

Changing Labour Market Outcomes and their Impact on Postsecondary Educational Decisions in Germany

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Abstract

This paper explores to what extent changes in outcomes to tertiary compared to vocational training qualifications in Germany influence educational decisions of students that are eligible to enrol in tertiary education. The core hypothesis of the paper is that students from different social backgrounds should react differently to changes in returns on education. To this end, a unique dataset consisting of large scale surveys of university qualified students from the German Higher Education Information System Institute is used. The surveys were conducted at five different points in time between 1983 and 2004. All analyses are run separately for men and woman and average state unemployment and income ratios for tertiary degree holders and apprenticeship graduates for each survey year were matched to the micro data to assess the effect of changes in labour market outcomes on educational decisions. Contrary to many previous findings, the results of the paper suggest that variations in relative income ratios do not seem to affect educational decisions of school leavers while variation in unemployment seems to have significant effects on postsecondary decisions for women only. Furthermore, female students from lower class backgrounds seem to be more responsive to changes in unemployment ratios than their higher class peers.

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1. Introduction

As other industrialized nations, Germany has witnessed a large growth of tertiary education in the past decades. More students than ever fulfil the necessary requirements to enter higher education, in most cases the *Abitur*. The number of students in tertiary education has reached two million in the early 2000s (Statistisches Bundesamt 2006). However, a sizable proportion of those qualified to enter tertiary education chooses to enter vocational training or opts for no further qualification. The overall-transition rate to tertiary education has fluctuated around 70% ever since the early 1980s (Hochschul-Informations-System GmbH 2002). While there are various interpretations for why the transition rate went up or down, most of them citing recent labour market developments, only a couple of studies have tried to systematically assess the impact of labour market characteristics for educational decision making at the micro level. Furthermore, my review of the literature revealed that only a handful of papers explored whether the possible effect of labour market conditions on educational transitions varies systematically by social origin. No study exists of the German context. Given the importance of anticipated labour market outcomes in sociological rational choice models explaining differentials in educational attainment, (Breen and Goldthorpe 1997, Erikson and Jonsson 1996, Morgan 2005) the scarcity of studies on this topic is surprising. This paper tries to fill the gap by analyzing whether changes in return to education affect the decisions making processes of school leavers in Germany who are eligible to enter higher education. Another core objective of the paper is to test whether students from different social backgrounds react differently to these changes in return to education. Furthermore, this paper focuses on income as well as employment status as two possible return dimensions to tertiary education that could affect educational decisions. I use a pooled dataset of five large school-leavers surveys that were collected between 1984 and 2004 and merge aggregate state

(‘Länder’) unemployment and income ratios for school leavers with tertiary and vocational training qualifications for each point in time for the empirical analyses. These surveys have an advantage over most other data sources in Germany because of the large number of observations in each study. Furthermore, they contain a detailed set of social background measures as well as a measure for the previous scholastic achievement and other control variables which might affect the transition to tertiary education.

2. Theoretical Background

2.1 The economic perspective

From the viewpoint of the canonical human capital approach (Becker [1964] 1993) the choice for or against (tertiary) education can be characterized as the result of a simple cost vs. benefit analysis. A student will choose the tertiary track when she expects to earn more having attended university than if she had not attended university and – in the case of Germany – completed a vocational training program instead or entered the labour market right away, net of university and opportunity costs. The traditional human capital model has been criticized by other economists as well as sociologists because it fails to account for several important aspects of the complex decision making process. First, it was pointed out that there are other ‘nonpecuniary’ or ‘consumption’ aspects of education (Blaug 1976) that might have to be considered in cost vs. benefit equation. Second, it does not take into account the uncertainty of educational investments. Namely: graduates can face the risk of unemployment. However, possibly as a result of rising unemployment rates in the 1980s, economists extended the traditional approach by incorporating the risk of unemployment in a theoretical human capital model (Kodde 1986, 1988, Micklewright et al. 1990). These papers are informative because they point out the two more or less opposite effects one can expect from unemployment on the demand for education. In an educational

system such as in England where students at age 16 have to decide whether to stay in school or exit (see for example Bennett et al. 1992, Paterson and Raffe 1995), high unemployment might drive young people into further schooling because of the difficulties that can be anticipated when trying to find a job right away (higher search costs) and small opportunity costs of additional education. But current unemployment can also affect the demand for education through its effect on anticipated future unemployment even though the theoretical predictions here are rather complex: An increase in the probability of unemployment that affects both those who left school right away and those who acquired a degree in the same way would reduce the rate of return to education and hence reduce the demand for (tertiary) education (see Mickelwright et al, 1990: 163). Furthermore, high unemployment rates might, on average, lead to lower financial family resources and hence reduce the take up of the more cost intensive tertiary schooling option due to economic constraints. However, predictions might be different when those who acquired more education are less affected by unemployment than those without additional schooling. In that case students should be led toward more schooling because the prospects of being able to avoid unemployment seem better with the acquisition of more education (ibid.: 163).

2.2 The sociological perspective

Classical sociological approaches that explain why inequalities in educational attainment between the different social strata come about such as the cultural reproduction perspective (Bourdieu 1977, Bourdieu and Passeron 1971) or conflict theory (Bowles and Gintis 1976, Collins 1971) offer few insights into how changing labour markets should affect educational decisions. Another sociological approach is what has been labelled the “parking theory” (Gambetta 1987: 133-148) or the “discouraged worker effect” (Paterson and Raffe 1995). According to the parking theory

