

Differentiation and Social Selectivities in Higher Education in Germany

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Draft prepared for Equalsoc Educ Meeting, Higher Education Workshop,

Tallinn, June 2009

Abstract

In this paper we investigate social selectivities in access to higher education in Germany and, unlike most previous studies, explicitly devote attention to semi-tertiary education such as the universities of cooperative education. Drawing on rational choice models of educational decisions we seek to understand which factors influence upper secondary graduates from different social backgrounds in their choices of diverse tertiary institutions in Germany.

Introduction

Similar to most Western societies, Germany experienced a considerable expansion of higher education throughout the last 50 years, moving from an elite system towards mass higher education (e.g. Trow 2005). However, this development has been less pronounced than in many other countries. As a common feature of all education systems, the expansion of higher education has been accompanied by institutional differentiation of various kinds (e.g. Huismann 1995, Teichler 1988). In this context, Germany is among the higher education systems that are considered to be of a *binary* type: In addition to the academically oriented *universities* a second tier of more vocationally oriented *universities of applied sciences* (Fachhochschulen) has been established in the 1970s. Apart from these two institutions of higher education, the German system of vocational education continues to be an attractive alternative for upper secondary graduates. Especially the so called apprenticeship in the *dual system* that offer a mix of school-based learning and in-firm training attracts (or diverts) many students from entering tertiary education (Mayer et al. 2007). While most the literature on differentiation in higher education in Germany has focussed on the division between universities and universities of applied sciences (Mayer et al. 2007, Reimer & Pollak forthcoming) another hybrid institution, labelled *university of cooperative education* that seeks to combine the advantages of the “dual system” with tertiary level schooling has largely escaped notice of most researchers so far (but see: Trautwein et al. 2006). In this paper we investigate social selectivities in access to higher education in Germany and, unlike most previous studies, explicitly devote attention to this and similar institutions of *semi-tertiary education*. Drawing on rational choice models of educational decisions we seek to understand which factors influence upper secondary graduates from different social backgrounds in their choices of diverse tertiary institutions in Germany.

Features of the German education system

The probably most central feature of the German education system is its early tracking: After 4th grade at the age of 10 (in some federal states 6th grade/ age 12) students are allocated to three secondary education tracks. Only one of them, *the Gymnasium*, provides access to the upper secondary degree (*Abitur*), which is the prerequisite for access to tertiary education. There is relatively little mobility between the three different tracks. In 2007, 47 percent of a birth cohort obtained the upper secondary certificate¹ and were thus eligible for higher

¹ of those, about 13 percent obtain a restricted version of the Abitur, which allows access to universities of applied sciences only

education (Statistisches Bundesamt 2008a), of which about 70 percent indeed enter tertiary education (Hochschul-Informationen-System GmbH 2002).

Among all post-secondary alternatives the traditional *university* is the most prestigious one and offers the best labour market rewards. At the same time it is the academically most demanding alternative. More than two thirds of all higher education students attend this kind of institution (Statistisches Bundesamt 2008b). One feature of the German university system is the lack of any clear cut prestige hierarchy of institutions and a balanced representation of all major fields of studies across institutions.² However, obtaining a degree from a traditional university takes relatively long: Prior to the Bologna reforms the average duration of study at universities was between 5-6 years. Until the recent introduction of tuition fees in most federal states, attending a university or any other higher education institution has been free of charge.

Universities of applied sciences are much more vocationally oriented than traditional universities and stress the applicability of knowledge. They offer a much narrower range of fields of study, such as engineering or applied economics. However, almost 30 percent of all higher education students study at this institution (Statistisches Bundesamt 2008b). The average length of study is less than 5 years. Since universities of applied sciences are somewhat less demanding and more practically oriented, dropout rates are clearly below those of traditional universities (Heublein et al. 2005, Heublein et al. 2002). Labour market rewards are somewhat lower if compared to universities, but the gap between the two institutions seems to narrow (Müller et al. 2002).

Under the label *semi-tertiary institutions* we subsume two kinds of institutions: *Universities of cooperative education* (Berufsakademien) and *universities of administration* (Verwaltungshochschulen). Both have in common that they are situated at the borderline between tertiary and non-tertiary education. Together they account for not more than about 3 percent of the total student body in higher education (cf. Statistisches Bundesamt 2008b). In both cases the student agrees on a contract with a specific employer³ who is responsible for the in-firm part of a dual training. At both of the above mentioned university types the students spend about an equal amount of time at university and the sponsoring organization. The most distinctive feature is the provision of a salary to the student. Since the employer selects his students and study places are very limited, competition for these positions is rather high. Universities of cooperative education offer programmes in

² If at all, prestige rankings are rather related to institutions in connection with specific fields of study.

