.[6]

The overall growth of the higher education system in Germany can also be characterized by the increase in the number of students enroled in institutions of higher education in the last 30 years. Their number increased most extensively in the 1970s from 422,000 to 972,000, and the upward trend continued in the years that followed until the growth stagnated in the 1990s. In the winter term 2000/2001 1.8 million students were enroled at tertiary institutions in Germany (Mayer, Müller, and Pollak forthcoming). In former West Germany the number of tertiary institutions itself climbed from 213 in the mid-1970 to 349 in 1998 (ibid).

In sum, we cannot be certain about the development of relative rates regarding social origin. However, a well-established significant development with respect to enrolment rates in higher education has been the trend towards gender parity. Looking at the proportion of the age group between 18-21, the difference between male and female enrolment in West Germany was 9% in 1984 (25% male vs. 16% female), 3% in 1996 and 0% in 2000 (33% male and female) in unified Germany (Heine 2002: 62).

4 Educational choices for university qualified students in the context of the educational system

The German educational system has been characterized by Allmendinger (1989) as a highly stratified and standardized system. Stratified because students are sorted into three qualitatively different tracks at a very early point in their school career and standardized because schools are fairly even with respect to exam standards and school resources and quality. In order to be able to attend higher education in Germany students need to obtain the *Abitur*. It is the qualifying exam completed after 4 years of primary education and 8 to 9 years of general secondary education - the latter usually at the *Gymnasium*. Those who have obtained the *Abitur*, in principle have free choice of a tertiary course of study and that is why we refer to the *Abitur* as "full entrance qualification". Nevertheless, the *Fachhochschulreife* ("restricted entrance qualification") is an alternative qualification into higher education that gives access only to the lower tier tertiary institution, the *Fachhochschulen* ("universities of applied sciences").[7] The *Fachhochschulreife* usually takes one year less of general schooling than the *Abitur* plus vocational training. It is frequently chosen as an entry way into higher education for graduates from the vocational training system. It should be noted, however, that there is not a direct way into higher education from the vocational training system in Germany. The *Abitur* or the *Fachhochschulreife* have to be obtained through additional tests and exams.

Students who earn the qualification to enrol in higher education (*Studienberechtigte*) are already a highly selected population with a relatively uniform qualification. While Allmendinger's typology was

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[6] At the universities of applied sciences the percentage of students with a parent with a tertiary degree increased from 14% to 30% and the percentage of student with an apprenticeship-parent decreased from 51% to 36% in the same time span.

[7] According to our data about a fifth of all university qualified students aquire the restricted entrance qualification.

developed for the secondary school system, the German system of tertiary education can also be characterized by the attribute of standardization since degrees earned at different universities do not vary substantially in terms of quality, prestige, or labour market opportunities. It is stratified in the sense that it has higher tear tertiary institutions, the traditional universities and lower tier universities of applied sciences. *Universities* are the institutions of traditional scientific training and academic learning, while the *universities of applied sciences* offer a limited selection of tertiary level programs with a more practical orientation and shorter study times.[8] Within the two types there is not a distinct differentiation in terms of resources, perceived standing, and reputation. Germany does not have elites institutions like the *grandes écoles* in France or the Ivy-League universities in the United States, just to mention a few. Only a very small percentage of students is enroled at private tertiary institutions; however the number of private institutions has been growing in recent years.[9]

Apart from enroling in a university or university of the applied sciences, university qualified students can choose to take up an *apprenticeship* in the vocational training system. An apprenticeship offers many advantages for university qualified students. They can obtain further education and receive a small training salary. The short duration of vocational training, usually 2 years for students with *Abitur*, allows for a quick entry into the labour market and the probability of being offered a job by the sponsoring apprenticeship firm is relatively high. Furthermore the probability of successfully completing a vocational degree is high for university qualified students because the schooling part of any vocational degree in Germany is designed in such a way that school leavers with less than a full secondary degree should be able to follow it. These reasons make the vocational alternative attractive for university qualified students.[10] Our data suggest that roughly a third of the university qualified students (1983: 33.37%, 1999: 31.92%)[11] choose a vocational degree as first post-secondary education. The fourth "educational" alternative is to *not pursue further education* and enter the labour market right away or to become a homemaker. Only a small and declining fraction of university-qualified students choose this alternative. According to our data this group is very heterogeneous in terms of social background and gender and consist of well below 10% of university qualified students.

To sum up, the set up of the educational landscape in tertiary education Germany is characterized by the divide between vocational training and tertiary education. When opting for higher education students can choose between the traditional universities and the universities of applied sciences.[12]

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[8] For a more detailed characterization of the differences between the two institutions see Mayer, Müller and Pollak: forthcoming.

[9] From the winter term 1992/1993 up to the winter term 2002/2003 the number of private tertiary institutions has increased from 19 to 51; in the same time the number of students at these universities or universities of applied sciences has tripled from 11,700 to 33,300 (Beck and Wilhelm 2003).

[10] The option of adding a tertiary qualification after successful completion of vocational training makes this post-secondary educational alternative also attractive. Büchel and Helberger (1995) characterize this double-degree strategy as insurance strategy because it provides a safety net to fall back on in case the pursuit of a tertiary degree fails.

[11] It should be noted that those numbers reflect "first educational choice" which means that a number of those beginners might not finish the apprenticeship or finish it and pursue a tertiary degree afterwards.

[12] It should be mentioned that another tertiary institution, the institutions of cooperative learning (*Berufsakademien*) are a third tertiary alternative for university qualified students in some regions of Germany that has become inceasingly popular. In 1998 19,000 students studied at 36 Berufsakademien in Germany (Hillmert und Kröhnert 2003: 200). A course of study at the *Berufsakademie* combines theoretical academic

5 Vertical and horizontal differentiation

5.1 Vertical differentiation

Using Rational Choice Theory to explain varying educational choices by social background (Breen and Goldthorpe 1997; Eriksson and Jonsson 1996) several characteristics of the four *vertical* post-secondary alternatives in terms of their costs, benefits, and perceived probabilities of success make them differentially attractive to students with different social origin.

In order to secure a labour market position similar to those of their parents, offspring of the service class have high incentives for *tertiary education* because it provides the best prospects for an upper service class position later on. In contrast, students of working class background and students from families with low parental education should be attracted by the shorter duration, high probability of success, and practical orientation of *vocational training* even though there is a trade-off with future labour market outcomes. For those working class students, who decide to pursue higher education the universities of applied sciences offer a number of advantages over the traditional universities. Due to the shorter study-times the universities of applied sciences are less costly, the probability of success is higher and the dropout rates are lower.[13] In contrast for service-class and especially upper service class students the universities should be more attractive than universities of applied sciences because of the better prospects for achieving an upper service class position later on.[14]

5.2 Horizontal differentiation

Beyond this *vertical* dimension in tertiary education in Germany the *horizontal* dimension in the higher education system, namely the choice of a field of study or a specific study programme in Germany, especially at the university level, is highly relevant because there are clear differences between fields of study in Germany in terms of reputation, labour market outcomes such as income (Machin and Puhani 2003; Schomburg et al. 2001), probabilities of entering the service class (Kim and Kim 2003), or job search rates (Schomburg et al. 2001) . Also, fields of study in Germany differ in terms of dropout rates (Heublein et al. 2002) and study-times (Reissert and Marciszewski 1987; Wissenschaftsrat 2001). As Windolf puts it, the choice for a specific field of study in Germany is not only the choice for a specific kind of education but a preliminary decision that determines a future profession and labour market opportunities (cf. Windolf 1992: 96). Depending on the field of study, access to it is usually regulated through the central admissions office of each university. Universal criteria for the intake of students is the grade achieved in the *Abitur*. For some fields with limited capacities for student intake like Psychology, Law, or Medicine, a country-wide Central Applications Office (ZVS) regulates access and placement to a field and university on the basis of the grade point average achieved (*numerus*

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and practical on the job training that only takes 3 years. Due to the very small number of students at *Berufsakademien* in the early 1980ies we treat this educational as equivalent to a vocational training in 1999 in order to be able to compare the educational choices in 1983 and 1999.

[13] One could also make the argument that from a *cultural* perspective the more practical orientation and job-relatedness of the universities of applied sciences make them more attractive to working class students.

clausus) in the *Abitur*. Only very recently departments at universities and *universities of applied sciences* were allowed to select students on their own and broaden the number of relevant criteria. Up to 1999 government funded tertiary institutions had very few possibilities for selective intake (cf: Mayer, Müller, and Pollak forthcoming).

Theoretical expectations for social background effects on choice of field of study

Even though the choice of a field of study highly depends on personal interests and motives (Heublein and Sommer 2002; Lischka and Wolter 2001) due to the different characteristics linked to fields of study, there is reason to believe that social background variables have an impact on the choice of field of study. Van de Werfhorst et al. (2001) propose three explanations of how family background can affect the choice of a field of study. First, they propose a mechanism of *direct intergenerational transmission* of field of study that they explain from a *cultural* perspective. Children learn about a field from their parents and gain specific insights to master the study programme.[15] The second explanation is a more refined version of the first mechanism in that it states that children from parents educated in economic fields are relatively likely to choose economic fields of study whereas children of the culturally educated parents are likely to choose a cultural field. Both mechanisms seem highly plausible but are hard to test empirically since they require data with information on parents' field of study. The third proposed explanation is Boudon's (1974) market model, the predecessor for further rational choice approaches, that states that costs and benefits are essential for educational decisions. Because children from different socioeconomic background differ in their perceptions of costs and benefits of different fields they are differentially attracted to them.

Given the lack of data to test the first two mechanisms we want to take a look at the third explanation and explore why different fields of study should vary in their attractiveness for students from different social background. We suggest four characteristics of a field of study that make them more or less suitable for students with different social background: 1) Perceived difficulty of a field of study 2) Typical study length 3) Perceived job security of a field 4) Opportunities to enter the upper service class and achieve high incomes. The *difficulty* or the perceived difficulty of a field should be a disincentive for the risk-averse working class whereas upper class offspring should not be too discouraged – especially if they have parents who completed higher education and who can help them assess the challenge of a given field more realistically (also see Erikson and Jonsson 1996). The typical *study length* should act in such a way that longer studying times associated to a field should act as a disincentive for a given field for working class students because of the higher costs and the longer time horizon. Perceived *job security* should be a clear incentive for working class students because of their tendency to be more risk-averse. The fourth characteristic, the *opportunities to enter the upper service class* should be especially important for upper service class offspring. However, what defines a "good"

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[14] On the official pay scale for government employees graduates from the universities of applied sciences receive a lower salary than graduates with a traditional university degree.

[15] Van de Werfhorst et al. argue that one can explain the direct transmission of field of study from a less strict *rational choice* perspective also: Children use their parents position as a reference point for their own aspirations and rely on the information provided by their parents concerning labour-market opportunities of a given field.

position is relative and the achievement of a "good" position and a "high" income is most likely a wish that students with differing social background share. One can expect that upper class students who follow mobility strategies *from above* (Goldthorpe 2000) will be more strategic in order to achieve their chosen field of study and not choose a field that gives restricted access to upper service class positions.

What fields offer incentives for students from upper class background?

Especially the two traditional fields leading to upper-class positions, *law* and *medicine*, should be more attractive for students from upper class parents. On the one hand they offer high labour market compensations in terms of income and prestige. On the other hand these two fields are characterized by prolonged training periods after graduation[16] only after which students can expect to earn a full salary. Furthermore, these fields have the image of being very challenging and time-consuming courses of study. In *law* it is by now common practice for many students to take part in an expensive private tutorial (*Repetitorium*) that prepares them for the final examination. Perceived job security should be relatively high for both fields even though law graduates have recently encountered increasing problems on the labour market.