“the length of children’s education is an inverse function of employment opportunities and of change of social mobility at low level of formal education” (Gambetta 1987: 132). Gambetta criticizes this approach because it fails to elaborate whether students choose to stay in school because they did not manage to find a job or because they do, at least to some extent, take into account the benefits of acquiring more education.¹ In my view, recent sociological rational choice theory (SRT), which view inequalities in educational attainment as the result of a differential assessment of benefits and costs as well as probabilities of success associated with the available educational options (Breen and Goldthorpe 1997, Erikson and Jonsson 1996), offer the most compelling avenue for explaining (possible) class-specific reactions to labour market changes. Even though the models differ in some theoretical detail, they all assume that the labour market returns associated with different educational options are a critical element in the process of educational decision making, together with costs and subjective expectations of future success. These models differ from economic formulations because they explicitly state that the perceived benefits associated with the more demanding educational option are greater for the more privileged classes. According to the Breen and Goldthorpe model (1997)², students and their families faced with the decision between different educational tracks put special emphasis on the maintenance of their class position. Even though the status maintenance (or downward mobility avoidance) motive applies to all social classes, the implications differ: Middle class students are driven towards the more demanding educational track in order to maintain their class position whereas working class students can choose less demanding tracks in order to achieve an occupational position at the level of their parents. A number of recent papers found reasonable

¹ Gambetta (1987: 134) also criticizes the parking theory because of its short-sighted view that students’ choice of further education should almost solely be attributed to a lack of employment opportunities.

² The model proposed by Erikson and Jonsson (1996) is similar to the B & G model in that its three central parameters are the costs and benefits attached to an educational option as well as perceived probabilities of success. However, status maintenance is not included in the model even though Erikson and Jonsson state that the evaluation of educational benefits can differ between classes.

empirical support for this theoretical model (Becker 2003, Breen and Yaish 2006, Davies et al. 2002, Holm and Jæger 2008, Stocké 2007). However, none of these papers addresses how changes in the returns on education affect the choice of educational options. In my view, following the core assumption from the Breen and Goldthorpe model, students from upper classes should be less sensitive to changes in the labour market prospects, namely higher risks of unemployment, of the more demanding tertiary track because they have to choose the educational path that maximizes their opportunities to enter the service class. Even if the 'rate of return' to tertiary education declines, it is unlikely that entering the labour market right away or choosing a vocational study track will ultimately lead to better prospects of attaining an upper class position compared to the choice of higher education.

Another argument why working classes might react differently to changing returns to tertiary education refers to the cost associated with the more demanding educational track. When unemployment is high it is likely that especially working class parents are more likely to lose their job compared to service class parents, which again makes the less costly educational alternative more attractive for working class students. Erikson and Jonsson (1996: 18-19) make a similar argument when they argue that the relative costs for schooling are higher for working class students because their parents are more likely to experience fluctuations or interruptions in income.

In sum, two contrasting hypotheses can be derived from sociological and economic theory: Following the sociological status-maintenance approach, and because of possible fluctuations or interruptions in income, upper service class students should be less sensitive to (changing) labour market conditions in their educational decision making process. This core hypothesis is contrasted against the classical human capital approach, from which one can infer that relative changes in the returns to tertiary education will lead to parallel shifts in the pattern of

postsecondary attendance for the offspring of every social group. It should be added that the economic ‘credit constraint’ argument also implies that higher unemployment rates lead, on average, to lower financial family resources which might affect the educational choices of students from less privileged background more strongly.

2.3 Problems with proxying ‘return expectations’

Given that both sociological and economic approaches assume that students’ expectations about possible labour market rewards are associated with the various educational options, it is surprising that only few papers try to measure or analyze expectations directly (Betts 1996, Brunello et al. 2004, Dominitz and Manski 1996, Morgan 1996, 1998, Smith and Powell 1990). In economics, the standard practice has been to make assumptions about expectations without actually observing them. It is typically assumed that youth “condition their beliefs on the same variables and process information in the same way” (cf. Manski 2004: 1332). A standard assumption in most economics studies is that students observe incomes of older cohorts; typically university or non-university graduates at age 30-40, and expect to realize the same incomes as the older graduates with the respective educational credentials. Nevertheless, it not clear, what the variables should be that students condition their expectations on (c.f. Manski 1993). More recent studies by economists use results from wage regressions with older cohorts that control for an extensive set variables and impute the predicted values from this model in the model that predicts schooling choices. Individuals are assigned expectations as “out of sample” average income values of comparable individuals (for example in terms of their gender, region and social origin (e.g. Wilson et al. 2005). Yet it is empirically unresolved to what extent students take into account their own characteristics when assessing possible benefits of educational options. As a

result, I follow a relative straightforward strategy which has been applied by sociologists before (Beattie 2002). Instead of calculating return rates that are differentiated by gender, social origin or other socio-demographic characteristics I only look at the effects of the average income and unemployment returns to tertiary education for all groups on postsecondary decisions, differentiated by states and survey year. However, instead of using the absolute returns to tertiary education, I consider the relations of outcomes to tertiary vs. vocational training qualifications which I consider as the best approximation of the theoretical model of sociological rational choice theory (see Hillmert and Jacob 2003 for a similar approach).

3. Previous studies on the effect of labour market outcomes on educational decisions

Even though a considerable number of studies assess the role of labour market conditions on educational decisions, the variety in the methodological approaches makes it difficult to assess the results. Some studies that explore the effects of unemployment on educational decisions, impute the absolute (aggregate) levels of unemployment (Paterson and Raffe 1995), while others use the rates for graduates with different qualifications or different age (Albert 2000, Merz and Schimmelpfennig 1999, Petrongolo and San Segundo 2002) or impute both, the aggregate and the rate for the more qualified group (Lauer 2002). The same applies to average income returns. Another source of variation is whether local labour market conditions are assumed to influence the decision making process (e.g. Albert 2000, Beattie 2002, Paterson and Raffe 1995, Petrongolo and San Segundo 2002) rather than averages at the national level (Merz and Schimmelpfennig 1999). Overall, this literature suggests that income returns and unemployment rates have significant albeit limited effects on the decision to continue education – even though the results seem to differ for men and women as well as students with different SES (e.g. Averett

and Burton 1996, Beattie 2002). Those studies that differentiate between overall and qualification-specific rates can generally show that higher unemployment rates of those with middle (upper secondary) education generally seem to increase the take up of education (Albert 2000, Petrongolo and San Segundo 2002) while the effect of the overall unemployment rate produces ambiguous results (Lauer 2002, Petrongolo and San Segundo 2002).