³ In the case of universities of cooperative education this is usually a private firm, in the case of universities of administration this is the state/ public administration.

engineering, technology, applied economics and social work, universities of administration are restricted to the training of civil servants for public administration and police functions. In both institutions the length of study is 3 years. It is yet unclear how much labour market prospects differ for graduates from the semi-tertiary institutions compared to the more established university types. As regards labour market rewards for universities of cooperative education, Hillmert und Kröhnert (2003) found that promotion prospects lag behind the other two alternatives. However, transition into employment is more or less guaranteed for graduates of semi-tertiary institutions since they are already connected to their employer. About one quarter of upper secondary graduates enters *non-tertiary education*. This includes apprenticeships in the dual system with a contract between employer and apprentice and a small salary as well as school based vocational training without any salary but in some cases even tuition fees. In both cases the training can be characterized as less academically demanding than any of the higher education programmes and labour market rewards are clearly below tertiary education. However, the training duration is much shorter, ranging from 2-3 years.

Theoretical expectations

The socially selective decision patterns related to choices of post-(upper-)secondary alternatives can be described with the simple rational choice formula for educational decisions that has been proposed by Erikson and Jonsson (1996): $U = p \cdot B - C$.

According to this, students will pick the alternative that promises the highest utility (U); and this utility is a function of the benefits (B) associated with the alternative, the probability (P) that these benefits will be reaped and the costs (C) associated with it. Translated into our specific context, this will lead to the following considerations:

Event though the absolute values of labour market returns to different education alternatives should be assessed equally across all social backgrounds, relative risk aversion theory (Boudon 1974, Breen & Goldthorpe 1997) assumes that the perception of benefits is strongly determined by the desire to avoid social demotion. This would for example mean that a degree from a university of cooperative education or even a non-tertiary degree is enough for a working class student to avoid downward mobility, whereas a student with an academic background would need not less than a university degree to maintain the family status. Apart from status maintenance considerations that are aiming at occupational positions the differential perception of benefits can also be related to other outcomes. First, status reproduction can also be related to educational status. If a student has been socialized within

an academic environment, he/she should assign higher values to education as a value as such and feel more comfortable with the abstract academic culture, whereas a working class student might rather consider educational tracks with practical relevance as more beneficial. Second, since working class students might be lacking certain resources, such as a parental financial safety net or parental social capital in the labour market transition process, they should tend to appreciate more those educational tracks that lead to safe and stable employment prospects. On the other hand, upper class students should be less risk-averse in their choices and be more inclined to pursue the goals of self-fulfilment – independently of employment prospects.

If we now consider first the binary decision between entering any of the higher education institutions and not entering tertiary education at all, we should expect big effects of social origin. Since the population at risk consists of upper secondary degree holders only, students from lower classes might have fulfilled the status maintenance requirement already and have thus lower incentives to enter higher education as students from upper classes. Also, tastes or preferences for the academic culture should be a selection principle that sorts higher shares of upper class students into the tertiary system. Moreover, the evaluation of the probability of success in higher education should be more optimistic among upper class students for two reasons. First, students with academically educated parents should profit from what Boudon (1974) calls primary effects: a better scholastic performance due to their parents' resources. Second, they should be much more familiar with the demands in higher education than their lower class peers, which might tend to overestimate the academic requirements. Finally, the cost factor should play a major role in generating social differentials in the decision pro tertiary education. Despite the legal entitlement of a federal grant, financing issues might constitute a big obstacle for students coming from low-income families. Especially long study periods without any proper income should appear discouraging for lower class students and divert them into non-tertiary education, which in most cases provides even a small salary during the comparatively shorter training period.

However, the above mentioned factors which we consider responsible for social disparities in the access to tertiary education should operate more or less strong according to the type of tertiary institution. In particular the semi-tertiary institutions should attenuate many of the obstacles for students from lower classes: The duration of study is not significantly longer compared to the non-tertiary tracks, a salary is being provided, transitions into employment are almost guaranteed and the contents of the study programmes offered are less of an abstract kind than at traditional universities. Semi-tertiary institutions, especially the universities of

cooperative education, should on the other hand be very selective with respect to indicators of trainability (e.g. upper secondary grades), since firms are making significant investments in the selected students (cf. Spence 1973). Thus, one could expect that semi-tertiary institutions constitute particular beneficial options for students from lower backgrounds with high performance levels. Likewise, universities of applied sciences are expected to be somewhat less socially selective than traditional universities due to their shorter study duration and the more practical orientation. Table 1 summarizes the rank order of alternatives with regard to the factors that evoke socially selective choices.

