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**Overqualification of Graduates:  
Assessing the  
Role of Family Background**

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Economic Research

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# Overqualification of Graduates: Assessing the Role of Family Background

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## Abstract

Studies on the underlying mechanisms of social mobility commonly find that half of the intergenerational earnings persistence remains unexplained. Focusing on the phenomenon of overqualification, this study examines a transmission channel that might operate beyond the mechanisms previously analysed. I explore how the family background of university graduates affects the probability to hold a job that does not require a tertiary degree, i.e. to be overqualified. Potential pathways of the family background effects are discussed and proxy variables for the mediating factors cognitive skills, study characteristics, social capital, financial capital, and aspiration are incorporated into the empirical analysis. Graduates from families with a high socioeconomic status are found to be less likely to be overqualified. The unconditional social overqualification gap amounts to 7.4 percentage points. Non-linear Blinder-Oaxaca decompositions show that roughly 60% of the social overqualification gap can be attributed to group differences in observable characteristics. Differences in cognitive skills, study characteristics, and social capital are found to be important mediators of the family background effects.

**JEL-Classification:** I23, I24, J24, J62.

**Keywords:** overqualification, overeducation, family background, intergenerational mobility, Blinder-Oaxaca decomposition.

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# 1 Introduction

Concerns of low intergenerational mobility are often formulated in the public debate in Germany and other industrialised countries. Most economic studies in the field of social mobility concentrate on the estimation of the intergenerational earnings persistence, i.e. the correlation between parental earnings and earnings of the offspring. Results for Germany indicate that a 10% increase in the father's earnings is associated with a 3.2% increase in the son's earnings in adulthood (Corak, 2006). A growing number of studies try to identify which underlying mechanisms generate the intergenerational earnings persistence (Black and Devereux, 2011). In this context, every factor that is related to family background and affects earnings constitutes a potential transmission channel. Educational attainment is commonly found to be the most important mediator of the earnings persistence. However, social inequalities in education do not account for more than half of the earnings persistence, raising the question which other mechanisms are relevant (Bowles and Gintis, 2002; Mulligan, 1999). Recently, several studies started to focus on mechanisms that could contribute to the intergenerational earnings persistence over and above educational attainment. Blanden et al. (2007) and Osborne-Groves (2005) analyse cognitive and non-cognitive skills as additional transmission channels, and Büchner et al. (2012) incorporate cultural and social capital. These studies share the result that 40-50% of the earnings persistence remain unexplained.

Focusing on the phenomenon of overqualification, this study examines an additional potential transmission channel of the intergenerational earnings persistence. Overqualification arises if individuals are working in jobs for which their current qualification exceeds the educational requirements of the job. Based on three arguments, overqualification appears to be a promising candidate for a transmission channel that operates over and above educational attainment. First, evaluating the effect of overqualification on labour market outcomes, such as earnings, one compares equally educated individuals who differ in the type of job they work in. Therefore, overqualification is an intermediate factor that does not come into effect until educational attainment has been completed. Second, the negative effects of overqualification on individual earnings are well-documented (Duncan and Hoffman, 1981; Korpi and Tåhlin, 2009). The results suggest that overqualified workers earn less than equally educated workers holding a matching job. An explanation for this wage penalty is that overqualified workers are not able to fully utilise their human capital and thus do not reach their production capacity (Sattinger, 1993). Büchel and Mertens (2004) also find that the wage growth is lower for the group of overqualified workers than for matched workers. Third, several factors suggest that the family background influences the probability to find an adequate job. For instance, innate ability and cognitive skills are transmitted within families (Black et al., 2009) and decrease the probability of being

overqualified (Büchel and Pollmann-Schult, 2004). Similarly, the choice of field of study is affected by family background (Jonsson et al., 2009) and is a crucial determinant of overqualification (Dolton and Vignoles, 2000). In contrast to the wage effects of overqualification, there is little empirical evidence on the link between family background and overqualification.