My literature search revealed only two studies that systematically analyzed the impact of labour market conditions on educational decisions in Germany, both using data from the German Socio-Economic Panel Survey (GSOEP). Merz and Schimmelpfennig (1999) studied whether university qualified students chose higher education rather than vocational training and impute the aggregate national unemployment rates for tertiary and vocational training graduates as well as the wage differential for graduates with tertiary and vocational qualifications. They find that the wage differential has a significant influence on the choice for higher education for men only. Unemployment rates for higher education graduates significantly decrease the probability to take up higher education while the unemployment rates for vocational training graduates increase the take up of tertiary studies. However, Merz and Schimmelpfennig (1999) do not test for interactions with the macro variables and parents' qualification, maybe due to the small number of school leavers in the analytical sample (N=423). Furthermore, their estimates might be biased as some important variables that affect educational decisions, such as previous scholarly achievement or ability are not available in the GSOEP. Lauer (2002) studied whether or not young people enrolled in higher education and proxies 'return expectations' by using income, as well as unemployment and employment status averages from an older cohort – differentiated by gender, nationality, family background, region and year. The results show that, the imputed labour market variables are a strong predictor of attendance. Interestingly, the absolute level of unemployment and not the ratio between highly qualified and vocationally qualified students has

the stronger impact on attendance. The opposite pattern can be observed with the imputed income averages. The absolute level of the wage premium has no effect on attendance while the income ratio between those with a tertiary and a vocational degree has a strong effect. As in the previous study, no interactions between social background variables and the labour market variables were tested.

4. The German institutional setting

In Germany's stratified schooling system only the highest schooling track (Gymnasium) typically leads to eligibility for tertiary education. For students who reached eligibility, in most cases the Abitur (A-level), the main choice is between tertiary education and vocational training. Only relatively few students choose to enter the labour market right away (Reimer and Pollak 2005). The short duration, high probability of success, and practical orientation of vocational training is particularly attractive for students with working class backgrounds even though there is a trade-off with future occupational returns. Furthermore, vocational training can be characterized as having the image of leading to relatively 'secure' employment opportunities even though unemployment rates of vocational training graduates rose more sharply than those of tertiary graduates in the 1990s (Reinberg and Hummel 2002). The university system consists of, the traditional university which focuses on traditional scientific training and academic learning and the university of applied sciences (Fachhochschulen) which offer a limited selection of tertiary level programmes with a more practical orientation and shorter study times. This paper focuses on the take up of tertiary education in general versus the vocational training alternative which can be considered the most important choice for tertiary qualified students in Germany (e.g. Becker and Hecken 2007, Hillmert and Jacob 2003).

5. Data and measures

For the analyses I use a dataset on educational transitions provided by the German Higher Education Information System Institute (HIS). The dataset is based on five pooled large scale mail surveys of students who earned eligibility for tertiary education in Germany in the years 1983, 1990, 1994, 1999 and 2004³. One drawback of the data, as is common for mail surveys, is that response rates for the initial waves were relatively low (from 26 % to 34 %). The 1983 data was collected only in West Germany, while from 1990 onwards both East and West Germany are included in the surveys. Because labour market conditions were still very unstable in East Germany in 1990, the year of the reunification, 5022 respondents who obtained their entrance qualification in the east (GDR) that year were not included in the analyses. Furthermore, 482 students who were older than 35 when obtaining the entrance qualification were excluded to reduce heterogeneity between school leavers resulting in a pooled dataset of 77,368 observations. In the HIS surveys, the graduating cohorts are typically surveyed twice: Half a year and three and a half years after graduation.⁴ In order to match the educational decision of the students to labour market conditions at a specific point in time I draw on the first wave of the data. However, additional analyses with the data from the second wave, which was conducted three and a half years after graduation, will be presented as well.

For male students that were in military service or civilian service, as well as all other students that had not taken up any form of postsecondary education six months after their entrance qualification (males and females alike) their educational decision were substituted with

³ I am indebted to HIS for granting access to the data and would especially like to thank Dr. Christoph Heine for his support.

⁴ However, the 1983 and the 1990 data also include a third wave while the 2004 data only consists of a cross-section of one wave only (collected 6 months after graduation).

a variable indicating their immediate educational plan. Overall this procedure was applied to 34% of the respondents in the analytical sample.

The data contain relatively detailed information about the occupational position of both parents. I followed the basic idea of the Erikson, Goldthorpe and Portocarero (EGP) class scheme and coded the occupational groups into a three fold collapse (e.g. Jackson et al. 2007) using the father's occupation as a reference while imputing mother's class in case the father's information was missing. The service class as well as the intermediate class were further differentiated according to the level of parental education. If one of the parents had an Abitur they were coded into the 'education high' class. Because the number of working class parents with Abitur was too low this group could not be differentiated according to their level of education resulting in a five category class variable (service class with and without Abitur, intermediate class with and without Abitur, and working class). Other control variables included are grade point average in the Abitur examination, gender, dummy variables for type of Abitur (full vs. restricted)⁵ and whether students completed a vocational training degree before their entrance qualification. Finally, five dummy variables for the year of the survey and 13 dummy variables for the respective state (German 'Länder') in which the entrance qualification was earned are included as well to capture other state characteristics or time trends that do not have to do with the variation in returns to education. Table 1 provides an overview of the independent variables in the pooled dataset. After listwise deletion the analytical sample contains 72,431 cases.

[Table 1 – about here]

⁵ A restricted Abitur (*Fachhochschulreife*) only permits entry to the universities of applied sciences but not universities.