Which fields should be attractive for working class students?

What fields are ideal choices for working class students? We suggest that *Teachers' education* ("Lehramt") and *Engineering* fields should be attractive for working class students, especially because of perceived high job security, which is the result of a very close linkage to the labour market. Both fields do not have the image of being exceptionally hard and have not very long study times (Wissenschaftsrat 2001; Reissert and Marciszewski 1987). It should be mentioned though that a complete teaching degree requires an additional two year training period. Possibilities of entering the upper service class are somewhat restricted for teachers. Engineering on the other hand can be a pathway to upper service class positions.[17] However, in the 1990s there was some fluctuation in the labour market opportunities for engineers.

In Germany most of the *Social Sciences*, such as Sociology and Political Science have the image of not being very challenging or demanding fields. In addition study times in these fields, roughly 6 years, are neither exceptionally short nor long (Wissenschaftsrat 2001) and there is not an extra training period after graduation before labour market entry. While we think that these criteria make the Social

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[16] Graduates of law, who want to practice law as a lawyer or judge need to go through a two year internship period with very low financial compensation (*Referendariat*), until they can expect to practice law and earn a full salary. For medicine graduates this prolonged period is even longer, after a one year internship (*Praktisches Jahr*) they have to serve two years as Assistants (*Assistenzarzt*), also with very reduced pay, until they can expect to earn a full salary. Just very recently the reduced pay for assistant medical doctors was abandoned in Germany.

[17] Apart from strict cost and benefit calculations there are a number of cultural arguments why engineering should be attractive for the working class: The *practical nature* and *job relatedness* of Engineering fields should act as incentives for working class students. According to Kelsall et al. 1972 (cf. van de Werfhorst et al. 2001: 281) working class children "will tend to prefer technology, and by association working, science courses, not only because they are seen to be related to future work, but also because they are more likely to lie within the occupation experience of many manual working fathers"

Sciences attractive for working class students, the perceived lower job security as well as a more "loose" linkage to the labour market should reduce social background effects.

Cultural fields on the other hand should be avoided by working class students because of the uncertain future labour market prospects in terms of prestige, income and job security as well as long study times (Reissert and Marciszewski 1987; Wissenschaftsrat 2001) and high dropout rates (Heublein et al. 2002; Reissert and Marciszewski 1987).

No discernable social background effects

With regard to other fields of study, such as *Economic fields*, the *Natural* and the *Life Sciences,* we expect that the four mentioned characteristics make it hard to discern social background effects that point in one direction. While economic fields seem to offer good opportunities to enter the upper service class, they do not have long study times with extra training periods and are perceived to be neither extraordinarily challenging nor very easy. Also the perceived job security and "job-relatedness" of economic study programmes is rather high so that the choice of an economic field should have advantages for both working class and upper class students. In our view the same logic applies to the choice of a natural or life science. These fields offer advantages and disadvantages for students of different social backgrounds: They are definitely perceived as very challenging on the one hand and offer decent labour market prospects on the other hand. Furthermore, they are not necessarily the typical entry-fields for upper service class positions.

After this brief overview of educational choices available to university qualified students and our assumptions concerning their relative desirability for students from different social origin, we proceed to develop our *guiding research hypothesis* about why social origin effects should have changed or not changed over the last two decades. We take into account the relevant developments in access to higher education in this time span.

6 Expected changes in social background effects 1983 - 1999

Given the reported developments in the 1980's and the 1990's – in what way should social background effects change at the transition to tertiary education? The expansion and the growing number of students and graduates in tertiary education, as well as the reduced inequalities in tertiary education in "unconditional" terms, have caused a tertiary degree to lose some of its previous exclusiveness. Following Goldthorpe's (2000) arguments concerning different *mobility strategies,* children from upper class background need to account for this development when choosing an educational path that secures them access to an upper service class position in order to avoid possible downward mobility. How could this motivation translate into different behaviour concerning the educational choices in tertiary education?

6.1 Expectations for change at the vertical level in tertiary education

At the *vertical* level we expect that upper classes will increase their participation in higher education. This means that they try to increase their enrolment rates at universities or, for those students who are

less academically inclined, at the universities of applied sciences to a larger extent than working class students. This strategy of a disproportionate increase in participation, could serve as a way to out-weigh shrinking advantages at the secondary level. This strategy, however, might be somewhat offset by the fact that the upper classes have already reached a *ceiling* in their transition to tertiary education in the early eighties or even before that time. Raftery and Hout (1993) put forward the idea that if de-mand for a given level of education is saturated for the upper classes, the association between social origin and education is weakened. Even though they define saturation when "some origin-specific transition rate approaches or reaches 100 percent" (ibid. 1993: 56), we argue that in the transition to tertiary education a ceiling is reached below 100% because there are other factors in addition to social origin – first and foremost previous educational achievement – that determine the chances of a transi-tion to the next educational level (see Erikson 1996). Cross tables with the gross transition rate from HIS, which defines the transition rates to higher education rather generously,[18] show that in 1983, 91% of male students with full entrance matriculation whose father had a tertiary degree from either a uni-versity or university of applied science (females 77%) chose to enrol in higher education (cf. Durrer-Guthof and Schaeper 1986: 34). Unfortunately, these analyses are quite rudimentary and were not followed up in the 1990s.

Concerning other relevant developments from the early eighties to the late nineties that influence the assessment of costs and benefits of tertiary education for students from different social background, such as the changing set up of the government study grant programmes, labour market opportunities and unemployment risks for academic degree holders or even a phenomenon as grade inflation in ter-tiary education do not point in a direction that urges us to predict more or less educational inequality. The changes in the federal assistance scheme in 1983 are likely to have increased class effects. As pointed out before, the reestablishment of a partial grant system in 1990 did not seem to have raised enrolment by those qualified to receive the grant because of low income parents. Furthermore re-search results suggest that labour market outcomes have been relatively stable for academic degree holders in Germany (Handl 1996). If anything labour market returns for graduates of the universities of the applied sciences have increased (Müller, Brauns, and Steinmann 2002).

Hypothesis 1: Upper classes will try to increase their participation in higher education in order to in-crease their relative advantages at the transition to tertiary education.

6.2 Horizontal differentiation: Expectations for field of study and study abroad

Given the fact that the upper classes have less room to increase their participation in higher education, we follow Lucas' (2001) idea of "effectively maintained inequality". Lucas argues that socioeconomi-cally advantaged actors secure for themselves some degree of advantage wherever advantages are commonly possible. For educational attainment he also suggests that once a level of schooling be-comes nearly universal "the socioeconomically advantaged seek out whatever qualitative differences

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[18] The transition rates are calculated generously because all students who plan to attend higher education eventually – even if they are currently in vocational training – are counted as "enroled in higher education".

there are *at that level* and use their advantages to secure quantitatively similar but qualitatively better education" (ibid: 1652). Although this idea was developed for secondary education we think it might be applicable to higher education as well. Higher education is far from "universal" in Germany but we argue that offspring of the upper service class will try to seek out qualitative differences in higher education to secure their relative advantage. Concerning a field of study they should avoid the low prestige fields and increasingly choose fields of study that offer the best opportunities to enter the upper service class.[19]

Hypothesis 2: Relative to lower classes, students from the upper classes increasingly opt for fields of study that offer the best opportunities to enter the service class.

Beyond the choice of a field of study there might be other mechanisms or strategies of qualitative differentiation in German higher education. Students might try to complete their studies in a very short time, achieve very good grades, and/or learn another foreign language or computer programme. We assume that students from different social background do not differ to a large extent in the take up of these strategies. Another strategy might be to enrich one's tertiary education by studying abroad for a certain amount of time. With increasing reliance upon knowledge-based industries and in most professional arenas in Germany the immediacy of a transnational presence, a study abroad may serve as a competitive edge. Future labour market prospects are likely to be enhanced by a study abroad or as Opper (1991: 235) puts it: "It is said that when one's job application joins a stack of others which are essentially alike in terms of academic qualifications, the reference to study abroad experience stand out to signal a candidate's initiative, self reliance, persistence, ability to adapt to differing cultures, and to cope with ambiguity." Except for a study by Opper[20] there is little empirical evidence analyzing the effects of study abroad for future labour market opportunities. However, her study shows that study abroad does provide a competitive advantage in getting to the interview stage in applying for jobs in the private sector in France, the United Kingdom and Germany. The positive effects showed regardless of gender of the applicant and whether the job sought did not specifically require international expertise (Opper 1991: 244). Hence we conclude that adding a study abroad or a work or internship abroad to a student's resume helps to achieve upper service class positions after graduation. Given that a study and/or a work stay abroad are usually very costly –most stipends do not suffice to cover living expenses – these strategies of qualitative differentiation should increasingly be taken up by the upper classes.

Hypothesis 3: Upper classes increasingly try to enrich their tertiary education by participating in a study or work stay abroad.

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[19] We make the assumption that even though fields of study somewhat fluctuate in terms labour market opportunities attached to them the overall rank order in terms of prestige, costs and benefits has not dramatically changed over the past two decades (see also van de Werfhorst et al. 2001: 281).

[20] Opper's survey study of 384 university graduates from three different countries has some data limitations. Graduates we asked to retrospectively evaluate the benefits of their study abroad which could have produced skewed results.

There are other strategies of qualitative differentiation one could think of – such as enrolment at the supposedly best study programmes at the best universities. For example, in the U.S. there is a clear ranking among colleges and universities in terms of prestige and labour market perspectives. Unfortunately, we do not have access to this information in the data set.[21]

7 Data and methods

For our analyses we use two mini-panel data sets. These data sets come from stratified random samples of students with entrance qualification to higher education in West Germany. The first data set comprises students who earned their entrance qualification in 1983, the second data set represents students from 1999.[22]

The data was provided by the Higher Education Information System Institute (HIS), an institute that collects and reports official data by order of the federal government. It was one of the first times the institute authorized outside researchers to analyse the data.[23] In order to test our hypotheses, we distinguish three dependent variables. First, we examine the effect of social origin on the first post-secondary educational decision, i.e. the *vertical* choice of an institution students make after they earned the entrance qualification. Second, we examine *horizontal* choices in higher education in terms of field of study that was chosen by the respondents, and third we look at study abroad experiences. In all analyses, we use the same set of independent variables. We distinguish between educational and occupational social background. Our measure for parents' education follows the CASMIN educational classification (Müller 2000). We use a summarized six-category version of it for father's education and a dummy-variable for mother's education.[24] Likewise, we operationalise parents' occupational position by borrowing the basic idea of the Goldthorpe class scheme and summarize these classes into four groups for father's occupational position: The upper service class, lower professionals combined with other non-manual employees, small proprietors, and the working class.[25] For mothers, we use again a dummy variable for reasons mentioned in footnote 24. Other independent variables include gender, year, grade point average of the entrance qualification exam (*Abiturnote*), and type of entrance qualification. Table 2 provides an overview over the different measures of the independent variables. Descriptives of all variables can be found in the appendix (Table A1).

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[21] However, we would not have expected marked effects for different universities yet because universities just started to differentiate and develop own profiles.

[22] The 1983 cohort was interviewed in December 1983 and December 1985. The 1999 cohort was interviewed in December 1999. For the analysis of study abroad, we use a preliminary version of the December 2002 data. We restrict our analyses to West German students because we are mainly interested in a comparative perspective over time. Nevertheless, we ran additional models in order to compare East and West German students of 1999. Overall, the results for East and West Germany are very similar.