Table 1: Rank order of post-secondary alternatives according to decision factors

demanding	University > Univ. appl. Sci. = Semi-tertiary > Non-tertiary
ability selection	University = Semi-tertiary > Univ. appl. Sci. > Non-tertiary
status maintenance	University > Univ. appl. Sci. > Semi-tertiary > Non-tertiary
practical relevance	Non-tertiary > Semi-tertiary = Univ. appl. Sci. > University
secure job transition	Non-tertiary = Semi-tertiary > Univ. appl. Sci. > University
duration	University > Univ. appl. Sci. > Semi-tertiary > Non-tertiary
costs	University > Univ. appl. Sci. > Semi-tertiary = Non-tertiary

Data

For our analyses we consider upper secondary graduates that received their Abitur degree in the 1990s. We cumulated three datasets based on large scale upper secondary school leaver mail surveys, collected in 1990, 1994 and 1999 by the German Higher Education Information System Institute (HIS). The data sets come from stratified, random samples of students with entrance qualifications to higher education in Germany. Students in the surveys were interviewed in two waves: half a year and three and a half years after graduation. Our analyses rely on the second wave, which includes retrospective data on the educational career in half-year steps. To reduce heterogeneity, we exclude individuals who were older than 30 when they obtained their entrance qualification. Also, we restrict our sample to students without any vocational training career prior to upper secondary education. We do this in order to be able to only compare students with each other that are making their first post-secondary transition. We apply three kinds of weights: First, a population weight that was delivered by the data providers accounts for sampling distortions in marginal distributions; second, a panel weight adjusts for selective dropouts between the first wave and our analytical sample; and third, a dataset weight will be applied for all cumulative analyses in order to assign equal weight to observations coming from different datasets.

Variables

The dependent variable is coded as first post-secondary education decision. We distinguish the categories *university*, *university of applied sciences*, *semi-tertiary institutions* and *non-tertiary education*. Those who did not pick any of these alternatives within our observation period are coded into *no further education*. Depending on our analytical interest, these categories will be further merged for specific analyses.

As central independent variable we consider *social background* and construct a composite measure of parental class and education. We start with a 3-category version of EGP class, based on father's occupation⁴ and distinguishing between working class, intermediate classes and service classes (e.g. Jackson et al. 2007). Then, intermediate and service classes are further subdivided according to whether at least one parent achieved a higher education degree.⁵

Scholastic *performance* is measured by the grade point average (GPA) in the upper secondary degree. The German grade scale has been z-standardized within datasets and federal states for the sake of better comparability, as well as mirrored, so that high values denote better performance.

Table 2: Theoretical concepts underlying educational decisions and indicators

Decision factor	Component	Indicator
Demanding	P	GPA
ability selection	<i>(primary effect)</i>	GPA
status maintenance	B	Wish to achieve a leading position (<i>6 point scale</i>) Wish to achieve high (occupational) status (<i>6 pt. scale</i>)
practical relevance	B	Interest in practical (applied) work (<i>6 point scale</i>) Interest in academic work (<i>6 point scale</i>)
secure job transition	B	Wish for a secure job (<i>6 point scale</i>)
Duration	C	Wish for a short study/training period (<i>6 point scale</i>)
Costs	C	Wish for quick financial independence (<i>6 point scale</i>)

Considerations of benefits and costs of educational alternatives are not explicitly measured in the HIS datasets. However, one big advantage of these data is the repeated implementation of

⁴ In case this information was missing, it has been replaced by mother's class.

⁵ The working class has not been divided according to parental education since only less than 5 percent in this category possess a higher education degree.

several standard instruments that are not subject to changes across surveys. One of these instruments is an item battery of motivational aspects that underlie the post-secondary educational choices and that can be used to approximate the theoretical concepts. For our analyses we consider a selection of motives from the first waves, where the graduates had to indicate on a scale from zero to five how much the respective motive influenced their post-secondary plans.⁶ Even though the items are related to the specific choices that students had in mind right after graduation, we assume them to reflect attitudes that are more or less persistent until the first educational choice is actually made. Table 2 summarizes the theoretical concepts as well as the indicators we use. The *status maintenance* motive is approximated by two items, indicating the wish to achieve a leading position and the wish to achieve a high occupational status. However, we regard this as a weak measure of the concept of status maintenance since the question is targeted at an absolute conception of status rather than at the risk of social demotion. Nevertheless, we consider it still plausible that these items should capture at least some part of the concept since upper class students should have bigger incentives to achieve a high status/ position in order to reproduce the family status.