This study examines how family background affects overqualification of university graduates in Germany. Concentrating on the subgroup of graduates is meaningful from a policy perspective since increasing the accessibility of higher education is an important strategy to support social mobility. The contribution of the study is twofold. First, it contributes to the literature on the mediators of the intergenerational earnings persistence by examining a further mechanism that operates over and above educational attainment. Second, this study contributes to the literature on the determinants of overqualification. Family background has been included in a few studies on overqualification determinants, however only as additional control variable. In my study this relationship is at the core of the analysis. Depending on the family background graduates might differ in various characteristics that are potential determinants of overqualification. Using data of the HIS-Graduate Panel 1997, I include a set of proxy variables which account for potential factors mediating the link between family background and overqualification. These factors include cognitive skills, study characteristics, financial capital, social capital, and aspiration. Employing a Blinder-Oaxaca decomposition approach, I then analyse which share of the social overqualification gap can be attributed to differences in these factors. The relative importance of the mediating factors is evaluated by conducting a detailed decomposition of the overqualification gap.

The empirical analysis shows that the risk of overqualification depends on the family background of graduates. I infer the families' socioeconomic status (SES) from parental education and distinguish high SES families, in which at least one parent has a tertiary degree, from low/mid SES families, in which parents do not have a tertiary degree. As compared to graduates from low/mid SES families, graduates from high SES families are found to be less likely to hold a job that does not require a tertiary degree, i.e. to be overqualified. The unconditional overqualification gap between graduates from low/mid SES families and graduates from high SES families amounts to 7.4 percentage points. The effect of family background is reduced but remains highly significant if the potential pathways are accounted for in a probit regression. Blinder-Oaxaca decompositions show that roughly 60% of the social overqualification gap can be attributed to the fact that graduates differ in observable mediators, i.e. the endowments effect. I find that differences in cognitive skills, study characteristics, and social capital are significant mediators of the link between family background and overqualification. The most important pathway is the

social difference in the choice of university type and subjects pointing to the importance of the horizontal dimension of higher education in the context of social mobility. In contrast, I find little evidence that financial support or aspiration mediate family background effects on overqualification. However, this result might be influenced by the imprecise measures for these factors.

The paper is structured as follows. Section 2 presents empirical evidence of the related literature and elaborates on potential pathways for family background affecting the risk of overqualification. In section 3 the data are introduced and briefly described. Section 4 describes the econometric methodology. The results are presented in section 5 and section 6 concludes.

## 2 Background Discussion

The present study is linked to two strands of the overqualification literature which are presented in the following two subsections. The third subsection discusses why family background might influence the risk of overqualification and presents potential pathways of the family background effect.

### 2.1 Productivity Effects of Overqualification

The first strand of literature the present study is related to focuses on the potential costs of overqualification at the individual level. Productivity losses are regarded as an important consequence of overqualification. Most of the studies refer to the assignment model ([Sattinger, 1993](#)) as a theoretical framework to analyse the productivity effects of overqualification. According to assignment theory, productivity hinges on the match between skill requirements of a job and the skills of the worker. In the model, workers who are heterogeneous in skills have to be assigned to jobs that are heterogeneous in skill requirements. High skilled workers holding jobs with low skill requirements underutilise their human capital and do not reach their production potential. Following the seminal work by [Duncan and Hoffman \(1981\)](#), numerous studies analysed if overqualification induces wage penalties.<sup>1</sup> [Kleibrink \(2013\)](#) provides a comprehensive study concerning causal wage effects of overqualification in Germany. In contrast to his fixed effects results, he finds significant wage penalties if instrumental variable estimations are employed or ability measures are included in an OLS regression. Applying random effects procedures, [Boll and Leppin \(2013a\)](#) confirm significant negative wage effects for Germany. In addition, wage penalties are found to be significant in other countries if fixed effects or instrumental

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<sup>1</sup>See [Leuven and Oosterbeek \(2011\)](#) for a critical discussion of this literature.

variable estimations are employed (Dolton and Silles, 2008; Korpi and Tåhlin, 2009; Verhaest and Omeij, 2012). Previous results also indicate that overqualification comes along with significant wage penalties for the subgroup of graduates (Chevalier, 2003; Green and McIntosh, 2007). Büchel and Mertens (2004) find that overqualification results in lower wage growth and less upward occupational mobility. Several studies also show that overqualification is a long-term phenomenon for a substantial share of mismatched workers (Blázquez and Budría, 2012; Dolton and Vignoles, 2000).<sup>2</sup> Cognitive decline due to overqualification is a further source for long-run effects (De Grip et al., 2007).