Labour market measures

The aggregate labour market information was matched to the micro data at the level of the German states. Some small states had to be collapsed because of data-access restrictions as well as small N (see Appendix, Table A1). The labour market statistics were gathered for tertiary and vocational training graduates from age 25-60⁶ using two datasets: Average monthly gross wages were computed using the German Socio Economic Panel (GSOEP). To reduce noise due to small N in some states in the GSOEP, average state-wages were computed combining two years (the year of the survey and the previous year), except for the 1984 time point, the year when the GSOEP was first initiated.⁷ Unemployment rates were computed on the basis of the German Labour Force Surveys (the German Microcensus), because the unemployment estimates from GSOEP proved to be too unstable at the state-level because of small N.⁸ Due to the variation in labour market conditions across states and over time, the labour market dataset contains 52 observations for each labour market measure. In order to summarize the relative position of tertiary vs. vocational training graduates in each state, at each point in time, average tertiary incomes were divided by vocational training incomes. Conversely, average unemployment rates for vocational training graduates were divided by tertiary unemployment rates to achieve better comparability with the income measure given that higher unemployment rates indicate a labour market disadvantage. As can be seen in table 1, on average incomes for tertiary degree holders were 1.52 times larger than incomes for vocational training graduates in the period considered while the latter group's unemployment rate was 1.57 times larger than tertiary graduate's unemployment rate.

⁶ A restriction to younger graduates would have been preferable as students might observe them rather than older graduates. This however was not possible due to insufficient case number in that age group in the GSOEP data.

⁷ Given that the students in the HIS survey were surveyed in December 1983, matching the 1984 income data does not seem too problematic.

⁸ Microcensus scientific use files from the following years were used: 1982 (matched to the 1983 cohort), 1989 (matched to the 1990 cohort), 1993 (matched to the 1994 cohort), 1999 (matched to the 1999 cohort), 2002 and 2004 (the average between 2002 and 2004 was matched to the 2004 cohort).

[Table 2 - about here]

In Table 2 the aggregate income and unemployment ratios as well as the percentage of students that chose tertiary education are shown across all survey years. With the exception of the unemployment risk, which seem to increase over time for those with a vocational training qualification compared to tertiary graduates, there seems to be no systematic trend in the income relations or the take up of tertiary education at this chosen level of aggregation.

5. Analysis & Methods

In order to test whether changes in the relative returns to tertiary education influence school leavers' postsecondary choices, the labour market ratios are introduced in logistic regression models predicting entry to tertiary education. While all models include the set of control variables shown in table 1, model 1 is computed without fixed effects for the states in order to explore the 'raw' effects of the unemployment and income ratios. In model 2 the state fixed-effects are introduced and model 3 includes interactions between the outcome measures and social class. Because the effect of macro level labour market data on micro units are computed, avoiding downward bias in the estimation of standard errors is a concern (Moulton 1990). Thus, for all analyses robust Huber-White standard errors were computed which additionally take into account the clustering of observations within all 52 state-year contexts.⁹ Since there is ample evidence in the research literature which suggests that women might respond differently to economic incentives than men (Beattie 2002, Marini et al. 1996) all models are calculated separately for male and female school leavers.

⁹ An alternative method to deal with the clustering at the state-level would be the estimation of so called HLM – or Multilevel Models (Bryk and Raudenbush 1992, Snijders and Bosker 1999). Given the few number of macro level state-units (13) the assumption that the regions are drawn from a random sample of states does not hold (e.g. Snijders and Boskers, 1999: 43) which is why a logit model with year and state fixed-effects seemed the preferable option.

5.1 The effect of labour market conditions on postsecondary educational decisions

As can be seen in Model 1 (table 3), results indicate that even net of previous academic achievement and other control variables, social class clearly structures access to higher education in Germany for both male and female students. Students from service class parents with Abitur are $e^{1.033}=2.81$ (women) and $e^{.0836}=2.33$ (men) more likely to enter higher education than their working class peers.

[Table 3 – about here]

Thus, across all school leaver cohorts, social class effects seem to be more pronounced for women than for men. As can be expected, grades strongly influence the decisions to enter higher education for both male and female students. Interestingly, neither the income nor the unemployment ratio coefficients reach statistical significance in the first model in the male subsample. In the female subsample however, an increasing advantage of tertiary incomes compared to vocational training incomes is positively associated with the take up of tertiary education. Both the positive effect of the income ratio as well as the non-effects for males contradicts previous findings that generally find that income-effects seem to be more pronounced for (white) men (e.g. Beattie 2003). However, for women the income effect vanishes completely, once we include the state fixed effects in model 2 and the effect for unemployment seems to be reversed in this model. Women enter higher education more often when the vocational training/tertiary education unemployment ratio increases. Apparently, not accounting for state characteristics might lead to very a distorted picture of the effects of the considered labour market measures. It should be noted though that for males the inclusion of the state fixed effects does not change the result which is that neither the income nor the unemployment ratio seems to affect their chances to enter higher education. Finally, model 3 includes interaction coefficients between

social classes and the labour market measures to test the core hypothesis of the paper which states that compared to the privileged service classes, working classes should be more responsive to changes in returns to education. For females, we see that none of the income-interaction coefficients reaches statistical significance. As regards the interactions coefficients with unemployment, there seems to be a systematic pattern which indicates that compared to the working classes, women from more privileged backgrounds seem to be less responsive to changes in the unemployment ratio. More specifically, based on the difference in log-odds ratios it seems that women from working classes substantially increase their take up of tertiary education with an increasing unemployment ratio while the effects for service class women is close to zero. However, only the interaction coefficient for the higher educated service class reaches statistical significance. For men, there seems to be no systematic pattern with respect to social class differences in the effect of the labour market measures even if the interaction between the unemployment ratio and the service class/education high dummy is significant at the 10%-level ($p=0.059$).

Alternative specification of interaction coefficients and predicted probabilities

Due to the various problems connected to testing significance and interpretation of interaction coefficients in nonlinear regression models (e.g. Ai and Norton 2003, Allison 1999) the analyses will also be complemented by predicted probability plots as well as different techniques to estimate the significance of the interaction coefficients.

Ai and Norton (2003: 123-124) point out that the magnitude of the interaction effect which is calculated by standard statistical packages for logistic regression models does not equal the marginal effect of the interaction term and can even be of opposite sign. Furthermore, depending on other covariates, the magnitude and significance of the interaction effect can vary

for different observations in the sample. As a result the previous analyses are complemented by an alternative method for estimating interaction coefficients in logistic regression models as well as predicted by probability plots.