Differences in the preferences for educational tracks with *practical relevance or academic orientation* are approximated by two items indicating both the interest in practical work or academic work. Considerations of *job security* are measured by an item indicating the wish for a secure job. Perceived costs associated with the *duration* of study are captured by an item indicating the wish for a short training period. Similarly, monetary *cost* pressures are indicated by the wish for quick financial independence.

Finally, we include a series of control variables in our analyses. We control for the type of Abitur degree by including a dummy variable indicating general vs. restricted degrees as well as a dummy variable distinguishing between general and vocational upper secondary schools as degree awarding institution. Furthermore, we control for gender and for age at upper secondary graduation.

Descriptives

Table 3 summarizes the descriptive statistics of our variables of interest, broken down by the categories of first post-secondary choice. Apart from a shift from university to the other tertiary institutions, the pattern of enrolment stays more or less stable across surveys. About half of the graduates opt for the traditional universities, somewhat less than ten percent attend

⁶ The exact wording was: 'Please indicate how relevant the following reasons and motives were for the choice of your post-secondary career path'.

the universities of applied sciences⁷, about six percent chose one of the semi-tertiary options and about one third decides to take up training in a non-tertiary track at first. Less than one percent has not started any type of post-secondary education within 3 and a half years after graduation. Students from working classes are underrepresented at traditional universities, but overrepresented in all other institutions, especially in those outside tertiary education.

Table 3: Descriptives

	University	University of applied sciences	Semi-tertiary	Vocational training	No further education	Total
<i>Distributions</i>						
Dataset 1990	54.31	7.23	5.53	32.26	0.66	100.00
Dataset 1994	47.98	9.44	5.21	36.64	0.73	100.00
Dataset 1999	46.84	12.15	6.28	33.87	0.86	100.00
All	50.47	9.10	5.59	34.10	0.74	100.00
Working Class	34.95	11.50	6.36	46.18	1.01	100.00
Intermed./ no tertiary	42.32	8.76	7.36	40.73	0.82	100.00
Intermed/ tertiary	61.47	9.90	4.40	23.76	0.48	100.00
Salariat/ no tertiary	46.68	9.50	6.17	36.99	0.65	100.00
Salariat/ tertiary	68.93	7.15	3.26	20.07	0.59	100.00
All	50.47	9.10	5.59	34.10	0.74	100.00
<i>Mean values</i>						
GPA	0.30	-0.12	0.08	-0.43	-0.75	-0.01
General degree	0.99	0.70	0.92	0.77	0.69	0.88
General school	0.92	0.60	0.74	0.69	0.60	0.80
Male	0.50	0.56	0.47	0.38	0.66	0.46
Age	19.52	19.59	19.50	19.48	19.79	19.51
Financial independ.	1.75	2.29	3.44	2.90	2.85	2.29
Short train. duration	0.45	1.09	1.85	1.18	0.67	0.84
Secure job	3.21	3.58	4.21	3.83	3.11	3.51
Practical work	2.33	3.17	2.79	3.06	3.14	2.69
Academic work	2.90	2.34	1.67	1.42	1.70	2.26
Leading position	2.60	3.03	3.39	2.87	2.54	2.77
High employm. Status	2.46	2.68	2.85	2.46	2.10	2.50

Interestingly, the differences in attendance patterns are stronger between students from non-academic and academic backgrounds than between students from intermediate and salariat

⁷ This figure is smaller than the 20 percent that are usually reported by official statistics since we exclude students that receive their Abitur after vocational training, which is a very common pathway into universities of applied sciences.

classes. Graduates from academic families are strongly overrepresented at traditional universities and strongly underrepresented in the vocational track.

Traditional universities, but also the semi-tertiary institutions attract (or select) graduates with a GPA-mean that is above the total average, whereas there is a clear negative selection into vocational education or out of education. Traditional universities and semi-tertiary institutions have the highest shares of students with general degrees or that are coming from general oriented upper secondary institutions. Universities of applied sciences and to a smaller extent also traditional universities are biased towards a male student population, whereas abstinence from higher education is more common among females. There is no noteworthy selection into institutions that is based on age, given that our sample is restricted to under 30-year-olds. As regards the motivations for educational choices, there are some quite interesting findings that are in line with our expectations. Both financial and cost considerations play an important role for students at semi-tertiary institutions and in the vocational track. Also, the wish for a secure job is most pronounced among students at institutions that are indeed connected with relatively high job security. Practical work is appreciated most by student at universities of applied sciences and in the vocational track, students at semi-tertiary institutions are a bit above average. Conversely, academic work is evaluated highest among students at traditional universities. Only our two measures of status considerations do not show the expected pattern. Here, university students seem not to put much value on status positions. It is rather the students who chose semi-tertiary institutions and the universities of applied sciences that house the most ambitious students.