## 2.2 Determinants of Overqualification

This study is, secondly, related to the strand of research trying to identify the determinants of overqualification at the individual level. This paragraph presents the empirical evidence of particular relevance for the present study. Skill heterogeneities among workers with the same educational background are likely since human capital also comprises ability and skills that are not acquired during education. Workers could compensate a lack in ability and skills with a higher educational attainment in order to meet their jobs' requirements (Korpi and Tåhlin, 2009). Several studies find that individuals with relatively low ability have a higher probability to be overqualified (Chevalier and Lindley, 2009). In general, these studies consistently suggest that cognitive skills are an important determinant of overqualification. For instance, Green et al. (1999) use scores of a math test and Quintini (2011) uses scores of literacy tests as direct measures for cognitive skills. In Germany, individuals with worse school leaving grades or university grades face a higher risk of being overqualified (Büchel and Pollmann-Schult, 2004; Fehse and Kerst, 2007). Although non-cognitive skills have been found to predict different labour market outcomes (Heckman et al., 2006), only few studies focus on non-cognitive skills as potential determinants of overqualification. Employing a direct measure, Blázquez and Budría (2012) show that non-cognitive skills significantly reduce the probability of becoming overqualified in Germany. In contrast, Sohn (2010) finds no significant effects of non-cognitive skills on overqualification in the US.

The risk of overqualification has been found to be related to the characteristics of the individual's education. For university graduates the overqualification rates differ strongly across fields of study (Dolton and Vignoles, 2000; Green and McIntosh, 2007). Klein (2011) provides evidence that the occupational specificity of a field of study reduces the risk of overqualification. In Germany, the lowest rates of overqualification are observed for the subjects Medicine, Law, and Teaching (Berlingieri and Erdsiek, 2012). As shown

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<sup>2</sup>This finding contradicts the career mobility theory by Sicherman and Galor (1990) which assumes that workers take overqualified jobs because of better promotion prospects.

by [Arcidiacono \(2004\)](#), ability sorting and individual preferences are important drivers of subject choices. Differences in overqualification rates across subjects, therefore, might be due to self-selection and are not interpretable in a causal manner ([Berlingieri and Zierahn, 2014](#)). The risk of overqualification also differs across educational institutions. The quality or prestige of the university a worker graduated from has been found to affect the risk of overqualification in several countries (e.g. [Robst \(1995\)](#) for the US and [McGuinness \(2003\)](#) for the UK). In Germany, individuals who obtained the university entrance certificate can choose between two tracks of tertiary education. They can either enrol at a traditional university or at a university of applied sciences. In general, traditional universities are academically more demanding than the practically oriented study programmes at universities of applied sciences. The subjects Medicine, Law, and Teaching require a state examination as finals and can solely be studied at traditional universities. At the early stage of the career cycle, graduates from universities of applied sciences face a higher risk of overqualification than graduates from universities ([Klein, 2011](#)).

[Weiss and Klein \(2011\)](#) analyse how the probability of overqualification is affected by different types of social networks that helped graduates to find their job. Graduates who found their jobs through the agency of their professors or previous internships during the study programme obtain a lower risk of overqualification. In contrast, finding the job through the agency of parents or friends is associated with a higher probability of overqualification.

Focusing on young unemployed individuals who just completed vocational education, [Baert et al. \(2013\)](#) analyse how the duration of finding an adequate job is affected by the decision to accept a job requiring a lower level of education than acquired. Their results suggest that early overqualification delays the transition into a matching job. One explanation could be that overqualification sends an even more negative productivity signal to potential employers than unemployment ([McCormick, 1990](#)).

[Leuven and Oosterbeek \(2011\)](#) provide an overview of some results concerning socio-demographic determinants, such as age or gender. A lower risk of overqualification is found for male workers. In the theoretical framework by [Frank \(1978\)](#) this finding is attributed to higher mobility constraints of women whose partners are the main wage earners and chose the location of residence. Married women thus face a lower spatial flexibility in their job choice than men. The empirical evaluation of this theory of differential overqualification has yielded mixed results ([Büchel and Battu, 2003](#); [McGoldrick and Robst, 1996](#)). The risk of overqualification is also found to decrease with age or labour market experience ([Hartog, 2000](#); [Green and McIntosh, 2007](#)).