[23] See the HIS website (http://www.his.de) for further information. We are indebted to HIS and would like to thank Dr. Christoph Heine and Percy Scheller and all other employees of HIS for their outstanding support and valuable input. We hope to be able to continue our cooperation in future projects.

[24] We tested many different kinds of operationalisations of father's and mother's education. The set of variables shown above turned out to be most efficient.

[25] Unfortunately, we had to combine lower professionals (class II in EGP) and other non-manual employees (class III) due to data limitations. There is only a small number of farmers in the data, so we merged them with other small proprietors.

Table 2: List of independent variables

Parents' education	CASMIN equivalents
Father:	
University *(Reference)*	3b
University of applied sciences (Fachhochschule)	3a
Full secondary education (Abitur), with/without vocational training	2c_gen/2c_voc
Secondary intermediate education (Realschule),with/without vocational training	2a/2b
Compulsory education plus vocational training	1c
Inadequately completed elementary education or (compulsory) elementary education	1a/1b
Mother:	
University degree *(Reference category)*	3b
Less than university degree	1a-3a
Parents' occupational position	
	EGP equivalents
Father:	
Upper service class *(Reference category)*	I
Lower professionals and employees	II/III
Small proprietors	IV
Working class	V-VII
Mother:	
Upper service class *(Reference category)*	I
Lower than upper service class	II-VII
Other independent variables	
Grade point average GPA (Abiturnote), *z-standardized*	
Sex: male=1, female=0	
Year: 1999=1, 1983=0	
Entrance qualification to tertiary education:	
full=1, eligible to study at traditional universities and univ. of applied sciences	
restricted=0, eligible to study at universities of applied sciences only	

7.1 First post-secondary educational decision

As outlined above, students basically have a set of four alternatives to choose from after they obtained their entrance qualification. Between 1983 and 1999, about 40% of all students decide to enter a traditional *university* programme, some 19% enter *universities of applied sciences*, *vocational training* is most attractive to 33% of these cohorts and 8% of the students do not aspire to any further formal education. Since we are mainly interested in the effects of social origin on students' first post-secondary educational decision, we display in Figure 2 the distribution of their decision by father's occupational position.[26] About 54% of all upper service class offspring enter university, whereas only 25% of working class students choose the most demanding option. Universities of applied sciences are more popular among lower classes (about 27% vs. 14%). The most preferred programmes for working class students, however, are vocational training programmes (about 36%). Looking at the change of participation rates over time, upper service class students increasingly opt for tertiary study programmes. On an aggregate level, it seems like students who previously chose vocational training programmes now

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[26] The results for first post-secondary educational decision by fathers' occupational education reveals the same structure as results of an analysis of educational decision by fathers' education. Therefore, we decided to show only one figure.

favour lower tertiary programmes of universities of applied sciences. Working class offspring, on the other hand, do not increase their participation rate in higher education and they increasingly opt for a relatively risk-less vocational programme.

Figure 2: Distribution of first post-secondary educational decision by father's occupational position; for students with full or restricted entrance qualification to higher education; data source: HIS-Studienberechtigtenpanel 1983 and 1999, N = 20,288
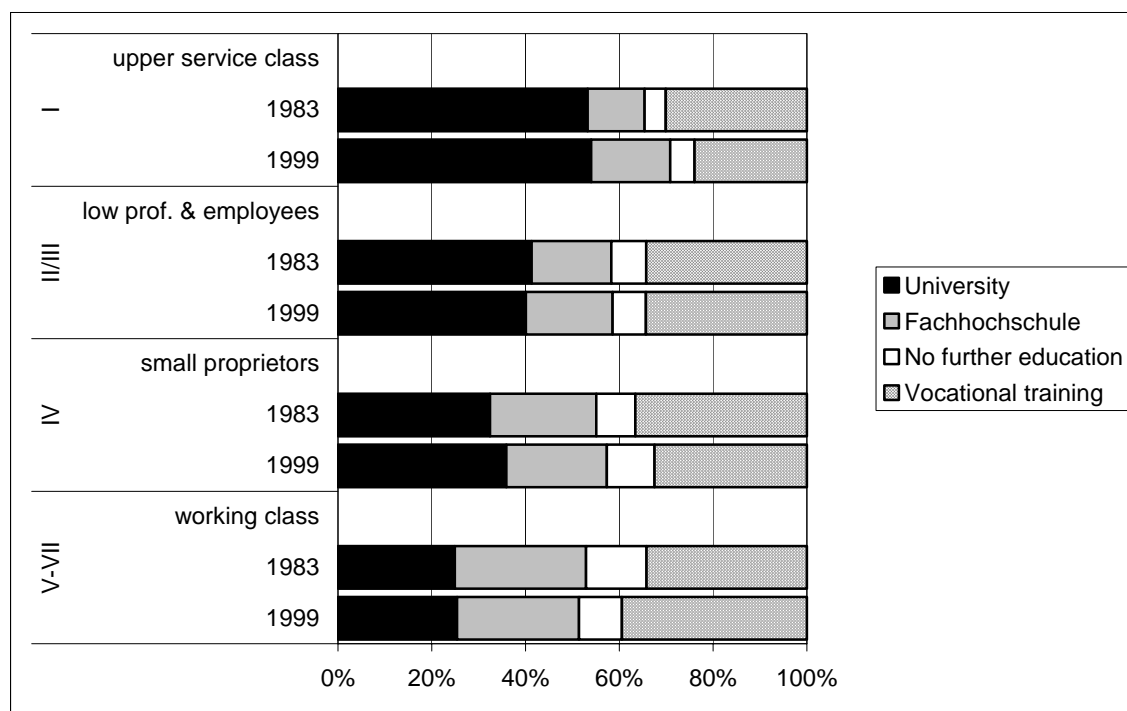
Taking on the saturation argument of Raftery and Hout (1993), it seems from these numbers that there is still room for upper class students to increase the transition rate to tertiary education, whereas the lower classes do not catch up in the period under consideration. This is clearly against the saturation argument *strictu sensu*. Therefore, we look again at the participation rates by father's occupational position, but this time we restrict our sample to the top 20% students.[27] Given excellent grades, about two thirds of all entrance qualification holders enter a traditional university, 13% choose lower tertiary programmes, 17% enter vocational training and 5% choose to pursue no further formal qualification. Figure 3 shows participation rates differentiated by social origin. Upper service class students have by far the highest transition rates into tertiary programmes. About 85% of them study at universities or universities of applied sciences. Transition rates for lower class backgrounds are successively lower. Only 40% of working class students with excellent grades enter a traditional university, another 26% choose lower tertiary education. There is only a minor change over time. Transition rates to traditional universities decrease somewhat for all classes. Therefore, almost all classes increasingly prefer uni-

versities of applied sciences (except working class offspring). If one looks at traditional universities and universities of applied sciences together, the increase for upper class students and students of small proprietors in tertiary education participation is relatively moderate. For students of lower professionals and other non-manual employees there is no change. Working class students, on the other hand, have lower participation rates and despite their promising grades, tend to increasingly prefer vocational training. In light of the saturation argument, there is good reason to conclude from these numbers that upper service class students with good grades almost reached their saturation level. For lower classes, there is still potential for higher transition rates. However, contrary to the expectations of Raftery and Hout (1993), rates for lower classes rather decrease instead of increase over time.
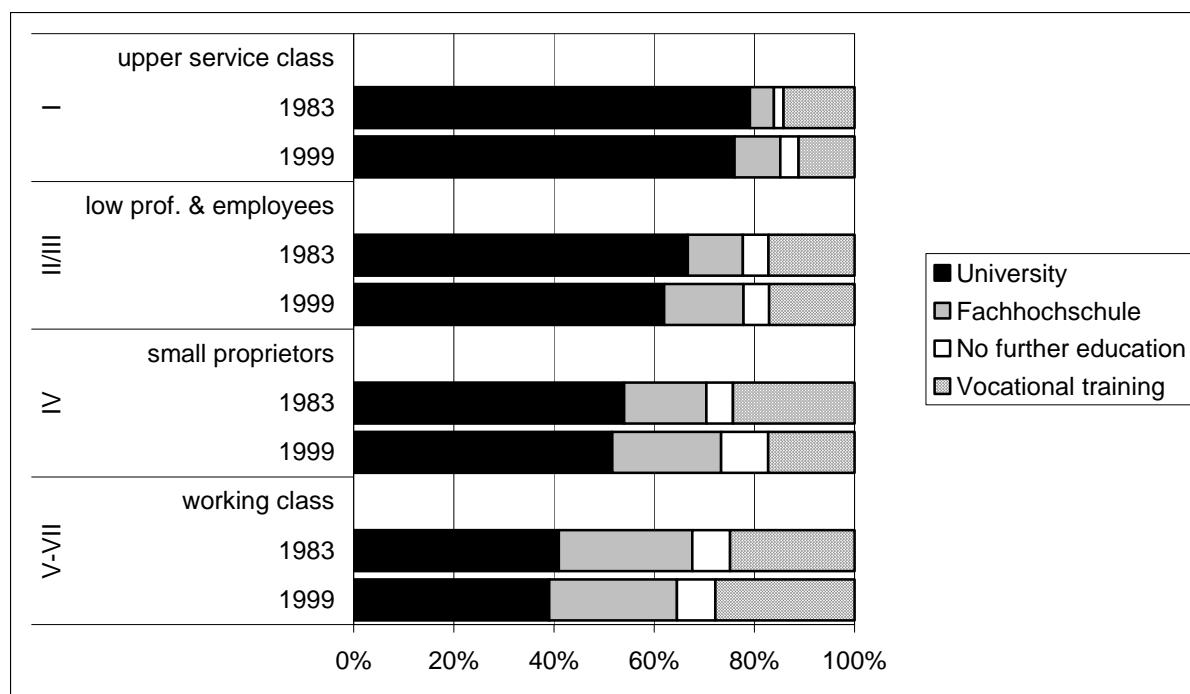
Figure 3: Distribution of first post-secondary educational decision by father's occupational position; top 20% of the students with full or restricted entrance qualification to higher education; data source: HIS-Studienberechtigtenpanel 1983 and 1999, N = 4,386

These bivariate results point into a moderate development towards more educational inequality at the post-secondary transition. However, other important factors like gender, full or restricted entrance qualification and other background variables have been neglected so far. Therefore, we turn to multinomial logistic regression models in order to assess the impact of social origin and its change at this transition in greater detail.[28] As Breen and Jonsson (2000) argue, using a multinomial model to ana-

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[27] About 38% of those students have upper class origins (compared to 31% in the unrestricted sample), 35% have a lower professional or employee as father (also 35% in the unrestricted sample), 13% (15%) are small proprietor offspring and 14% (19%) have working class roots.