Analyses

In the subsequent analyses we follow a two-step approach in order to trace the social selectivities at the transitions into the different institutions of higher education. In a first step we consider the decision for or against entering higher education as the first post-secondary choice. In a second step we consider, conditional on having entered the tertiary system, the decision for the type of institution.

Table 4 depicts the respective transition models. The first column (model 1) shows the net effects of social background. Graduates coming from salariat families with academic background have the highest chances to enter higher education. Their chances are twice as large as those of graduates with a working class background, which constitute the reference category. Graduates from academic families of the intermediate classes have the second highest chances with an odds ratio of 1.8. Model 2 introduces the list of explanatory and

control variables, which explains much of the social background effects. However, a somewhat reduced effect of academic background still persists after controlling for the variable set.

Table 4: Transition models into higher education and conditional transition models into type of higher education institution, odds ratios

Transition to...	Total graduates sample		Sample of higher education students					
	M1	M2	M3	M4	M5	M6	M7	M8
	Higher education		University	Univ. appl. Science	Semi-tert. Institution	University	Univ. appl. Science	Semi-tert. Institution
Ref.: Working class								
Intermediate no tertiary	1.15*** (4.14)	1.02 (0.65)	1.19*** (3.44)	0.77*** (-3.78)	1.03 (0.63)	1.11* (2.30)	0.84*** (-3.51)	1.11 (1.92)
Intermediate tertiary	1.84*** (14.69)	1.37*** (7.29)	1.59*** (7.82)	0.71*** (-4.59)	0.67*** (-6.66)	1.29*** (4.69)	0.92 (-1.45)	0.73*** (-4.13)
Salariat no tertiary	1.26*** (6.67)	1.08* (2.06)	1.29*** (4.76)	0.78*** (-3.45)	0.89* (-2.44)	1.15** (3.06)	0.87** (-2.60)	0.97 (-0.49)
Salariat tertiary	2.06*** (21.43)	1.38*** (9.50)	2.02*** (13.62)	0.57*** (-8.26)	0.57*** (-12.32)	1.57*** (10.59)	0.75*** (-5.96)	0.64*** (-7.87)
GPA		1.33*** (24.69)				1.04*** (2.82)	0.89*** (-7.69)	1.07*** (3.38)
General degree		1.68*** (9.52)				5.62*** (15.30)	0.18*** (-18.48)	1.45*** (3.39)
General school		1.11*** (3.34)				1.61*** (11.47)	0.75*** (-6.50)	0.69*** (-7.42)
Male		1.20*** (8.18)				0.99 (-0.36)	1.15*** (4.52)	0.85*** (-4.45)
Age		1.09*** (6.43)				1.05** (2.94)	0.99 (-0.82)	0.95* (-2.56)
Financial independence		0.86*** (-21.73)				0.88*** (-13.49)	0.97*** (-3.36)	1.30*** (22.21)
short duration of training		0.94*** (-8.92)				0.78*** (-24.94)	1.15*** (12.97)	1.23*** (18.68)
Secure job		0.93*** (-8.53)				0.92*** (-7.15)	1.00 (0.14)	1.18*** (9.30)
Practical work		0.93*** (-11.57)				0.90*** (-12.72)	1.18*** (17.02)	0.97** (-2.83)
Academic work		1.25*** (31.81)				1.21*** (21.56)	0.95*** (-5.78)	0.77*** (-20.62)
Leading position		0.94*** (-7.23)				0.87*** (-11.65)	1.06*** (4.46)	1.18*** (10.57)
High empl. status		1.13*** (13.14)				1.12** (9.37)	0.97* (-2.54)	0.87*** (-9.01)

Note: Exponentiated coefficients; t statistics in parentheses; * p<0.05, ** p<0.01, *** p<0.001, weighted data.

Moreover, a good scholastic performance, a general degree and a degree from a general school enhance the chances to enter higher education. Also, male students are more likely to

start tertiary education. As regards the motivations, only a taste for academic work and aiming for a high occupational status have positive effects on choosing a higher education institution. All the other motives seem to lower the chances of entering the tertiary system.