The role of family background has been accounted for in some recent studies on the determinants of overqualification. Studies focusing on the German labour market are

summarised in the following. Due to data restrictions most studies measure family background by means of the parents' level of vocational education. Workers are identified to originate either from a high status family (at least one parent holds a tertiary degree) or from a low/mid status family (neither parent holds a tertiary degree). [Fehse and Kerst \(2007\)](#) find that graduates from high status families obtain a lower risk of being overqualified one year after graduation than graduates from low/mid status families. [Boll and Leppin \(2013b\)](#) differentiate the effects of having a university-educated father from having a university-educated mother. They find mixed results depending on the gender of the offspring and the measure of overqualification. In contrast to previous studies solely including social origin as additional control variable, my analysis focuses on different pathways through which family background may affect overqualification.

### **2.3 Pathways for Family Background Effects**

Several factors suggest that overqualification of graduates depends on the family background. Family background is a crucial determinant of an individual's set of ability and skills. Several studies find that cognitive skills of parents and their offspring in adulthood are significantly correlated ([Anger and Heineck, 2010](#); [Björklund et al., 2010](#); [Black et al., 2009](#)). The same holds for the intergenerational transmission of non-cognitive skills within families ([Anger, 2012](#); [Grönqvist et al., 2011](#)). The amount of financial resources invested in an individual's human capital is also likely to depend on the social origin ([Bourdieu, 1983](#)). Social differences in (innate) ability could maintain a correlation between social origin and overqualification since the probability of being mismatched seems to be affected by cognitive skills ([Büchel and Pollmann-Schult, 2004](#)) and non-cognitive skills ([Blázquez and Budría, 2012](#)). A similar channel could be that potential employers incorporate family background into their selection process of new workers as a signal related to productivity ([Jacob and Klein, 2013](#)).

Many studies provide empirical evidence that family background is crucially important for educational choices such as the decision to enrol in tertiary education ([Lucas, 2001](#)). Recently, a growing number of sociological studies analyse how social origin affects the choice of field of study. The results indicate that the subject choice is related to the family's socioeconomic status and parental occupations ([Jonsson et al., 2009](#)). The offspring from high status families more often enrol in subjects promising high levels of prestige or economic payoff such as Medicine or Law ([Lörz, 2012](#)). Social differences tend to be less pronounced in the fields of Engineering or Business & Economics. The literature has pointed out several pathways for the family background effects on subject choice. In order to avoid downward social mobility, members of the privileged group might be more inclined to choose more promising subjects. Subject choices are also based on considerations

on costs and benefits which might depend on the social origin. Furthermore, differences in the school leaving examination grades might contribute to the social stratification in fields of study. Enrollment in some prestigious subjects is restricted by the requirement of school grades better than a certain threshold. In addition, some studies focus on the relevance of occupational reproduction in the context of subject choices ([Jonsson et al., 2009](#); [Van de Werfhorst and Luijkx, 2010](#)). The intergenerational transmission of occupation-specific knowledge seems to affect the offspring's preferences and interests which are crucial for the subject choice. Family background also might influence the decision whether to enrol in traditional universities or in the more practically oriented universities of applied sciences. Studying at a university of applied sciences might be more appealing for members of the less privileged group for the same reasons that affect the subject choice ([Reimer and Pollak, 2009](#)). The quality or prestige of the chosen university also might depend on the available financial capital transmitted within families. Since the risk of overqualification strongly differs across subjects and university type or quality, social stratification in the study programme characteristics might contribute to the association between social origin and overqualification.

A social gap in the risk of overqualification could also be mediated by the different kinds of capital transmitted within families. The process of finding a job could be directly influenced through the social capital of the parents. Based on their social networks parents may provide contacts to potential employers or arrange job interviews. These social connections could be more advantageous for graduates from high socioeconomic status families. For instance, [Corak and Piraino \(2011\)](#) provide evidence for the intergenerational transmission of employers between Canadian fathers and their sons. The probability that sons are working for the same employer as their father increases with the father's earnings and is particularly high among the top income families. Furthermore, a family's financial capital might influence the risk of overqualification. Graduates from wealthy families might have the opportunity to search longer for an adequate job than graduates with an adverse family background. Less privileged graduates might be obliged to start working shortly after graduation due to financial constraints resulting in a higher probability to accept an inadequate job. As shown by [Berlingieri and Erdsiek \(2012\)](#), overqualified graduates more often accepted a job in order to avoid unemployment than matched graduates. [Baert et al. \(2013\)](#) point out that being overqualified shortly after graduation delays the transition into an adequate job. How familiar graduates are with the high-skilled labour market might also be influenced by the cultural capital provided by the family. The graduate's knowledge about job tasks and the functionality of the high-skilled labour market could be more profound among children from high status families. More accurate expectations about the selection procedure for high-skilled jobs could