[28] Students with a restricted entrance qualification are not supposed to enter traditional universities. However, a mixture between university and university of applied sciences ("Gesamthochschulen") in one state (*Land*) of Germany offers a way for these students to obtain a university degree. If we exclude these students, a multinomial logistic regression model would not be sensible any more, because students with full or restricted entrance qualification have different alternative sets. We ran a conditional logit model to control for this. The

lyse educational continuation decisions has the advantage over Mare's (1980) binary transition model to be able to differentiate social origin effects between a choice set of qualitatively different options. Table 3 presents model fits from a model building exercise. We started with a simple model that includes gender, year, and parents' education and occupational position. Next, we include grade point average (GPA) and type of entrance qualification (full or restricted) to tertiary education. With 6 additional degrees of freedom, the model fit increases considerably. These two variables have a decisive impact on the first post-secondary educational choice. They are both partly dependent on social origin. However, as model 2 shows, they also have strong independent effect. In model 3, we add interaction effects for gender, GPA and entrance qualification by year. Again, the model fit increases markedly. As we will see later, this is mainly due to the changing effects of gender. The next model (model 4) additionally captures change of the effect of parents' occupational position over time. With 12 additional degrees of freedom, the model fit improves significantly, i.e. the effect of social origin is indeed varying over time. This change, however, is rather little compared to the change over time for gender, GPA and entrance qualification. If we add additional interaction effects of parents' education by year, the model does not improve significantly. Hence, we choose model 4 as the best fitting model and present results of it in Table 4.

Table 3: Model fits of various multinomial logit regression models of first post-secondary educational decision on gender, GPA, social origin and year; for students with full or restricted entrance qualification to higher education; data source: HIS-Studienberechtigtenpanel 1983 and 1999, N = 20,288

Main and interaction effects by year	Model 1	Model 2	Model 3	Model 4	Model 5
Year = 1999 *(ref: 1983)*	X	X	X	X	X
Male	X	X	X	X	X
Male * Year			X	X	X
Grade Point Average		X	X	X	X
Grade Point Average * Year			X	X	X
Entrance qualification to university		X	X	X	X
Entrance qual. to university * Year			X	X	X
Parents' occupational position	X	X	X	X	X
Parents' education	X	X	X	X	X
*Parents' occupational position*Year*				X	X
*Parents' education*Year*					X
log likelihood	-23,080.2	-19,848.9	-19,741.9	-19,724.9	-19,718.3
degrees of freedom	36	42	51	63	81
Difference to respective previous model					
Δ Chi²	-	6462.47	312.91	33.95	13.15
Δ degrees of freedom	-	6	9	12	18
Significance	-	0.000	0.000	0.001	0.792

log likelihood of null model: -24,513.6

results of the conditional logit model for substantive variables are basically the same, therefore we present the more familiar multinomial model.

Table 4 shows results of a multinomial logistic regression of first post-secondary educational choice on gender, year, social origin and other independent variables. The coefficients indicate the log-odds effects of these variables on the contrast of one alternative compared to the base category of vocational training. Most of the main effects of our control variables point into a direction that we had anticipated, and these effects are generally significant. Students with a high GPA (the higher the better) have significantly higher chances to enter a traditional university or a university of applied sciences compared to vocational training. Men have higher chances to choose a tertiary study programme than women, i.e. women seem to favour vocational training. If we look at changes over time, women's preference for vocational training significantly decreases.

Table 4: Multinomial logit regression of first post-secondary educational decision on gender, GPA, social origin and year (b coefficients and z-values); for students with full or restricted entrance qualification to higher education; data source: HIS-Studienberechtigtenpanel 1983 and 1999; N = 20,288

|	university vs. vocational training		university of appl. sciences (FH) vs. vocational training		no further education vs. vocational training	
Main and interaction effects by year						
Year = 1999 *(ref: 1983)*	-0.10	*(-0.27)*	0.70	*(2.43)*	0.18	*(0.50)*
Male	1.05	*(20.95)*	1.39	*(20.02)*	1.20	*(13.22)*
Male * Year	-0.60	*(-8.11)*	-0.53	*(-5.54)*	-0.30	*(-2.29)*
Grade Point Average	0.68	*(25.74)*	0.25	*(7.02)*	0.02	*(0.49)*
Grade Point Average * Year	-0.07	*(-1.69)*	0.00	*(0.02)*	0.18	*(2.68)*
Entrance qualification to university	3.20	*(16.76)*	-2.20	*(-31.26)*	-1.54	*(-17.07)*
Entrance qual. to university * Year	0.81	*(2.49)*	0.94	*(9.34)*	0.81	*(5.91)*
Parents' education *(ref: university)*						
Father: REIHENFOLGE						
University of applied sciences	-0.29	*(-4.21)*	0.25	*(2.62)*	-0.38	*(-2.72)*
Full secondary education (Abitur)	-0.46	*(-5.53)*	0.05	*(0.4)*	-0.27	*(-1.71)*
Secondary intermediate education	-0.67	*(-10.44)*	-0.19	*(-2.03)*	-0.40	*(-3.18)*
Comp. education + vocational training	-0.78	*(-12.54)*	-0.15	*(-1.73)*	-0.25	*(-2.15)*
Compulsory education	-0.35	*(-3.09)*	0.11	*(0.78)*	-0.01	*(-0.05)*
Mother:						
Less than university	-0.40	*(-5.72)*	-0.19	*(-1.83)*	-0.36	*(-2.7)*
Parents' occupational position *(ref: upper service class)*						
Father:						
Lower professionals and employees	-0.02	*(-0.37)*	0.10	*(1.14)*	0.28	*(2.29)*
Small proprietors	-0.24	*(-3.04)*	0.20	*(1.85)*	0.22	*(1.53)*
Working class	-0.31	*(-3.75)*	0.16	*(1.51)*	0.44	*(3.28)*
Mother:						
Lower than upper service class	-0.09	*(-0.64)*	0.50	*(2.1)*	0.19	*(0.67)*
Interaction effects parents' occupational position by year						
Father:						
Lower grade professionals * Year	-0.21	*(-2.33)*	-0.33	*(-2.71)*	-0.24	*(-1.38)*
Small proprietors * Year	0.09	*(0.76)*	-0.23	*(-1.58)*	0.13	*(0.65)*
Working class * Year	0.05	*(0.48)*	-0.31	*(-2.25)*	-0.40	*(-2.09)*
Mother:						
Lower than upper service class * Year	-0.26	*(-1.50)*	-0.65	*(-2.37)*	-0.37	*(1.08)*
Constant	-2.26	*(-9.62)*	-0.34	*(-1.33)*	-1.01	*(-3.31)*

L_0 = -24,514; L_1 = -19,725

Note: Reference categories are written in italic.

Universities of applied sciences become more popular compared to vocational training and students with full entrance qualification increasingly prefer other alternatives than vocational training.

Our main interest focuses on the effects of social background variables and their change over time. If we look at parents' education, we find a clear pattern in the contrast between traditional university and vocational training. The lower parents' education, the lower the chances for their children to enter university. The contrast between universities of applied sciences and vocational training is rather erratic. One interesting aspect is the effect of whether the father has a university of applied sciences degree. The chances of these students entering a university of applied sciences are $e^{0.25}$=1.28 times higher compared to students whose father has a university degree. Most likely, this finding can be interpreted as direct horizontal transmission of educational degrees. Fathers who attended the university of applied sciences encourage their offspring to do so as well rather than attending a traditional university. As we have seen from the table of model fits, there is no change in the effects of parents' education over time.

The effects of parents' occupational position show a similar pattern. For the first contrast between university and vocational training, children of small proprietors or working class members have significantly lower chances to enter the university. In 1999, this is also true for children of lower professionals and employees. The effect of mothers' occupational position tends to work into the same direction. The effect is not significant in 1983 but the interaction in 1999 points even further into this direction. If we look at the second contrast between universities of applied sciences and vocational training, we find negative and partly significant effects of lower education, i.e. students with upper class background prefer universities of applied sciences more often than lower class students. However, this is not true if one looks at fathers who themselves hold a degree from universities of applied sciences. The effects of occupational background indicate that in 1983, upper class students prefer vocational training over universities of applied sciences. This effect, however, flips completely in 1999. All interaction effects are negative and they all outweigh the main effects and almost all of them are significant.

Figure 4: Changes in predicted probabilities according to model 4 in Table 3;
First post-secondary educational decision.
Independent variables: GPA, Sex, Parents' occupational position and
education. Upper box = 1983; lower box = 1999
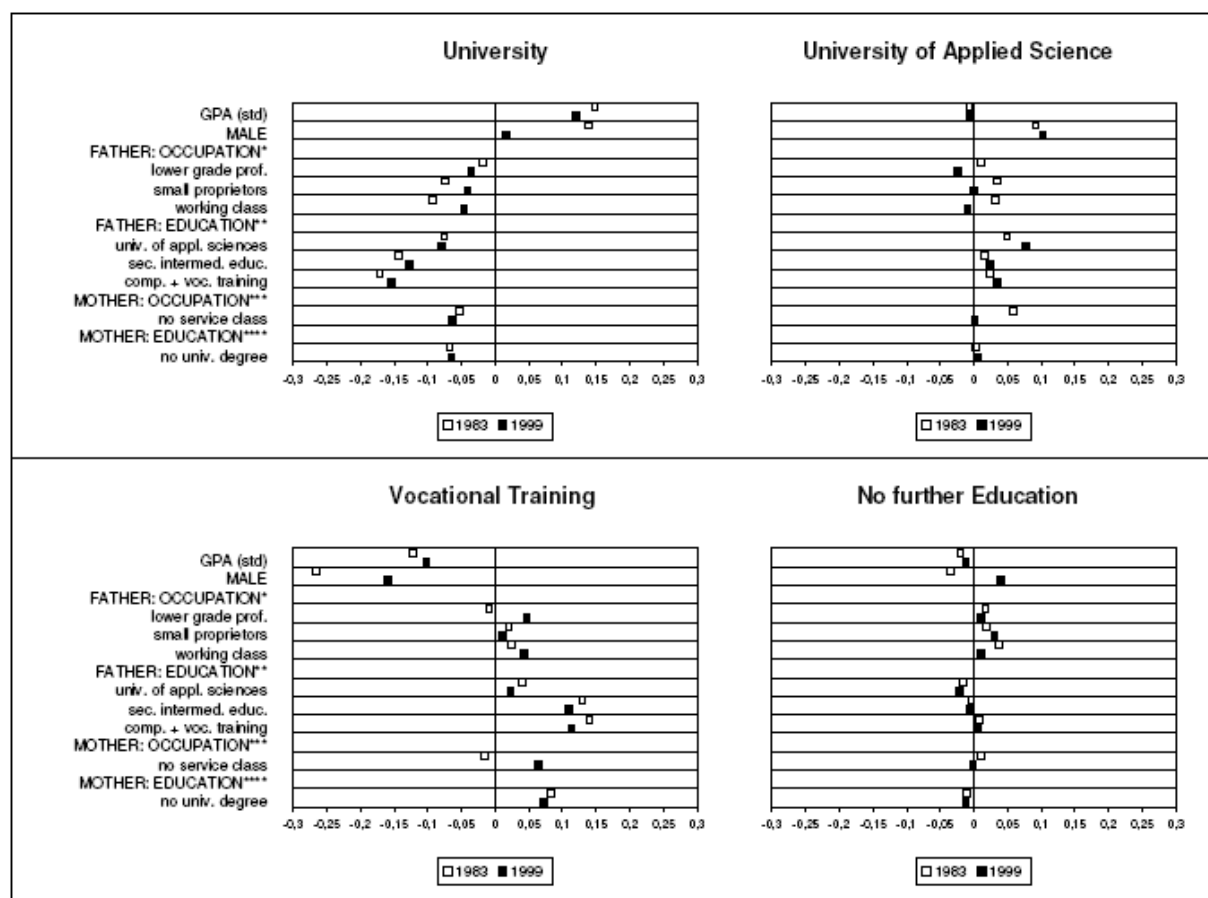
*	Reference:	*Father: higher grade professional (service class)*
**	Reference:	*Father: university degree*
***	Reference:	*Mother: higher grade professional (service class)*
****	Reference:	*Mother: university degree*

The interpretation of the coefficients from the multinomial model is quite complex because they are relative in respect to the base category as well as in respect to the reference categories. An easier way to present the results are plots that display discrete changes in probabilities of each outcome when the values of independent variables change by one unit and all other independent variables are held constant at their mean. Figure 4 represents this kind of plot. If we look at the effect of gender for example, we learn from the model that men's probability to enter university is about 14 percentage points higher compared to women in 1983 (upper "white box" in the Male row in the "University" plot). In 1999, this effect declined dramatically. Men's probability is only 2 percentage points higher than women's (lower "black box" in the Male row). Gender differences in access to the university have basically disappeared. However, there is still a marked gender gap for vocational training, although this gap became much smaller (.27 in 1983 to .16 in 1999). For universities of applied sciences, the prob-

abilities for men and women have hardly changed.[29] The effects of grade point average do not change much over time. Traditional universities become somewhat less selective and vocational training is less connected to poor grades.