Norton et al. (2004) suggest a technique for the estimation of interaction coefficients in logit models which calculates the size and significance for each individual in the analytical sample in order to receive the ‘correct’ estimate.¹⁰ Using this alternative calculation technique for interaction coefficients I estimate an additional model for both genders which only includes the interaction between the dummy for the higher educated service class and the unemployment ratio. Based on this alternative method, the effect of the unemployment ratio is, again, on average less pronounced for women from service class/education high backgrounds compared to working classes (average logit interaction effect=-.031, s.e.=.015, z=-2.336). Yet, an inspection of the statistical significance (z-statistics) of the interaction effect across all observations (appendix, figure A1) reveals that the interaction is significant only for women who have a predicted probability of entering higher education that is larger than about 0.6 while it is not significant for most women with a predicted probability below 0.4. Thus, there seem to be social class differences in the effect of the unemployment ratio only for those women who have a relatively high predicted probability of enrolment. For men, the average interaction coefficient is not significant based on this alternative calculation method even if it only marginally misses conventional levels of significance (average logit interaction effect= -.031, s.e.=.016, z=-1.851). Interestingly, significance levels across male observations do not seem to vary across the predicted probabilities of enrolment (appendix, figure A2).

Having established that the effect of the unemployment ratio seems to be different for women from different class backgrounds, I now turn to predicted probability plots for substantive

¹⁰ Significance tests are conducted based on the so called “delta method”. This alternative method for the estimation of interaction effects was calculated using the user written STATA ado “inteff” programmed by Norton et al. (2004).

meaningful interpretations of the effect of the unemployment rate. I plot predicted probabilities of entry to tertiary education for men and women from either working class or higher educated service classes based on a Model 3 respectively. Because the income-ratio coefficient does not seem to reach statistical significance in any of the models that include state fixed-effects no further illustration of the effects are shown. In order to represent the most typical school leaver, predicted probabilities are calculated for students with German citizenship who had not completed prior vocational training and who had completed a full entrance qualification while all other variables (including the year and state dummy variables) are set to the sample-mean.

[Figure 1 about here]

Figure 1 illustrates that with an increasing vocational training/tertiary education state unemployment ratio, only women from working class origin seem to be reacting in the sense of classic human capital theory as they are increasingly more likely to enter higher education. For average working class women, a change in unemployment ratio from 1.5, which represents the mean-ratio across all survey years, to about 3.0 which implies that the state vocational training unemployment rates is three times larger than the tertiary unemployment rate, predicted probabilities of higher education entry increase by about 10 percentage points, which can be considered substantial. For service class men, there seems to be an, albeit small, effect in the opposite direction which should be interpreted with caution given the lack of significant effects.

5.2 Analyses based on realized educational decisions

Because about a third of the students in the analytical sample had not decided yet about their postsecondary pathways, Models 1 to 3 are replicated based on the second wave of the respective survey that was conducted three and a half years after graduation. Due to the fact that there is no

second wave of the 2004 data available, the analysis is restricted to the four older graduating cohorts so that only 40 different labour market ratios could be matched to the pooled microdataset.¹¹ Replicating the analyses based on the realized educational decisions also has the advantage that the labour market measures now have the status as a ‘lagged’ variable, because they relate to the time well before the period in which most students entered higher education. To achieve better comparability with the previous analyses, only the first post-secondary education after graduation is considered. The use of the second wave of the data also comes at the cost of considerable panel attrition leading to a reduced analytical sample of 42,610 cases.¹²

[Table 4 about here]

Overall the results based on the realized educational decisions mirror the results of the previous analyses based on the first wave only (table 4). In neither the male nor the female model that does not control for state fixed-effects the labour market measures reach statistical significance. Again, in the female subsample the unemployment ratio has a significant effect once these fixed-effects are introduced in model 2, while none of the labour market measures reach statistical significance in the male sample. None of the interaction effects reach statistical significance in model 3. The sole exception is the interaction coefficient for the low educated intermediate classes and the income ratio which does not seem to be connected to a substantively meaningful effect. As in the previous analyses I calculated interaction effects for the most privileged class and the unemployment ratio for both genders using the alternative technique developed by Norton et al. (2004). Again, this additional model only includes the interaction between the most privileged class and the unemployment ratio. Interestingly, the results of this alternative calculation reveal

¹¹ Because the timing of waves deviates for the 1983 graduating cohort, information from the third wave will be used which was conducted four and a half years after graduation. In order to be able to compare this information to the other waves, retrospective information on educational decisions were censored at three and a half years after graduation.

¹² In the analyses with the second wave of the data a longitudinal weight derived based on a dropout analysis is applied in order to account for panel mortality.

that the logit for the interaction effect only marginally misses the threshold of conventional significance levels for women (average logit interaction effect -0.34, s.e.=0.019, $z=-1.863$) and for men (average logit interaction effect -0.34, s.e.=0.018, $z=-1.880$) which is in contrast to the results based on the conventional method shown in table 4. An inspection of the z-statistics across all observations (Appendix, figure A2) shows the same qualitative result as in the case of the first wave. For women, there is a large variation of the across estimated predicted probabilities of enrolment indicating that the interaction coefficient between unemployment and service class is significant only for those observations with a relatively higher predicted probability of enrolment. For men, the significance of the interactions is around the significance threshold and does not vary much across the predicted probability of entry to tertiary education.

5.3 Further Methodological Considerations

Given that the labour market relations between tertiary and vocational training qualified persons seem to affect educational decisions to a limited extent only, I replicate Modell 2 from tables 2 and 3 on the basis of the absolute tertiary incomes and unemployment rates instead of the ratio-measures.¹³ This is the method applied in many of the previous studies reported in the literature review which estimated the effect of labour market conditions on educational decisions.