improve the performance in recruitment processes and therefore increase the probability to get a job offer.

Social differences in aspiration might affect occupational choices after tertiary education has been completed. Graduates from high status families might try to prevent downward mobility by only accepting jobs requiring tertiary education. In contrast, graduates from low status families already reached the goal of social advancement by obtaining a tertiary degree. They might be less motivated to be in leading positions or to get a high status job (Jacob and Klein, 2013). Due to occupational reproduction, graduates might also end up in similar occupations as their parents regardlessly of completing tertiary education. For graduates from low status families these jobs are less likely to require a tertiary degree.

Finally, graduates from low status families could be prevented from accessing adequate jobs due to discrimination. A crucial source for discrimination is favouritism which occurs if persons are favoured not because of relevant characteristics but rather because of being a member of a preferred group. In the context of this study, favouritism would occur if recruiters are less likely to pick graduates from low status families out of a group of equally eligible candidates for a high-skilled job. It is important to point out that this behaviour only pictures discrimination if the recruiter's decision is only based on favouring members of high status families but is not due to productivity signals associated with family background. As pointed out by Erikson and Jonsson (1998), the difference between favouritism and the productivity mechanism is rather subtle.

## 3 Data Set and Descriptive Analysis

### 3.1 Data Set

For the empirical analysis data from the first wave of the HIS-Graduate Panel 1997 are employed covering graduates who completed their tertiary education in 1997.<sup>3</sup> It is a representative nationwide study of tertiary graduates in Germany which surveys individuals one year after graduation. This data set has several advantageous features for my analysis. In comparison to data sets covering the entire work population, focusing the analysis on the group of graduates does not produce small sample sizes. In addition, graduates are observed at the same early stage of the career cycle shortly after labour market entry. Due to the cohort design of the survey, interviewed graduates also face the same overall economic situation. In order to further increase the comparability of graduates, I exclude individuals who were older than 35 years at the time of graduation

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<sup>3</sup>Hochschul-Informationen-System (HIS), Hannover (2007): HIS-Graduate Panel 1997. GESIS Data Archive, Köln. ZA4272 Data File Version 1.0.0, [dx.doi.org/10.4232/1.4272](https://dx.doi.org/10.4232/1.4272).

or who obtained the university entrance certificate abroad.<sup>4</sup> The size of the remaining sample amounts to 3,706 graduates.

Overqualification is the main outcome variable in this analysis. I employ a subjective measure for overqualification that is based on the self-assessments of the graduates.<sup>5</sup> In particular, graduates were asked whether their job usually requires a tertiary education. I define workers to be overqualified if they indicate that their job usually does not require a tertiary degree.

The central explanatory variable is the social origin of the graduate, i.e. the socioeconomic status (SES) of a graduate's parents. The SES is operationalised by means of the level of vocational education of the graduate's parents. In particular, I use the information whether the father or the mother has completed tertiary education. A graduate's socioeconomic background then is distinguished into high SES if at least one parent has a tertiary degree and low/mid SES, otherwise.

As outlined above, there are several potential pathways for family background affecting the probability to be overqualified. The aim of this study is to uncover which channels contribute to the social gap in the risk of overqualification. Employing a rich data set, I thus include proxy variables for the aforementioned potential mediators. These observable proxy variables are presented in the following.

The potential mediating channel of social differences in ability and cognitive skills is accounted for by including grades of the school leaving examination as well as university grades. School grades, i.e. the school leaving examination grades, are standardised within federal states since the procedure of the school leaving examination differs across the 16 federal states in Germany. University grades are standardised within subjects and university types in order to account for differences in average levels of grades across subjects and university types. School grades and university grades are constructed such that high values indicate better achievements.