If we look at the effects of parents' education, we find a clear pattern. The probabilities of students of parents with lower education are lower compared to students whose parents hold a university degree (reference category). For example, the probability for students whose fathers have compulsory education and vocational training to enter university is about 17 percentage points lower than for students whose fathers hold a university degree. This effect is remarkably ample, given that we control for grades and other variables in the model. If we add the effects of parents' occupational position, it is striking that social origin effects are so pronounced considering we analyse the post-secondary transition. As we have seen before, the effects for parents' education do not change significantly over time. The probabilities are not exactly identical because other control variables have changed over time. We do find change, however, if we look at parents' occupational position. In 1983, students from lower classes have lower probabilities to enter university, but higher probabilities to enter a university of applied sciences. Hence, for upper service class students in 1983, the university of applied sciences was less popular than vocational training. This effect, however, has changed completely. In 1999, the university of applied sciences is located between university and vocational training. Upper service class students apparently accepted universities of the applied sciences as a viable alternative to secure relative advantages compared to lower classes. The differences in the probability for traditional universities decline for working class and small proprietor offspring, but increase for students of lower professionals and non-manual employees.

In sum, we have found declining gender effects over time for the first post-secondary educational decision. We also found substantial effects of social origin, especially for parents' education – even if we control for ability (GPA). The effects of parents' education do not change over time. For parents' occupational position, we see interesting changes in the choice of the university of applied sciences. Students from the upper service class increasingly opt for this alternative. Vocational training, on the other hand becomes increasingly less attractive to this class. There are no noticeable effects of our independent variables for the probabilities to choose no further education. With exception of the gender effect, men are 1983 less likely and 1999 more likely to not pursue further education[30], the differences in predicted probabilities are close to zero. Apparently the decision to not pursue further education can not be explained by our chosen set of independent variables.

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[29] From the log-odds presentation of Table 4, one could have expected declining gender effects for the university of applied sciences. However, the decline is only relative to vocational training. Therefore, a probability plot reveals a more intuitive picture of the effects at work.

[30] We think that the most likely explanation for this finding is the different coding of our dependent variable "first post-secondary educational decision" in 1983 and 1999. For the 1983 data we tracked students first educational decision for 2 ½ years after leaving school so that most males who typically enter military or civilian service had time to make an educational decision. In 1999 our reference point was only 6 months after graduation from school so that more males might have been still undecided at this point. To make sure this coding does not effect other results in this paper, we ran all models with identical coding (3 ½ years after graduation). The results remain unchanged.

In our hypotheses, we expected a small – if any – increase in educational inequality at the post-secondary transition. We have seen that upper class students have almost reached saturation at traditional universities. Therefore, we are not surprised that the effects of social origin on traditional universities do not increase; if anything, they decline. However, a new pathway for upper class students seems to be to use the university of applied sciences as one way to increase participation rates in higher education and to secure an advantage in terms of formal education compared to lower classes.

7.2 Choice of field of study

We argued before that students with an upper service class background will seek out qualitative differences in higher education to secure their relative advantage by increasingly opting for fields of study that offer the best opportunities to enter the upper service class later on. For this analysis we restrict our sample to those students who chose to pursue tertiary education at the traditional university or a university of applied sciences and analyse their choice of a field of study.[31] Altogether, we distinguish between ten different fields of study. Table 5 lists these ten categories and displays column percentages of choice of field of study by social origin, measured as father's occupational position, separated for 1983 and 1999.

A first inspection of the table reveals rather little differences in the choice of field of study by father's occupational position. As expected, law and medical sciences are more popular among upper class students, whereas engineering and social sciences are more preferred by working class students. Comparing 1983 and 1999, we find some change in the overall distribution of field of study. Especially the number of students who choose engineering declined by about a third, biology and chemistry also became less attractive. Social sciences and teaching, on the other hand, were selected more often in 1999. Changes with regard to class-based preferences are more difficult to detect.

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[31] For sake of comparability, we exclude students with restricted entrance qualifications, because at universities of applied sciences, there is a limited set of fields of study. Again, we ran conditional logit models to test whether the effects of social origin vary between these students. Indeed, especially the effects of working class background on engineering becomes somewhat stronger for students with restricted entrance qualification. However, overall, the results are very similar, so we chose to present just one straightforward model.

Table 5: Column percentages of field of study by parents' occupational position, separated by year; for students with full entrance qualification to higher education; data source: HIS-Studienberechtigtenpanel 1983 and 1999; N = 10,104

Field of study	Year	upper service class	lower prof. and employees	small proprietors	working class	All
Life Sciences (Biol., Chemistry, Pharmac.)	1983	10.20	9.76	6.37	9.10	9.40
	1999	6.62	7.09	6.84	7.21	6.89
Engineering	1983	14.67	16.68	17.36	21.15	16.59
	1999	9.84	11.74	12.15	12.62	11.15
Culture/Humanities	1983	14.45	13.55	15.76	14.21	14.28
	1999	14.75	15.16	15.25	13.69	14.84
Medical Sciences	1983	9.16	6.98	7.05	5.14	7.59
	1999	9.59	6.57	6.52	5.51	7.63
Social Sciences	1983	3.96	6.27	6.09	8.25	5.61
	1999	8.65	8.47	6.60	9.37	8.40
Law	1983	10.13	7.12	6.14	4.58	7.82
	1999	8.57	5.22	7.01	7.00	6.97
Economics	1983	12.23	12.27	17.24	13.51	13.07
	1999	14.87	13.64	18.16	16.53	15.04
Teacher	1983	8.47	8.64	4.83	7.81	7.96
	1999	10.91	13.48	11.69	12.45	12.12
Other (Agriculture, Architecture, Sports)	1983	4.29	4.21	7.86	2.86	4.54
	1999	4.77	5.19	6.35	4.98	5.15
Natural Sciences (Phys., Math., Comp.Scienc.)	1983	12.43	14.50	11.30	13.41	13.13
	1999	11.43	13.43	9.43	10.64	11.81
Total	1983	100.00	100.00	100.00	100.00	100.00
	1999	100.00	100.00	100.00	100.00	100.00

One could mention the social sciences, which increasingly attract upper service class offspring as well. In law, there are indications for the opposite effect, it becomes more attractive to working class students. For engineering, we see a sharp decline in participation rates, especially for working class students. It seems that the less secure labour market perspective in the late 1990's affected working class students relatively more in their decision than upper service class students. To get a full picture of the association between social origin and field of study, we control these gross effects for other independent variables and run a multinomial logistic regression model with field of study as dependent variable and gender, year, grade point average and social origin as independent variables. We chose economics as our base category in the multinomial model. Table 6 shows model fits of our model building exercise.

Table 6: **Model fits of various multinomial logit regression models of choice of field-of-study on gender, GPA, social origin and year; for students with full entrance qualification to higher education; data source: HIS-Studienberechtigtenpanel 1983 and 1999, N = 10,104**

	Model 1	Model 2	Model 3	Model 4
Main and interaction effects by year				
Year = 1999 *(ref: 1983)*	X	X	X	X
Male	X	X	X	X
Male * Year			X	X
Grade Point Average		X	X	X
Grade Point Average * Year			X	X
Parents' occupational position	X	X	X	X
Parents' education	X	X	X	X
*Parents' occupational position*Year*				X
*Parents' education*Year*				X
Log likelihood	- 21,437.2	- 21,112.9	- 21,030.3	- 20,971.8
degrees of freedom	108	117	135	225
Difference to respective previous model				
Δ chi²	-	648.60	165.18	116.91
Δ degrees of freedom	-	9	18	90
Significance	-	0.000	0.000	0.030

log likelihood of null model: -22684.3

The first model contains gender, year and social origin as independent variables. Adding GPA in model 2 clearly improves the model fit. In model 3, when the effects of gender and GPA are freed to vary over time, the model fit improves significantly. Last, we include interaction terms for social origin. The overall fit again improves significantly. Therefore, we keep model 4 as our best model to capture the impact of social origin on field of study over time.[32]

Reporting all coefficients of model 4 in one table results in a very complex arrangement. Furthermore, the coefficients will be difficult to interpret with respect to nine comparisons to the base category. That is why we restrict our discussion of the model we selected to the plots that show the discrete change in predicted probabilities, but all coefficients of the model are displayed in Table A2 in the appendix. The discrete change probability plot in *figure 5a* shows the effects of gender and GPA, *figure 5b* shows the effect of all social origin variables on field of study. The first prominent result is the size of the effects. The effects of gender and GPA and in particular the effects of social origin on field of study are much smaller compared to the effects in the analysis of post-secondary educational decisions. As the model fits show, social origin has a significant influence, but for most subjects, the impact is quite limited.

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[32] Additional models with fixed or varying effects of parents' education or parents' occupational position show that we could fix each of the origin sets without worsening the fit, but not both. Therefore, we decided to use the full interaction model. Of course, the overall effect of social origin on field of study remains significant.

Figure 5a: Changes in predicted probabilities according to model 4 in Table 6;
               Independent variables: Grade Point Average (GPA), and Gender;
               upper lines = 1983; lower lines = 1999
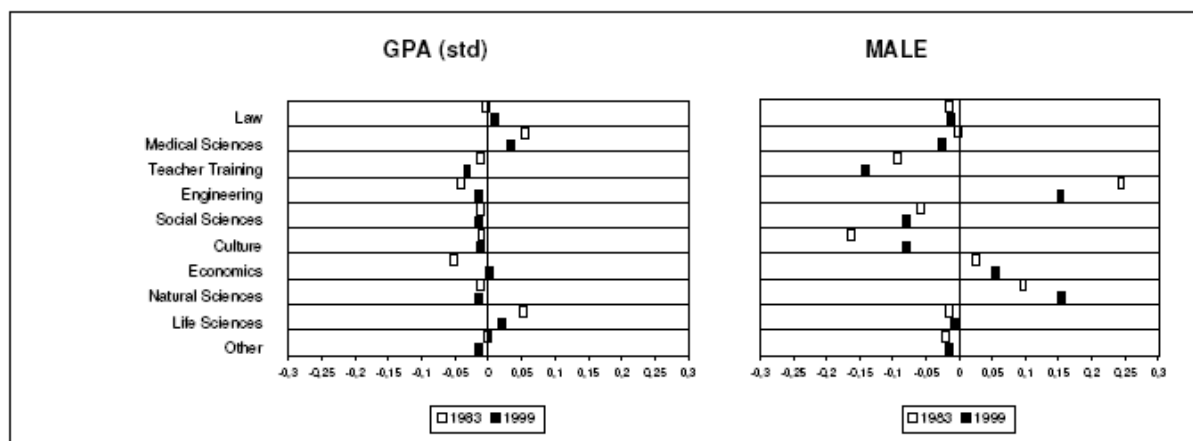
Following our model, gender (figure 5a, right half) is the most decisive factor for choosing a field of study. Natural Sciences like physics, mathematics and computer sciences, engineering and economics, are preferred by men, whereas cultural studies and humanities, social sciences and teaching are favoured by women.[33] Gender effects, however, vary substantially over time. For natural sciences, economics, teaching and social sciences, the gender gap widens. Natural sciences and economics become even more of a male domain, teaching and social sciences (and to some extent medical sciences), on the other hand, are increasingly preferred by women. For cultural fields and engineering, gender effects decline. Interestingly, more prestigious subjects like natural sciences and more recently economics are increasingly chosen by men. Less prestigious fields of study like social sciences or nowadays teaching are more and more chosen by women. Declining vertical gender gaps in higher education participation seem to find their counter-part in increasing horizontal gender gaps within field of study.