Given these observable selectivities in the population of higher education students we consider in a next step the choices between the three tertiary alternatives (obviously restricted to the sample of tertiary students). Models 3-5 depict the conditional net effects of choosing a traditional university, a university of applied science or a semi-tertiary institution. Within higher education, students from academic families, either salariat or intermediate, have again the highest chances (odds ratios of 1.6 and 2.0) to pick a traditional university rather than one of the other two institutions. Students with working class background (reference category) have the lowest odds. Another picture emerges for the selection into universities of applied sciences. Here, the working class students have the highest chances to enter, whereas the students from academic salariat classes are most reluctant to start their studies at this institution. A quite similar pattern can be observed for semi-tertiary institutions. Table 5 gives a summary of both total participation rates and the distribution of institutional participation conditioned on higher education entrants.

Models 6-7 in table 4 display the conditional effects of entering one of the three higher education institutions, controlling for the whole set of explanatory and control variables. Introducing the variable set lowers the effects of social background in each model. However in none of the models is the reduction of background effects are very substantial, i.e. the effects of social origin can not be completely accounted for by our explanatory variables. If we take a look at the single variables, one finds that within the sample of higher education students the Abitur performance (GPA) has a positive effect on entering a traditional university or a semi-tertiary institution. This is in line with our expectation that performance selection is higher in these institutions. When we consider the motivational variables one has to be aware of the fact that the higher education sample is connected to a negative selection on all motives, except for academic work and high status, which are related to a positive selection. Within this sample, the wish for financial independence has a clear effect in favour of semi-tertiary institutions, which are the only alternative that provide a salary during the course of study. The wish for a short duration of training is connected to the choice of universities of applied sciences or semi-tertiary institution, both of which offer shorter training periods than the traditional universities. The wish for a secure job is positively connected to semi-tertiary institutions and negatively connected to universities. Again, this is in line with our expectations. The interest in practical work leads students into the universities

of applied sciences and keeps them away from traditional universities. However, this item also exerts a small negative effect on the choice of semi-tertiary institutions, which is not in line with our expectations. In contrast, the interest in academic work shows clearly our hypothesized pattern. It is strongly favouring traditional universities and has a negative effect on the choice of the other two institutions. Whereas the effect of the wish for a leading position is again not in line with our expectations, the wish for a high status exerts the expected effect on the institutional choices.

Table 5: Overall and conditional transition rates to institutions of higher education, by social background

	Transition rate to higher education	University		Univ. appl. Sci.		Semi-tertiary	
		share higher educ	total particip. rate	share higher educ	total particip. rate	share higher educ	total particip. rate
Working Class	53 %	0.66	35 %	0.23	12 %	0.11	6 %
Intermediate/ no tertiary	58 %	0.72	42 %	0.16	9 %	0.12	7 %
Intermediate/ tertiary	75 %	0.81	61 %	0.13	10 %	0.05	4 %
Salariat/ no tertiary	63 %	0.75	47 %	0.16	10 %	0.10	6 %
Salariat/ tertiary	79 %	0.87	69 %	0.09	7 %	0.04	3 %

Example: 53 percent of the upper secondary graduates coming from working classes enter higher education. Of those, 66 percent visit a traditional university, which makes up a total university participation rate of 35 percent ($=53 \cdot 0.66$) among the working class graduates.

Explaining class differentials

In the following, we proceed with our analyses to a more thorough explanation of social background effects. In the analyses shown in table 4 we were not able to completely explain away the social background effects completely. One reason could be that we did not take into account that the socially selective choices of institutions can also be driven by the choices of fields of study, which are not equally represented at each of the institutions. To address this, we narrow our analytical sample further down by restricting it to students of those fields that are represented at all institutions. These fields of study turn out to be *social sciences* and *economics*. In the subsequent analyses we will concentrate on the contrast between the extreme categories of social background, working class and the salariat classes with academic education.