Differences in the study programme characteristics are observed in terms of field of study, university type and study duration. The set of fields of study is divided into five groups of subjects. The subject groups Medicine & Law, and Teaching can solely be studied at universities, while the remaining subjects can be studied at either universities or universities of applied sciences. These remaining subjects are divided into three groups of subjects, namely Science, Technology, Engineering, and Mathematics (STEM subjects), Business & Economics, and Social & Cultural Sciences. Dummy variables are generated for each combination of subject group and type of university (university vs. university

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<sup>4</sup>Individuals who have not worked between graduation and the time of the survey are also excluded since the outcome variable of overqualification is missing.

<sup>5</sup>Several measures for overqualification have been employed which differ in the identification of required education, see [Hartog \(2000\)](#) for an overview and discussion.

of applied sciences). Study duration (in semesters) is standardised within subjects and university types in order to obtain a relative measure since average study durations vary across subjects and university types.

Information on job search channels are employed to account for differences in social capital. In particular, respondents indicated whether they found their current job through the guidance of their parents or friends. If high-skilled parents have better connections to potential employers, this search channel could be more profitable for graduates from high SES families. Further search channels include connections that have been established during a previous internship or other jobs the graduate has had before or during the study.

Financial capital is a crucial part of the properties that characterise high SES families. Unfortunately, the data set employed does not contain a direct question concerning a family's financial capital such as parental earnings or house ownership. Therefore, a set of questions is employed that could proxy for the amount of financial support. First, I include the information to what extent graduates financed their studies by own work or parental support. Although the observed shares result from graduates' choices, they could proxy for parental financial capital to some extent. The offspring from poorer families, for instance, are expected to be more often constrained to work during the study. This is also the rationale of the second set of questions, where respondents indicate if their job during study was related or unrelated to their subject. If working is necessary for financing the study, it may be more likely that jobs are taken that are unrelated to the subject. The third question used to proxy for financial capital covers information on the graduates' mobility. The respondents indicate how far the working place is away from the native place. The rationale of this proxy is that moving or commuting over a long distance could be encouraged by financial support from the parents.

In order to control for social differences in aspiration and career orientation, I employ two sets of questions. In the first set, respondents were asked about their future goals. They had to indicate whether they plan to perform better than the average, fully exploit their own potential or fill a leading position. Since graduates from low/mid SES families already achieved social advancement in educational attainment, they could have lower aspirations and take jobs they are overqualified for. Second, respondents were asked which actions they have already undertaken to improve their career prospects. The items include showing a high commitment to the job, taking additional courses during the study programme, gaining experiences abroad, being mobile or establishing social networks.<sup>6</sup>

Finally, I include a gender dummy and control variables for age, marriage, and parenthood at the time of the survey (one year after graduation).

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<sup>6</sup>The two items concerning experiences abroad and mobility may not only proxy for career orientation but also depend on the financial capital of the parents.

## 3.2 Descriptive Analysis

Descriptive statistics for the estimation sample are provided in Table 1. One year after graduation 20.1% of the respondents are overqualified, i.e. they hold jobs that usually do not require a tertiary education. Approximately 46% of the graduates originate from a high SES family, i.e. at least one parent holds a tertiary degree.

Table 2 presents the differences in the variable means depending on the family background of the graduates. Column 1 presents the variable means for graduates from low/mid SES families, whose parents do not hold a tertiary degree and column 2 presents the means for graduates from high SES families with at least one parent holding a tertiary degree. A share of 16.1% of the high SES graduates is overqualified whereas 23.5% of the graduates from low/mid SES families are overqualified. Column 3 shows that the mean difference of 7.4 percentage points is significantly different from zero at the 1 percent level. This unconditional overqualification gap indicates that graduates from high SES families more often find a matching job that requires a tertiary degree as compared to graduates from low/mid SES families.