If we look at the impact of the grade point average (figure 5a, left half), one field of study stands out. Economics used not to attract the "sharpest knives" among the student body in 1983. However, this has changed completely in 1999. Economics is now one of the more selective subjects. In contrast, teaching has become the least selective field of study. For medical sciences and biology, the effect of GPA declined to some extent, for all other subjects not mentioned so far, the effects are more or less the same.

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[33] Reading example: In 1983, men's probability of choosing engineering is .24 percentage points higher than women's probability. Likewise, men's probability to choose cultural studies is .16 percentage points lower than women's probability for the same subject.

Figure 5b: Changes in predicted probabilities according to model 4 in Table 6: parents' occupational position and education; upper lines = 1983; lower lines = 1999
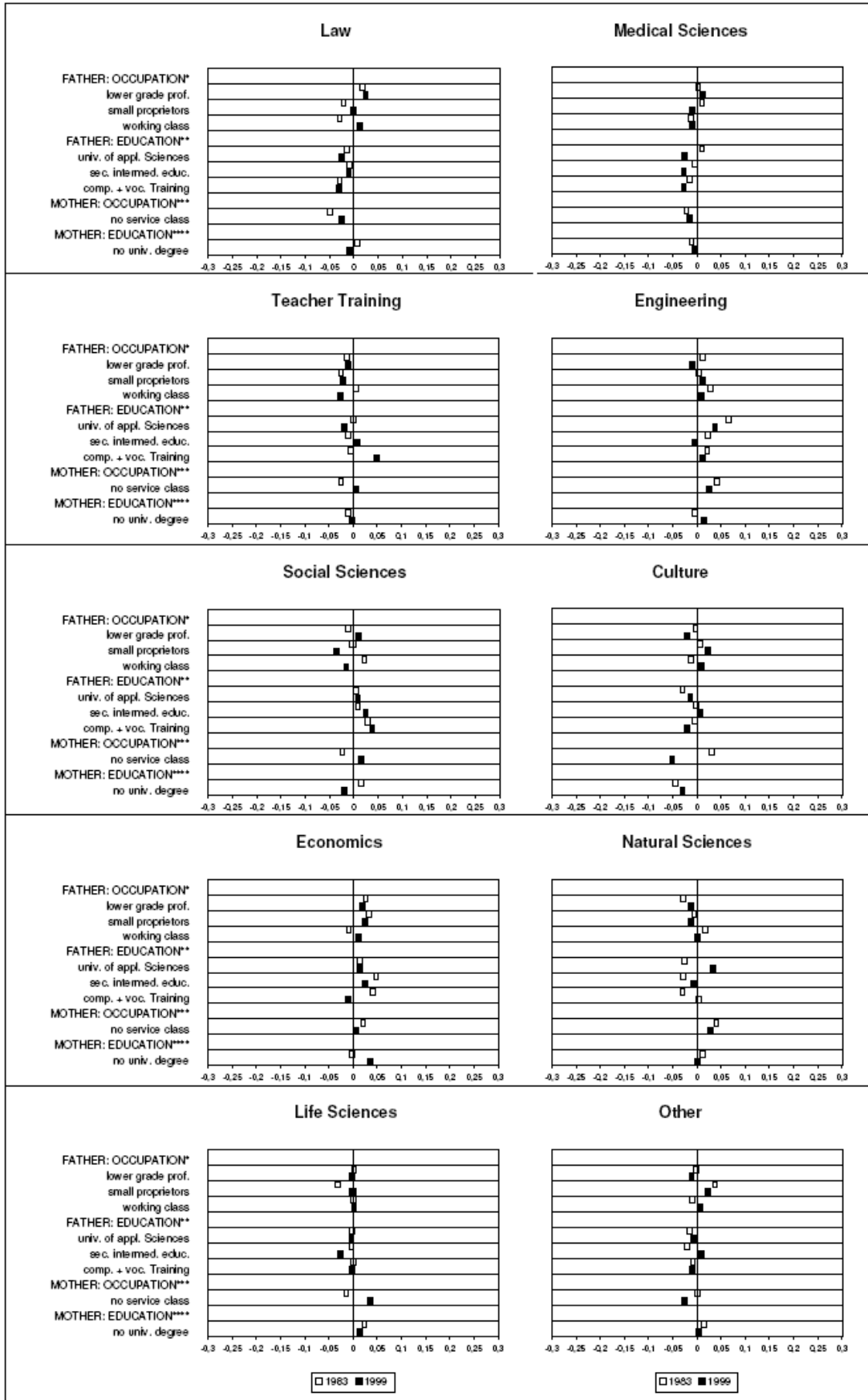
* Reference: Father: higher grade professional (service class) ** Reference: Father: university degree

*** Reference: Mother: higher grade professional (service class) **** Reference: Mother: university degree

In figure 5b we can see that social origin only plays a minor role in choosing a field of study. The effects range between -.05 and +.05 percentage points, i.e. there is a maximum difference of .05 percentage points in probabilities between a given origin category and the respective reference category. Nevertheless, a look at particular fields of study reveals interesting results. *Medical sciences* (upper right plot in figure 5b) are almost always less preferred by lower classes or students of lower educational background. This is very much in line with our expectations. These effects in probabilities, however, hardly increase over time (only to a small degree for parents' education). For *law* (upper left plot in 5b), we also find mostly negative effects for lower social background. If there is any change, law becomes less selective. So apparently, students with favourable backgrounds do favour fields of study with high prestige, but they do not try to secure their relative advantage by increasingly choosing these prestigious fields of study. *Social sciences* (3rd row, left graph in 5b) and *teaching* (2nd row, left graph in 5b), on the other hand, are typically chosen by students of lower educational background. But there is no apparent trend for these subjects over time, either. *Engineering* (2nd row, right graph in 5b) appears to be a lower class subject, too. Here, an affinity between university of applied sciences offspring and engineering diminishes a little. *Cultural fields* (2nd row, right graph in 5b), if anything, are more preferred by students of higher educational background. And last we can see that *economics* (4th row, left graph in 5b) used to be a prominent field for students of lower educational background and was used as an upward mobility channel. It seems like this channel is becoming somewhat less promising as can be seen in a decline of some formerly positive effects of lower social origin. All other fields of study hardly change at all.

So overall, we do find significant change in the effect of social origin over time as shown by the model fit exercise. The overall effect on field of study, however, is rather small, and changes over time are difficult to detect. In general, medical science, law, and cultural studies are more popular among students of more favourable background, whereas subjects like social sciences, engineering, and (still) economics are preferred by less advantaged students. However, we do not find clear indications towards any trend among upper class students of increasingly opting for prestigious fields of study. Given the small impact of social origin in general on field of study, other channels of horizontal differentiation might turn out to be more relevant for upper class offspring to assure their relative advantage over lower classes.

Still, one finding is worth being repeated again. We found remarkable effects of gender-based decisions on field of study. These effects increasingly work against an equalisation between men and women because the gender-based preferences run along prestigious vs. less prestigious fields of study. We suspect that this effect is a result of two mechanisms: On the one hand, women who would have chosen vocational training in typically female segments in 1983 (cf. Steinmann 2000) now enter tertiary education and opt for fields of study of similar content (e.g. social work, teaching).[34] On the other hand, men increasingly take a decision against less prestigious subjects, like teaching. On the whole, the gender gap widens with respect to field of study.

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[34] Our data contain variables about motives regarding the educational decision taken. The motive of "helping" is much more prominent among women than among men, and this motive shows a significant positive association with fields of study like social sciences and teaching.

7.3 Study abroad

In the past two analyses, we examined educational decisions with respect to the choice of educational institution and field of study. The underlying assumption referred to an increasing demand of upper class students for differentiation in higher education. Besides type of educational institution and field of study, we chose a *study abroad* to test the idea of increasing differentiation. In order to analyse the propensity of students with different class backgrounds to study abroad, we take advantage of the mini-panel structure of our data and construct a dependent variable of students who live in foreign countries during the second wave of the panel.[35] Like in the previous analyses, we first take a look at a cross tabulation of the dependent variable by social origin, measured as father's occupational position, separated for 1983 and 1999. Table 7 shows absolute numbers and row percentages of students with different class background who study or do not study abroad.

Table 7: **Absolute numbers and row percentages of study abroad by parents' occupational position, separated by year; for students with full or restricted entrance qualification to higher education who study at university or university of applied sciences; data source: HIS-Studienberechtigtenpanel 1983 and 1999; N = 9957**

Occupational position		study abroad			
		Year	no	yes	All
upper service class	absolute numbers	1983	2,309	23	2,232
		1999	1,130	102	1,232
	row percentages	*1983*	*99.01*	*0.99*	*100.00*
		1999	*91.72*	*8.28*	*100.00*
lower prof. and employees	absolute numbers	1983	2,228	5	2,233
		1999	1,197	65	1,262
	row percentages	*1983*	*99.78*	*0.22*	*100.00*
		1999	*94.85*	*5.15*	*100.00*
small proprietors	absolute numbers	1983	901	5	906
		1999	384	18	402
	row percentages	*1983*	*99.45*	*0.55*	*100.00*
		1999	*95.52*	*4.48*	*100.00*
Working class	absolute numbers	1983	1,152	1	1,153
		1999	424	13	437
	row percentages	*1983*	*99.91*	*0.09*	*100.00*
		1999	*97.03*	*2.97*	*100.00*
Total	absolute numbers	1983	6,590	34	6,624
		1999	3,135	198	3,333
	row percentages	*1983*	*99.49*	*0.51*	*100.00*
		1999	*94.06*	*5.94*	*100.00*

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35 Students were surveyed 2 ½ (for cohort 1983) and 3 ½ (for cohort 1999) years after earning the entrance qualification to tertiary education. The results will have to be interpreted in light of this design.