Table 6: Composition of samples used for the decomposition analyses

		All graduates	Higher educ	Social science/economics-sample		
				University/ Univ.appl.Sci.	University/ Semi-tertiary	Univ.appl.Sci./ Semi-tertiary
All	Working	0.18	0.16	0.17	0.17	0.23
	Salariat tertiary	0.28	0.33	0.31	0.30	0.22
	GPA	0.00	0.22	0.08	0.12	0.09
	General degree	0.89	0.95	0.89	0.97	0.78
	School degree	0.81	0.86	0.79	0.85	0.65
	Male	0.47	0.51	0.51	0.54	0.39
	Age	19.51	19.53	19.57	19.56	19.49
	Financ. independ.	2.32	1.97	2.11	2.38	2.85
	Short training	0.85	0.66	0.75	0.92	1.53
	Secure job	3.52	3.35	3.49	3.68	3.85
	Practical work	2.71	2.49	2.27	2.19	2.93
	Academic work	2.28	2.71	2.52	2.46	1.90
	Leading position	2.78	2.72	3.29	3.41	3.32
	High empl. Status	2.52	2.52	2.90	2.99	2.85
	Working	GPA	-0.21	0.01	-0.04	0.01
General degree		0.82	0.89	0.81	0.96	0.75
School degree		0.70	0.50	0.66	0.77	0.53
Male		0.44	0.52	0.46	0.47	0.34
Age		19.48	19.63	19.60	19.56	19.40
Financ. independ.		2.70	2.22	2.22	2.52	3.11
Short training		0.94	0.74	0.81	1.00	1.50
Secure job		3.74	3.47	3.54	3.76	3.94
Practical work		2.82	2.58	2.44	2.34	2.94
Academic work		2.10	2.62	2.59	2.43	1.93
Leading position		2.85	2.80	3.26	3.32	3.47
High empl. Status		2.60	2.61	2.87	2.88	3.02
Salariat		GPA	0.28	0.44	0.26	0.31
	General degree	0.95	0.98	0.94	0.99	0.83
	School degree	0.90	0.93	0.87	0.92	0.74
	Male	0.48	0.50	0.57	0.59	0.43
	Age	19.50	19.50	19.62	19.55	19.74
	Financ. independ.	2.00	1.79	2.09	2.27	2.71
	Short training	0.74	0.61	0.80	0.93	1.77
	Secure job	3.34	3.23	3.49	3.60	3.75
	Practical work	2.60	2.41	2.24	2.14	3.06
	Academic work	2.60	2.89	2.66	2.65	1.95
	Leading position	2.74	2.68	3.41	3.49	3.33
	High empl. status	2.51	2.52	2.99	3.08	2.79

Note: weighted data

We will apply a non-linear decomposition method to estimate the relative contribution of specific variables in creating class differentials in the institutional attendance rates. For the decomposition analyses we apply a technique developed by Fairlie (2005).⁸ The rationale behind it is that differences in participation rates between social classes can be decomposed

⁸ At this point we want to abstain from a detailed and technical description of the method. This can be found in Fairlie (2005).

into differences in the distributions of single explanatory variables and differences in the effects of these variables on participation in a given institution. By means of counterfactual manipulation, it is possible to assess the relative impact of single variables in the creation of class differentials in participation rates. We deviate somewhat from the origin decomposition concept as we do not have a binary outcome variable but rather a variable with three outcomes (university, university of applied science and semi-tertiary institutions). This is why we create the artificial contrast between all possible pairs of institutions. However, this procedure does not alter the interpretation of the results significantly. The restriction of the sample to specific fields and the limitation to binary contrasts creates selectivities in the composition of analytical samples.

Table 6 gives an overview of the selectivities in the distribution of observable variables. The upper panel depicts the mean values of the variables used in the analyses and compares the total sample of upper secondary graduates to the respective analytical samples. The lower panels show the same comparisons within the two class categories. Working classes seem to be slightly underrepresented in the samples of university/university of applied sciences (sample 1) and university/semi-tertiary (sample 2) and somewhat overrepresented in the sample university of applied sciences/semi-tertiary (sample 3). The salariat classes with academic parents are only slightly overrepresented in the first and second sample and underrepresented in the third sample. As can be seen in the lower panels of table 6, the selection into the three subsamples creates selectivities in the distributions of almost every variable even within social background categories. This has to be taken into account when interpreting the results of the decomposition analyses.

The results of the decomposition analyses for each binary contrast are displayed in table 7. Salariat class students (if compared to working class students) have distributions that lean more towards universities than to universities of applied sciences in the first contrast, more towards universities than to semi-tertiary institutions in the second contrast and a bit more towards universities of applied sciences than to semi-tertiary institutions in the third contrast. These unequal distributions between salariat and working class students are accounted for by the variables listed in the lower panel of table 7. In the first contrast, the variables explain 83 percent of the unequal distribution, in the second contrast they capture 65 percent and in the third contrast they only account for 39 percent. Their contribution of single variables are displayed in the coefficient-columns. Negative coefficients denote variables that widen the class differences rather than explaining them.