[Table 5 about here]

As can be seen in table 5, results are largely identical to the results reported before. An increasing unemployment rate of tertiary graduates suppresses the propensity to enter higher education for females only while no other effect reaches statistical significance. In light of the fact that only 52 labour market contexts could be matched another concern is that results might be driven by

¹³ Given the aforementioned problems estimating and testing significance of interactions effects in logit-models no results for interactions between social class and the labour market measures are reported for these additional models.

outliers with respect to income or unemployment. As a result, I replicated the results with two reduced samples in which the highest 5 and lowest 5 of the 52 income ratios (see row 2, table 4) as well the top 5 and the lowest 5 unemployment ratios were excluded (row 3, table 5). As can be seen in case of the models in which the 10 state-year units with the most extreme income-ratios are excluded, the qualitative patterns of results is the same as the ones reported before. However, when excluding the 10 state-year units with the most extreme values for the unemployment ratios, the pattern of results changes slightly. The unemployment ratio does not have a significant effect for females in the first wave anymore while it is still significant in the second wave, in addition, and somewhat surprisingly, the unemployment ratio now also has a negative significant effect for males in the second wave. Regardless of these small deviations from the previous results, the additional specifications confirm that, irrespective of the specification, higher state unemployment rates for tertiary graduates seem to divert females away from tertiary education. For male, there seems to be no effect of unemployment - if any than in the opposite direction. Furthermore, there is no effect of the income measures at the state level.

6. Discussion

The goal of this paper was to find out whether students in Germany who are eligible to enroll in tertiary education are influenced by changes in labour market conditions when making educational decisions. Furthermore I wanted to test whether students from different class backgrounds differ in their response to changes in labour market conditions. To this end labour market information on income *and* unemployment relations between tertiary graduates and persons with vocational training qualifications at the level of German states was matched to a pooled dataset on educational decisions of school leavers. I hypothesized that because educational decisions are influenced by the downward mobility avoidance motive and because of

differential exposure to economic fluctuations, students from different class backgrounds should differ in their reaction to changes in labour market conditions.

Results of the paper indicate that average incomes of tertiary graduates at the state level, in relation to those persons with a vocational training qualification do not seem to affect educational decisions, irrespective of gender and chosen specification. Differential unemployment ratios however seem to have a robust effect for women but not for men. With an increasing relative unemployment risk of vocationally qualified labour compared to tertiary graduates, female school leavers propensity to enter higher education increases. Furthermore, in line with the core hypothesis of the paper, this effect seems to be more pronounced for female students from less privileged class backgrounds. Women from higher educated service class origins seem to be relatively indifferent to changes in the unemployment risks. This result was robust across a number of specifications and different methods for assessing the significance and magnitude of interaction effects. One finding from these additional analyses is however that class differences only appeared for women who had a relatively high predicted probability of entering higher education. Possibly, in order to observe differential sensitivity to changes in unemployment rates, entering higher education must be in the realm of possibility. Thus, it can be inferred that in order to disentangle social class differences in the effect of labour market changes, other variables, such as previous academic achievement might have to be considered to find out why and how these mechanisms operate.

Comparing the results of this paper with findings from previous studies, there are at least two possible explanations for the pattern of results found here. First one may argue that – disregarding the robust effect of unemployment for women – the lack of more consistent effects of the labour market measures can be attributed to methodological caveats of the presented analysis such as the fact that labour market context information could only be matched at the

state-level which might be too broad of a geographical unit in order to function as realistic 'return expectation', too much noise in the imputed unemployment and income estimates or the relatively high nonresponse-rates of the school-leavers surveys. Regarding the first objection, one may argue the opposite and claim that tertiary graduates who are not restricted to labour markets might only consider average outcomes to tertiary education beyond their respective local contexts. No doubt, future work is necessary to systematically assess the role of local labour markets for educational decisions. An alternative possible interpretation of the reported findings is that changes in returns on tertiary education do have indeed very little effects on educational decisions of school leavers in Germany, once an appropriate statistical framework is adopted which includes fixed effects for the respective local contexts and takes into account of the clustering of observation within state- or other local units.

Overall the results presented here also indicate that it is indeed advisable to separate men and women when analysing the effects of labour market outcomes on educational choices. Why exactly women seem to respond differently to unemployment goes beyond the scope of this paper but one may speculate that they weigh job security higher than men, and thus are more sensitive to changes in unemployment risks for tertiary graduates. In any case more research is needed that helps to uncover the processes that influence the formation of adolescent educational expectations and how class and gender shape these expectations.

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Tables & Figures

Table 1: Descriptive statistics; pooled
HIS-Surveys 1983, 1990, 1994, 1999 and 2004, N=72,431

Variable	Mean	Std. Dev.	Min	Max
<i>Dependent Variable</i>				
Choice of tertiary education	0.66		0.00	1.00
<i>Parents' class & education</i>				
Service class & education high	0.15		0.00	1.00
Service class & education low	0.28		0.00	1.00
Intermediate & education high	0.04		0.00	1.00
Intermediate & education low	0.32		0.00	1.00
Working Class	0.21		0.00	1.00
<i>Other independent variables</i>				
Grade ¹	2.45	0.63	0.90	4.00
Full entrance qualification	0.81		0.00	1.00
Vocational training with/before Abitur	0.22		0.00	1.00
Male	0.49		0.00	1.00
Age	20.11	1.92	17.00	35.00
German citizenship	0.98		0.00	1.00
<i>Labour market measures²</i>				
Unemployment rate tert. graduates/voc. training graduates (by 'Länder')	1.52	0.42	0.89	3.57
Gross monthly income for tertiary graduates/ voc training graduates (by 'Länder')	1.56	0.19	1.27	2.31

Notes: ¹ This variable was standardized and "reversed" for the multivariate analysis so that positive values indicate better grades.

² Based on pooled GSOEP (Income) and pooled Mikrozensus Surveys (Unemployment), own computations.