Evidently, we have to be quite cautious with the interpretation of the table because there are only 232 students altogether who study abroad. Especially for 1983, the frequencies in some cells are quite sparse. In part, this is due to different observation periods of the second panel wave (see footnote 35). In part, however, there is good reason to believe that the increase in the propensity of studying abroad captures a real development (Bundesministerium für Bildung und Forschung 2000; 2002). If we look at absolute numbers first, we see upper class students having by far the largest affinity for study abroad programmes. In 1983, 23 out of 34 study abroad students have upper service class background. In 1999, it was 102 out of 198 students. In contrast, working class students have the least tendency to study abroad in both years. We analyse these class differences in greater detail and run a logistic regression of study abroad on the set of independent variables we used before. In addition, we include a variable for type of tertiary education institution (university vs. university of applied sciences). The results shown in Table 8 seem very reasonable. As expected, the coefficient for year is very strong and positive, i.e. more students study abroad in 1999 compared to 1983. The better a student's grade, the larger the odds for him or her to go to a foreign country and earn some experiences. If we look at gender, we seem to find a surprising result. Men's odds to study abroad are about $e^{0.5}$=1.6 times lower than the odds for women. However, one has to bear in mind that male students usually have to do their mandatory military or alternative service before they enter higher education. Therefore, they are less advanced in their studies.[36] They might make up for this delay in later years. Last, the effects on entrance qualification and type of tertiary education are not significant. However, the signs of the coefficients point into meaningful directions. Basically all effects of social origin are in accordance with our expectations. Upper class students have higher odds of studying abroad than lower classes. The effect of lower professionals and non-manual employees is significant, for working class students, it is almost significant at the 10%-level. For children of small proprietors, however, these differences are quite small. Mother's occupational position has no effect. Results for educational background variables tell a similar story. We find an almost linear trend towards lower odds of studying abroad for students with less favourable educational origins. The effects turn out to be significant for the main categories of lower educational background. As for occupational background, mother's educational background has no effect on the propensity to study abroad, either. If we run interaction effects of social origin by year, the model loses many cases due to perfect prediction and the coefficients become no longer meaningful to interpret. For future analyses, we hope to have access to the third panel wave of the 1999 cohort. We expect more students (especially men) to take up a study abroad, so the numbers become more robust. For now, we have to turn back to our cross tabulation of father's occupational position by study abroad by year in order to assess some meaningful developments over time.

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[36] Another plausible interpretation for this effect is a field of study effect. Women study more often foreign languages than men and are more likely to study some time abroad to increase their knowledge of the language.

Table 8: **Logistic regression of study abroad on gender, GPA, social origin, type of higher education and year (b coefficients and z-values); for students in tertiary education; data source: HIS-Studienberechtigtenpanel 1983 and 1999; N = 9957**

Main effects	
Year	2.31 *(11.90)*
Male	-0.50 *(-3.41)*
Grade Point Average	0.43 *(5.79)*
Entrance qualification to university	0.41 *(0.98)*
University of Applied Sciences	-0.28 *(-1.22)*
Parents' occupational position *(ref: upper service class)*	
Father:	
Lower grade professionals and employees	-0.38 *(-2.30)*
Small proprietors	-0.17 *(-0.68)*
Working class	-0.52 *(-1.59)*
Mother:	
Less than upper service class	0.05 *(0.23)*
Parents' education *(ref: university)*	
Father:	
University of applied sciences	-0.26 *(-1.18)*
Full secondary education (Abitur)	-0.32 *(-1.06)*
Secondary intermediate education	-0.60 *(-2.33)*
Compulsory education + vocational training	-0.48 *(-2.00)*
Compulsory education	-1.00 *(-1.33)*
Mother:	
Less than university	-0.17 *(-0.96)*
Constant	-4.88 *(-9.83)*
	$L_0 = -1{,}101; L_1 = -902$

Note: Reference categories are written in italic; z-values in parentheses.

As we have seen, our data show a clear increase in the proportion of students studying abroad (0.51% in 1983 vs. 5.94% in 1999). If we take a closer look at the row percentages, we see a sharp increase for upper class students (from 0.99% in 1983 to 8.28% in 1999). The increase in terms of percentages is markedly lower for lower classes. Among working class students, the propensity rises from 0.09% in 1983 to 2,97% in 1999). If we compare the differences in percentage rates for upper service class students and working class students, we find some indication for increasing differences. In 1983, the difference in percentage rates between these two classes was 0.99-0.09=0.90 percentage points. In 1999, the difference was 8.28-2.97=5.31 percentage points. In absolute terms over time, far more students with upper service class origin use study abroad programmes to earn extra-curricular qualifications that probably provide them with better job opportunities on the labour market. In relative terms, however, one would come to a different conclusion. But relative terms are quite vulnerable in tables with low cell frequencies, so we would be very hesitant to interpret relative numbers in our given case. For an understanding of the mechanisms that equip upper class children with better opportunities compared to working class children, we think it is best to look at absolute values at this stage. Therefore, we interpret differences in percentage rates as indicators for increasing extra-curricular efforts of upper service class students to secure their relative advantages compared to lower classes.

8 Discussion

In this paper we argued that tertiary education has lost some of its previous exclusiveness due to educational expansion and reduced educational inequalities. Furthermore we suggest that children from the upper service class need to account for these developments when making decisions at the transition to higher education in order to secure their pathway towards an upper service class position.

Concerning the *vertical* choice of an educational institution, we hypothesised that upper class students will try to increase their transition rates to the traditional universities and the universities of applied sciences. Given that a certain ability level is needed to make this transition, we suggested that the upper classes might have reached a ceiling in 1983 already. The bivariate cross tabulation of parents' occupational position and first post-secondary decision for the subset of students with high ability supports this argument. The results of the selected multinomial regression model show that both social origin variables, parents' occupational position and parents' education have substantial impact on the first post-secondary choice even if ability (GPA) and gender are controlled for. Nevertheless, the effects of parents' education do not change over time while the effects of parents' occupational position show an interesting new pattern. Students with upper service class origin increasingly opt for the university of applied sciences while they decrease taking up vocational training. Apparently upper class offspring use the university of applied sciences as a new way to increase participation rates in higher education in order to secure relative advantages in formal education. Considering that graduates from universities of applied sciences are catching up to university graduates in terms of labour market outcomes (Müller, Brauns and Steinmann 2002), this is quite reasonable. Contrary to our expectations upper class students do *not* increase their transition to traditional universities, which further supports the idea that a ceiling is reached for that level. Albeit small, the reduction in educational inequalities for parents' occupational position for traditional universities would support Raftery and Hout's (1993) claim that a reduction in inequality is only to be found if saturation is reached. However, since our bivariate results do not show any substantial increase in the transition to higher education for working class students, neither at the universities nor the universities of applied sciences, this interpretation is probably void.

Another notable result from this model is the changing effect of gender. With respect to the choice of university, gender differences have basically disappeared, whereas more women than men still choose vocational training as first post-secondary education, even though the difference has decreased considerably as well. For universities of applied sciences, the gender difference has remained relatively stable. Our results are very much in line with previous findings with general population data (Mayer, Müller and Pollak forthcoming). However, in contrast to the present analyses, Mayer et al. looked at highest educational degree earned. Given similar results, we can conclude that most of the selection happens indeed at the first post-secondary transition and not within the educational branches hereafter.

We developed a second set of hypothesis regarding changes in *horizontal* choices at the tertiary level. Following Lucas's (2001) idea of "effectively maintained inequality", we argued that children of the upper service class will try to secure advantages wherever advantages are commonly possible.

The first mechanism of horizontal differentiation we considered, the choice of a *field of study*, did not show the results we expected. We hypothesized that upper service class students would increasingly opt for more prestigious fields of study. We found that social origin only has minor effects on the choice of field of study and that these effects do not change substantially over time. Acknowledging the small impact of social origin, we still found that our expectations for the particular fields were largely supported. Medical sciences and law are almost always preferred less by lower classes or students of lower educational background. Social sciences, teaching and engineering, however, are typically chosen by students of lower educational background. Cultural fields seem to attract students of higher educational background. Gender effects, however, show a striking pattern. Gender is the best predictor for the choice of field of study in our model and varies substantially over time. On the one hand we found that more prestigious subjects like the natural sciences and more recently economics are increasingly chosen by men. Less prestigious fields of study on the other hand, like social sciences or teaching are more and more chosen by women. Declining vertical gender disparities in higher education participation seem to be somewhat compensated through increasing horizontal gender gaps in field of study.

Last we looked at another mechanism of horizontal differentiation that lies outside the educational curriculum. We argued that upper class offspring would try to secure their advantages by, among other means, increasingly opting for a *study abroad*. As in the analysis for field of study we only looked at the subset of students who chose tertiary education. For the most part results of this analysis supported our hypothesis. Social origin has considerable effects regarding the decision to study abroad. These effects seem to increase over time, hence study abroad might serve as an additional way to maintain upper classes relative advantages. Concerning the change over time, however, conclusions must be rather tentative due to data limitations.

What can be learned from this paper? Educational choices at the transition to higher education are still strongly related to social origin in Germany. This is striking for two reasons: First, the most selective transition has already happened after fourth grade when students at age 10 have to choose their pathway in the three-partite German educational system. Accordingly, the sample of students who earn an entrance qualification to higher education is already quite selective. Second, the effects shown in the paper take place at a very late stage of an educational career. One would think that social origin effects become smaller, because students are more independent and probably received fairly accurate feedback in school about their cognitive abilities. And yet, the effects of social origin remain strong, even though we cannot necessarily make the case for increasing educational inequalities from 1983 to 1999.

In addition we find some new insights in the strategies of upper classes to secure their relative advantages. Obviously, they do not increasingly push their children into traditional universities. Instead, they discovered the universities of applied sciences as an alternative pathway to receive advantageous jobs later on. In terms of horizontal differentiation, new channels do not seem to include the choice of a field of study. As our analysis of the study abroad suggests, there seem to be other mechanisms outside the educational curriculum that point in the direction of more inequalities. For

women on the other hand we see a clear pattern of reduction of educational inequalities at the *vertical* level that is somewhat offset by increasing gender segregation at the horizontal level, namely in the choice of field of study.

For further research, we can think of a variety of analysis that are left out in the paper. First, there is need to develop a complete decision model for first post-secondary educational choice that considers vertical as well as horizontal differentiation (combining choice of educational institution and choice of field of study). Second, it would be interesting to test extra-curricular horizontal differentiation in greater detail, like study abroad, but also other mechanisms that offer a comparative advantage like internships. Third, we would like to analyse the linkage between tertiary education with its horizontal and vertical differentiation and various labour market outcomes in greater detail.