Table 7: Estimates from non-linear decomposition analyses

	University vs. Univ. of applied sciences		University vs. Semi- tertiary institutions		Univ. of appl. science vs. Semi-tertiary inst.	
N subsample	1636		1601		711	
N salariat class	1120		1067		363	
N working class	516		534		348	
Distribution salariat	80/20		86/14		60/40	
Distribution working	66/34		70/30		54/46	
Difference (%-points) of which explained	14 11		16 10		6 2	
<i>Explained by vars (%)</i>	Coef.	z	Coef.	z	Coef.	z
Controls	8.33***	4.21	4.31*	2.40	-10.25	-1.80
Social sciences	-0.30	-0.30	25.69***	8.96	79.73***	7.12
General degree/school	64.49***	16.63	5.73*	2.01	-47.65***	-3.62
GPA	-1.71	-0.92	-4.86**	-2.90	-1.49	-0.58
Status	0.90	0.83	-1.04	-0.73	2.70	0.52
Practical relevance	10.02***	5.57	15.02***	7.31	18.10**	2.80
Secure job	-0.06	-0.01	3.24*	2.19	5.51	1.08
Duration	1.91*	2.16	4.71***	4.60	-31.28***	-4.21
Costs	-0.22	-0.21	11.96***	6.30	24.08***	3.33
Total	83.36		64.76		39.45	

Notes: * p<0.05, ** p<0.01, *** p<0.001, significance levels based on standard errors approximated by delta-method; results based on 1000 replications with random variable ordering and a pooled estimation of effect coefficients in the logit regressions, controlling for social class; weighted data.

In the *contrast between traditional universities and universities of applied sciences* the class differences in the distribution across the two institutions can primarily be ascribed to the type of degree (64 percent), which is not surprising since students with a restricted degree are not eligible for studying at traditional universities. However, the fact that working class students obtain a restricted degree to much higher rates than their salariat class peers points to the importance of qualitative differences in the socially selective process of upper secondary graduation. Differences in the evaluation of practical and academic work account for additional ten percent in the different distribution of the two classes over both institutions. Different evaluations of the duration of study account for another two percent of the unequal distribution.

The differences in the distribution over *universities and semi-tertiary institutions* are mainly accounted for by the fact that working class students can be found relatively more often in social sciences rather than in economics if compared to salariat class students and by the fact that social sciences can be found relatively more often at semi-tertiary institutions if compared to economics. This explains 26 percent of the unequal class distributions in this contrast.

Here, the type of degree accounts for only 6 percent. The GPA-distribution rather covers than

explains class effects. Different considerations of practical and academic work account for 15 percent and cost considerations for about 12 percent of the overrepresentation of working class students at semi-tertiary institutions. The items related to job security and duration of training account for 3 and 5 percent of the class differentials, respectively.

Unequal class distributions over the contrast *universities of applied sciences vs. semi-tertiary institutions* can to a large extent be ascribed to the unequal distribution over the two fields of study. However, the large explanatory contribution of 80 percent that is displayed in the table might be somewhat misleading since it takes into account the big negative values that are connected to the control variables, to the types of degree and to the duration item, all of which suppress the social background effects. This is mainly due to selection processes into this subsample (cf. table 6). Even within this contrast, the two items that represent the practical-academic divide, account for a high share of the class differentials. However, a closer inspection of the data reveals that due to selectivities in this subsample, salariat class students have on average higher values both in the evaluation of practical work and in the evaluation of academic work (cf. table 6). Additionally, both items are positively related to the choice of university of applied science rather than with the choice of a semi-tertiary institution. Hence, this finding is a direct consequence of the selection into the sample. In contrast, the high explanatory power of the cost item is indeed operating in the hypothesized direction. Cost considerations cause working class students to favour semi-tertiary institutions over universities of applied sciences to a much higher extent than it is the case for salariat class students.

Summary and discussion

With our analyses we tried to capture the factors that are responsible for creating class differentials in the access to different institutions within the German higher education system. Deduced from a rational choice approach, we identified scholastic performance as well as cost and benefit considerations, such as status maintenance, expected job security, study duration, monetary costs and preferences for study contents, as possible factors, that account for social selective choices. These variables are indeed related to both access to higher education and choices between different institutions of higher education. Moreover, controlling for these variables explains at least part of the social background effects. Applying a non-linear decomposition method for a subsample of students that have the full institutional choice set, we were able to identify the contribution a different variables in the choices for or against specific institutions. We could show that restricted Abitur degrees are one obstacle that deters

working class students from access to traditional universities. This finding shifts the focus to processes that occur already before upper secondary graduation, namely the selection into different upper secondary institutions or the pathways to qualitatively different kinds of degrees. Furthermore, we could provide evidence for the importance of the role of orientations towards either academic or practical work, which shapes the socially selective choice behaviour between higher education institutions. Another finding underpins the role of semi-tertiary institutions in attracting students from underprivileged backgrounds. The property of providing a salary together with a short duration of training and at the same time providing higher education schooling, seems to draw students with monetary constraints into the tertiary system. These students might otherwise have opted for non-tertiary training in the vocational sector.

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