Table 2: Income and Unemployment relations and Choice of Tertiary Education over time

Year	Income Ratio	Unempl. Ratio	%Tertiary Ed.	N
1983	1.49	1.38	.64	13.922
1990	1.67	1.28	.66	18.496
1994	1.57	1.50	.68	19.827
1999	1.52	1.78	.64	13.004
2004	1.50	2.02	.67	7.182

Notes: Aggregate income and unemployment ratios across all states based on pooled GSOEP (Income) and pooled Mikrozensus (Unemployment) after they were matched to the HIS surveys, own computations. Tertiary Education estimates based on HIS data.

Table 3: Logistic Regression of Entry to Tertiary Education on social background and objective labour market measures (first wave)

Variable	M 1	M 2	M 3	M 1	M 2	M 3
	Female			Male		
<i>Parents class (reference: working class)</i>						
Service class & education high	1.033*** (22.19)	0.997*** (19.79)	1.447*** (3.87)	0.845*** (12.63)	0.836*** (12.09)	1.666*** (2.73)
Service class & education low	0.473*** (15.80)	0.433*** (13.81)	0.432 (1.22)	0.427*** (9.66)	0.420*** (9.57)	0.921 (1.91)
Intermediate & education high	0.719*** (10.66)	0.738*** (10.59)	0.885 (1.27)	0.568*** (6.51)	0.578*** (6.58)	0.148 (0.15)
Intermediate & education low	0.188*** (6.65)	0.159*** (5.26)	-0.173 (-0.62)	0.137*** (3.44)	0.132*** (3.33)	0.930 (1.91)
<i>Other independent variables</i>						
Grade (std.)	0.546*** (30.86)	0.562*** (31.63)	0.562*** (31.58)	0.484*** (26.99)	0.487*** (25.92)	0.487*** (25.94)
<i>Labour market measures</i>						
Ratio Tert./Voc. Income	0.283* (2.22)	-0.056 (-0.70)	-0.141 (-1.01)	0.253 (1.13)	-0.078 (-0.64)	0.200 (0.96)
Ratio Voc./Tert. Unemployment	-0.140 (-2.17)	0.140* (2.07)	0.193* (2.19)	-0.086 (-0.98)	-0.014 (-0.13)	0.037 (0.34)
<i>Interactions</i>						
Service class & educ. high * Income			-0.097 (-0.51)			-0.295 (-0.95)
Service class & educ. high * Unemploy.			-0.183* (-2.03)			-0.240 (-1.89)
Service class & educ. Low * Income			0.018 (0.10)			-0.248 (-0.97)
Service class & educ. Low * Unemploy.			-0.009 (-0.13)			-0.079 (-0.85)
Intermediate & educ. High * Income			0.084 (0.21)			0.270 (0.52)
Intermediate & educ. high * Unemploy.			-0.155 (-1.40)			0.004 (0.02)
Intermediate & educ. low * Income			0.249 (1.92)			-0.478 (-1.76)
Intermediate & educ. low * Unemploy.			-0.032 (-0.52)			-0.034 (-0.46)
Constant	-3.289*** (-8.31)	-3.275** (-8.97)	-3.236*** (-7.41)	0.713 (1.41)	0.880* (2.14)	0.387 (0.69)
Pseudo-R ²	0.096	0.101	0.101	0.064	0.068	0.068
Observations		37,267			35,164	

*** $p < .001$, ** $p < .01$, * $p < .05$

Note: †not reported are the coefficients for prior vocational training, type of entrance qualification, German citizenship, 13 state dummy variables (in Model 2 and 3) and 4 dummy variables for survey year.

Table 4: Logistic Regression of Entry to Tertiary Education on social background and objective labour market measures (second wave)

Variable	M 1	M 2	M 3	M 1	M 2	M 3
	Female			Male		
<i>Parents' class (reference: working class)</i>						
Service class & education high	1.033*** (16.24)	1.000*** (14.59)	1.562** (2.89)	1.028*** (13.07)	1.019*** (12.45)	1.832** (2.42)
Service class & education low	0.472*** (10.86)	0.431*** (8.86)	0.463 (0.98)	0.436*** (8.11)	0.427*** (7.77)	0.697 (1.09)
Intermediate & education high	0.669*** (6.75)	0.713*** (7.32)	-0.101 (-0.12)	0.660*** (5.91)	0.675*** (6.01)	-0.388 (-0.28)
Intermediate & education low	0.173*** (3.66)	0.140*** (2.81)	-0.086 (-0.18)	0.148*** (3.31)	0.143** (3.15)	0.770 (1.26)
<i>Other independent variables</i>						
Grade (std.)	0.582*** (26.86)	0.597*** (26.11)	0.597*** (26.05)	0.530*** (24.46)	0.528*** (22.77)	0.528*** (22.89)
<i>Labour market measures</i>						
Ratio Tert./Voc. Income	0.180 (1.14)	-0.092 (-1.05)	-0.051 (-0.26)	0.311 (1.04)	-0.141 (-1.18)	0.213 (1.09)
Ratio Voc./Tert. Unemployment	-0.127 (-1.44)	0.289*** (4.02)	0.247* (2.16)	-0.118 (-0.96)	-0.014 (-0.11)	-0.138 (-1.05)
<i>Interactions</i>						
Service class & educ. high * Income			-0.222 (-0.78)			-0.371 (-1.02)
Service class & educ. high * Unemploy.			-0.142 (-1.04)			-0.156 (-0.79)
Service class & educ. Low * Income			-0.132 (-0.56)			-0.314 (-1.00)
Service class & educ. Low * Unemploy.			0.119 (1.07)			0.152 (-0.80)
Intermediate & educ. High * Income			0.496 (1.14)			0.542 (0.68)
Intermediate & educ. high * Unemploy.			0.041 (0.26)			0.146 (0.75)
Intermediate & educ. low * Income			0.060 (0.26)			-0.610* (-2.03)
Intermediate & educ. low * Unemploy.			0.088 (0.79)			0.230 (1.40)
Constant	-2.092*** (-4.00)	-2.363*** (-5.24)	-2.370*** (-4.26)	1.809*** (2.84)	2.135*** (4.31)	1.762** (3.17)
Pseudo-R ²	0.101	0.106	0.106	0.088	0.096	0.097
Observations		21,355			35,164	

*** $p < .001$, ** $p < .01$, * $p < .05$

Notes: ¹not reported are the coefficients for prior vocational training, type of entrance qualification, German citizenship, 13 state dummy variables (in Model 2 and 3) and 4 dummy variables for survey year. All models include longitudinal weights to correct for panel attrition.