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Appendix

Table A1: **Descriptive statistics for variables used in the models; data source:** *HIS-Studienberechtigtenpanel* **1983 and 1999**

Variable	Observations	Mean	Std. Dev.	Min	Max
First post-secondary educational decision					
Dependent variable	20288				
University	(8886)	0.44	0.50	0	1
University of appl. sciences	(3523)	0.17	0.38	0	1
Vocational training	(6561)	0.32	0.47	0	1
No further education	(1318)	0.07	0.25	0	1
Year	20288	0.46	0.50	0	1
Male	20288	0.51	0.50	0	1
Grade Point Average	20288	0.01	1.00	-2.45	2.42
Full entrance qual. to university	20288	0.82	0.39	0	1
Father's occupational position	20288				
Upper service class	(6438)	0.32	0.47	0	1
Lower prof. and employees	(7201)	0.35	0.48	0	1
Small proprietors	(2970)	0.15	0.35	0	1
Working class	(3679)	0.18	0.39	0	1
Mother's occupational position*	20288	0.94	0.24	0	1
Father's education	20288				
Compulsory education	(881)	0.04	0.20	0	1
Comp. educ. + voc. training	(7575)	0.37	0.48	0	1
Secondary interm. education	(3562)	0.18	0.38	0	1
Full secondary education	(1325)	0.07	0.25	0	1
University of applied sciences	(2472)	0.12	0.33	0	1
University	(4473)	0.22	0.41	0	1
Mother's education[**]	20288	0.88	0.33	0	1
Choice of field-of-study					
Dependent variable	10104				
Biology, Chemistry	(834)	0.08	0.28	0	1
Engineering	(1455)	0.14	0.35	0	1
Culture/Humanities	(1441)	0.14	0.35	0	1
Medical Sciences	(762)	0.08	0.26	0	1
Social Sciences	(702)	0.07	0.25	0	1
Law	(747)	0.07	0.26	0	1
Economics	(1410)	0.14	0.35	0	1
Teacher	(1009)	0.10	0.30	0	1
Other	(479)	0.05	0.21	0	1
Natural Sciences	(1265)	0.13	0.33	0	1
Year	10104	0.47	0.50	0	1
Male	10104	0.52	0.50	0	1
Grade Point Average	10104	0.28	1.02	-2.34	2.42
Father's occupational position	10104				
Upper service class	(3958)	0.39	0.49	0	1
Lower prof. and employees	(3603)	0.36	0.48	0	1
Small proprietors	(1317)	0.13	0.34	0	1
Working class	(1226)	0.12	0.33	0	1
Mother's occupational position*	10104	0.92	0.27	0	1
Father's education	10104				
Compulsory education	(346)	0.03	0.18	0	1
Comp. educ. + voc. training	(2908)	0.29	0.45	0	1
Secondary interm. education	(1624)	0.16	0.37	0	1
Full secondary education	(693)	0.07	0.25	0	1
University of applied sciences	(1400)	0.14	0.35	0	1
University	(3133)	0.31	0.46	0	1
Mother's education[**]	10104	0.82	0.38	0	1

(continued)

Studying abroad

Dependent variable	9957	0.02	0.15	0	1
Year	9957	0.33	0.47	0	1
Male	9957	0.58	0.49	0	1
Grade Point Average	9957	0.21	1.01	-2.34	2.42
Full entrance qual. to university	9957	0.84	0.37	0	1
University of Applied Sciences	9957	0.84	0.37	0	1
Father's occupational position	9957				
Upper service class	(3564)	0.04	0.18	0	1
Lower prof. and employees	(3495)	0.02	0.14	0	1
Small proprietors	(1308)	0.02	0.13	0	1
Working class	(1590)	0.01	0.09	0	1
Mother's occupational position*	9957	0.93	0.25	0	1
Father´s Education					
Compulsory education	(443)	0.00	0.07	0	1
Comp. educ. + voc. training	(3504)	0.01	0.10	0	1
Secondary interm. education	(1569)	0.01	0.12	0	1
Full secondary education	(597)	0.02	0.15	0	1
University of applied sciences	(1279)	0.03	0.16	0	1
University	(2565)	0.05	0.21	0	1
Mother's education[**]	9957	0.86	0.34		

Note: * *For mother. it is a dichotomy between upper service class and the rest.*
      ** *For mother. it is a dichotomy between university and the rest.*

Table A2: Multinomial logit regression of choice of field-of-study on gender, GPA, social origin and year (b coefficients and z-values); for students with full entrance qual. to higher education; data source: *HIS-Studienberechtigtenpanel* 1983 & 1999, N = 10,104

	BIOLOGY VS. ECONOMICS		ENGINEERING VS. ECONOMICS		CULTURE VS. ECONOMICS		MEDICAL VS. ECONOMICS		SOCIAL SC. VS. ECONOMICS		LAW VS. ECONOMICS		TEACHER VS. ECONOMICS		OTHERS VS. ECONOMICS		COMPUTER SC. VS. ECONOMICS	
Main and interaction effects by year																		
Year (Y) = 1999	-0.86	(-2.12)	-0.10	(-0.24)	0.00	(-0.01)	0.44	(1.20)	0.55	(1.26)	-0.35	(-0.99)	-0.21	(-0.59)	0.43	(0.91)	-0.80	(-2.09)
Male	-0.35	(-2.80)	1.91	(12.94)	-1.30	(-11.51)	-0.21	(-1.54)	-1.27	(-8.50)	-0.37	(-2.90)	-1.40	(-10.29)	-0.63	(-4.09)	0.55	(4.59)
Male * Y	-0.13	(-0.70)	-0.67	(-3.38)	0.41	(2.58)	-0.53	(-2.74)	-0.10	(-0.50)	-0.16	(-0.86)	-0.32	(-1.70)	-0.04	(-0.17)	0.56	(3.23)
GPA	0.85	(13.39)	0.05	(0.98)	0.27	(4.74)	1.24	(16.88)	0.12	(1.66)	0.29	(4.46)	0.19	(2.89)	0.34	(4.32)	0.50	(8.91)
GPA * Y	-0.59	(-6.31)	-0.24	(-2.99)	-0.35	-(4.42)	-0.79	(-7.84)	-0.29	(-2.90)	-0.17	(-1.81)	-0.48	(-5.33)	-0.62	(-5.65)	-0.33	(-4.03)
Parents' education (ref: University)																		
Father																		
Compulsory educ.	-0.65	(-1.73)	-0.28	(-0.96)	-0.11	(-0.34)	-0.20	(-0.54)	0.13	(0.33)	-1.27	(-2.70)	-0.36	(-0.94)	-0.53	(-1.19)	-0.31	(-1.04)
Compulsory + voc.	-0.26	(-1.29)	-0.12	(-0.66)	-0.30	(-1.60)	-0.55	(-2.44)	0.26	(1.00)	-0.61	(-2.89)	-0.34	(-1.54)	-0.45	(-1.77)	-0.47	(-2.54)
intermediate	-0.33	(-1.52)	-0.13	(-0.70)	-0.30	(-1.54)	-0.38	(-1.62)	-0.13	(-0.48)	-0.40	(-1.83)	-0.43	(-1.83)	-0.79	(-2.74)	-0.49	(-2.52)
Full sec. education	-0.59	(-2.04)	-0.44	(-1.78)	-0.25	(-0.98)	-0.71	(-2.21)	-0.05	(-0.13)	-0.39	(-1.42)	-0.37	(-1.23)	-0.29	(-0.87)	-0.84	(-3.17)
Lower tertiary	-0.12	(-0.53)	0.32	(1.62)	-0.32	(-1.53)	0.08	(0.32)	-0.03	(-0.11)	-0.27	(-1.17)	-0.10	(-0.42)	-0.46	(-1.55)	-0.27	(-1.31)
Mother																		
Less than university	0.27	(1.08)	-0.02	(-0.09)	-0.28	(-1.28)	-0.16	(-0.66)	0.32	(0.92)	0.09	(0.35)	-0.13	(-0.50)	0.34	(1.04)	0.09	(0.39)
Interaction effects parents' education by year																		
Father																		
Comp. educ.*Y	1.00	(1.73)	0.29	(0.55)	-0.14	(-0.28)	0.50	(0.84)	-0.04	(-0.06)	1.28	(1.93)	0.65	(1.15)	-0.13	(-0.16)	0.51	(0.97)
Comp. + voc.*Y	0.30	(1.00)	0.30	(1.15)	0.23	(0.89)	0.20	(0.63)	0.19	(0.59)	0.19	(0.61)	0.78	(2.72)	0.34	(0.94)	0.56	(2.08)
intermediate *Y	-0.22	(-0.68)	-0.06	(-0.22)	0.20	(0.76)	-0.19	(-0.58)	0.24	(0.69)	0.11	(0.36)	0.36	(1.19)	0.80	(2.15)	0.28	(1.00)
Full sec. education*Y	0.19	(0.49)	0.16	(0.47)	-0.09	(-0.27)	0.24	(0.57)	-0.32	(-0.72)	-0.10	(-0.25)	0.14	(0.37)	-0.05	(-0.12)	0.75	(2.15)
Lower tertiary *Y	-0.02	(-0.05)	-0.02	(-0.08)	0.15	(0.56)	-0.55	(-1.73)	0.04	(0.11)	-0.21	(-0.65)	-0.15	(-0.51)	0.25	(0.66)	0.50	(1.80)
Mother																		
Less than univ.*Y	-0.31	(-0.99)	-0.02	(-0.08)	-0.11	(-0.41)	-0.14	(-0.45)	-0.74	(-1.92)	-0.44	(-1.43)	-0.11	(-0.36)	-0.51	(-1.31)	-0.31	(-1.10)

(continued)

Table A2: **Multinomial logit regression of choice of field-of-study on gender, GPA, social origin and year (b coefficients and z-values); for students with full entrance qual. to higher education; data source:** *HIS-Studienberechtigtenpanel* **1983 and 1999, N = 10,104**

	BIOLOGY VS. ECONOMICS		ENGINEERING VS. ECONOMICS		CULTURE VS. ECONOMICS		MEDICAL VS. ECONOMICS		SOCIAL SC. VS. ECONOMICS		LAW VS. ECONOMICS		TEACHER VS. ECONOMICS		OTHERS VS. ECONOMICS		COMPUTER SC. VS. ECONOMICS	
Parents' occupational position (ref: upper service class)																		
Father																		
Lower prof./empl.	0.16	(1.03)	0.10	(0.72)	0.21	(1.45)	0.14	(0.83)	0.41	(2.14)	-0.02	(-0.14)	0.36	(2.18)	0.22	(1.08)	0.37	(2.59)
Small proprietors	-0.57	(-2.60)	-0.19	(-1.09)	-0.16	(-0.89)	-0.04	(-0.18)	-0.25	(-0.99)	-0.46	(-2.08)	-0.60	(-2.44)	0.38	(1.58)	-0.24	(-1.29)
Working Class	0.06	(0.26)	0.25	(1.29)	-0.04	(-0.18)	-0.17	(-0.61)	0.42	(1.60)	-0.31	(-1.17)	0.15	(0.60)	-0.14	(-0.45)	0.17	(0.81)
Mother																		
l. than upper serv. cl.	-0.29	(-0.91)	0.21	(0.68)	0.09	(0.30)	-0.48	(-1.54)	-0.53	(-1.38)	-0.59	(-2.00)	-0.45	(-1.41)	-0.12	(-0.30)	0.14	(0.46)
Interaction effects parents' occupational positions by year																		
Father																		
Lower grade prof.*Y	0.00	(-0.02)	0.14	(0.68)	0.03	(0.17)	-0.17	(-0.72)	-0.41	(-1.67)	-0.20	(-0.85)	-0.15	(-0.69)	0.10	(0.37)	-0.10	(-0.52)
Small proprietors*Y	0.42	(1.36)	0.18	(0.70)	0.16	(0.62)	-0.23	(-0.72)	-0.35	(-1.05)	0.32	(1.03)	0.27	(0.87)	-0.17	(-0.51)	-0.04	(-0.13)
Working class*Y	-0.11	(-0.30)	-0.21	(-0.71)	0.03	(0.09)	-0.04	(-0.11)	-0.67	(-1.91)	0.41	(1.11)	-0.45	(-1.37)	0.17	(0.40)	-0.22	(-0.72)
Mother																		
l. th. upper serv. *Y	0.85	(2.06)	0.10	(0.26)	-0.40	(-1.16)	0.25	(0.67)	0.67	(1.52)	0.27	(0.74)	0.48	(1.28)	-0.30	(-0.62)	0.14	(0.37)
Constant	-0.16	(-0.52)	-1.41	(-4.39)	0.99	(3.47)	-0.29	(-0.94)	-0.33	(-0.87)	0.63	(2.18)	0.80	(2.63)	-0.71	(-1.76)	-0.42	(-1.36)

L0 = -22,684; L1 = -20,972