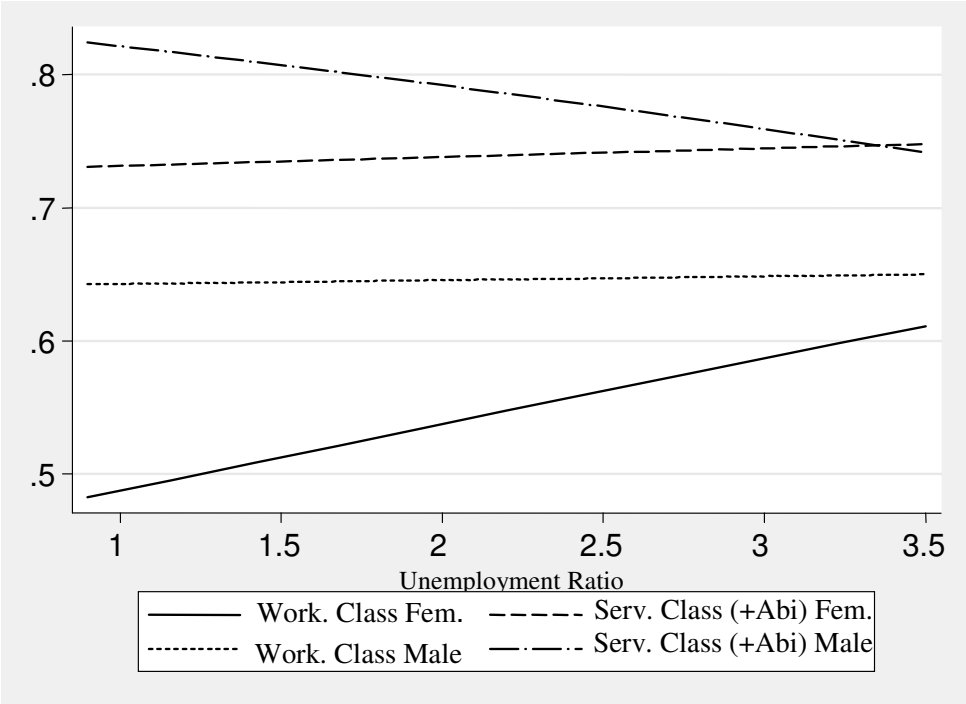
Table 5: Additional specifications for estimation of effect of labour market measures on educational decisions (log-odds coefficients)

Specification	Income				Unemployment			
	Female		Male		Female		Male	
	wave 1	wave 2	wave 1	wave 2	wave 1	wave 2	wave 1	wave 2
Absolute Tertiary Income/Unemployment Rate					-	-		
Exclusion of Highest & Lowest 5 Income Ratios ¹					+	+		
Exclusion of Highest & Lowest 5 Unemployment Ratios ²						+		-

Legend: no sign=no significant effect, +=positive significant effect, -=negative significant effect (5% significance level)

Notes: ¹ N female: (first wave/second wave) 33.783/19.018; male 31.568/19.122, ² N female: (first wave/second wave) 32.765/18.750; N male 30.388/18.354

Figure 1: Predicted Probabilities of Higher Education Entry according to Vocational Training /Tertiary Education unemployment ratio



Appendix

Table A1: German States

State
<i>West-German States</i>
Schleswig-Holstein
Niedersachsen/Hamburg/Bremen
Nordrhein-Westfalen
Rheinland-Pfalz/Saarland
Hessen
Baden-Württemberg
Bayern
West-Berlin
<i>East-German States</i>
Mecklenburg-Vorpommern
Sachsen
Sachsen-Anhalt
Thüringen
Berlin/Brandenburg

Note: Eastern states are only included from 1994 onwards. West-Berlin is considered a Western State in 1983 & 1990. Starting in 1994 West- and East Berlin and Brandenburg are combined in one state-region.

Figure A1: Z-statistics of interaction effect (Unemployment Ratio*Service class & education high) after logit by gender (First wave)

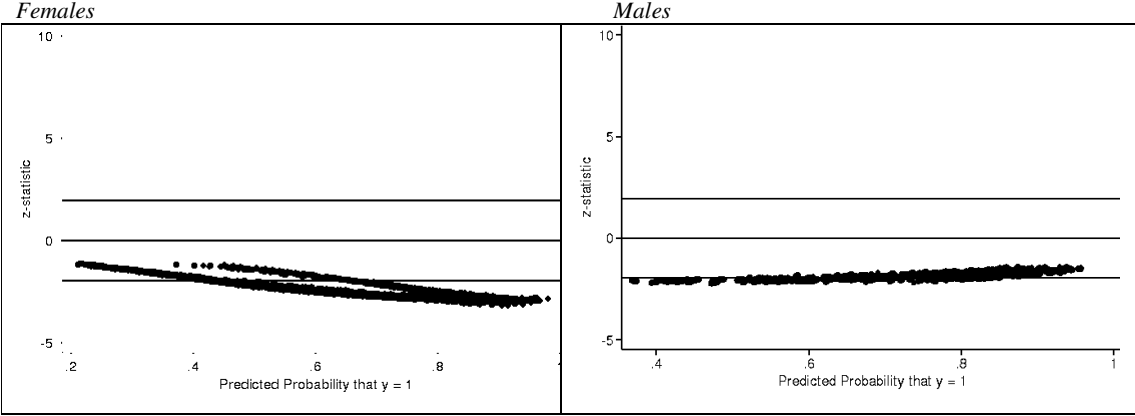


Figure A2: Z-statistics of interaction effect (Unemployment Ratio*Service class & education high) after logit by gender (Second wave)