The descriptive analysis clearly shows that the two groups of graduates are highly heterogeneous with respect to observable characteristics. Graduates from high SES families started their study programme with better grades in their school leaving examination and have better university grades than low/mid SES graduates. The choice of the university type and subject differs strongly between graduates from low/mid SES and high SES families. While 34.2% of the respondents from low/mid SES families graduated from a university of applied science, the share for respondents with a high SES background amounts to only 14.8%. The social differences in the choice of university type are still significant if subjects are presented separately. Except for the subject group Business & Economics, graduates from low/mid SES families study significantly less often at traditional universities than graduates from high SES families. For instance, the subject group Medicine & Law is studied nearly twice as often by high SES graduates (14.9%) than by low/mid SES graduates (7.8%).

The job search channels also differ in some aspects. While there are no significant differences in the share of graduates finding a job through the agency of parents/friends or an internship, low/mid SES graduates more often found a job through jobs they had during or before studying. This finding corresponds to the fact that the share of respondents who completed a vocational education before entering the study programme is higher among low/mid SES graduates.

Concerning the proxies for the families' financial capital, I find that low/mid SES graduates more often worked in jobs not related to their subject during study and financed a larger proportion of their studies by working. Overall, high SES graduates worked less

often during study. In addition, they were more extensively supported by their parents in order to finance their study. Graduates from high SES families seem to be more mobile since they are more likely to work more than 100 kilometers away from the native place as compared to low/mid SES graduates.

I find little evidence for social differences in the proxy variables for career orientation and aspiration. Respondents only partly differ in the actions they have already undertaken to improve their career prospects. High SES graduates have more often gained experiences abroad or established social networks that they found useful. No social differences are found for the shares of graduates who report showing a high commitment to the job, attended additional courses during the study or stated to have been mobile. In addition, graduates are equally likely to have the future goals to show an above-average performance, fully exploit their own potential, or fill a leading position.

## 4 Methodology

As shown in the descriptive analysis, overqualification is more prevalent among graduates from low/mid SES families than among graduates from high SES families. The empirical analysis now focuses on the question which of the aforementioned pathways contribute to the social overqualification gap.

In a first step, I will test whether the family background effect is robust against the inclusion of the potential mediating variables. Conducting probit regressions, I estimate the effects of family background and the mediating factors on the probability to be overqualified one year after graduation. For graduate  $i$ , the relationship is specified as:

$$\Pr[Overqual_i = 1 | High\_SES_i, \mathbf{X}_i] = \Phi(\alpha + \beta_{High\_SES} High\_SES_i + \beta_{\mathbf{X}} \mathbf{X}_i) + \varepsilon_i \quad (1)$$

with  $\Phi(\cdot)$  representing the cumulative normal distribution function, and  $\varepsilon_i$  an identically and independently distributed error term. The binary variable *Overqualification* takes the value one if a graduate works in a job that does not require a tertiary education and zero otherwise. Family background is measured by the dummy variable *High SES* taking the value one if at least one parent holds a tertiary degree and zero if neither of the parents holds a tertiary degree. All aforementioned control variables are included in matrix  $\mathbf{X}$ .

In the second step, a decomposition analysis is applied to reveal how differences in observable characteristics contribute to the social overqualification gap. For this purpose, I employ the Blinder-Oaxaca decomposition method for mean outcome differences (Blinder, 1973; Oaxaca, 1973). It divides the raw outcome differential into two components: A part that is “explained” by group differences in observable characteristics and an “unexplained” part that captures the relevance of differences in coefficients (including the constant).

The standard Blinder-Oaxaca decomposition is mainly used in the literature on wage discrimination and can be summarised as follows. In a linear model, the raw differential in the continuous outcome variable  $Y$  between two groups  $L$  and  $H$  can be expressed in two ways:

$$\bar{Y}_L - \bar{Y}_H = (\bar{X}_L - \bar{X}_H)\beta_L + \bar{X}_H(\beta_L - \beta_H), \quad (2)$$

$$\bar{Y}_L - \bar{Y}_H = (\bar{X}_L - \bar{X}_H)\beta_H + \bar{X}_L(\beta_L - \beta_H), \quad (3)$$

where  $\bar{X}_j$  is a row vector comprising average values of the independent variables and  $\beta_j$  is a vector of coefficient estimates obtained by OLS regressions for group  $j = L, H$ .<sup>7</sup> The first part on the right hand side of both equations is the explained part of the raw gap that can be attributed to differences in observable characteristics, i.e. differences in endowments. The second term on the right hand side indicates which share of the gap is due to group differences in the estimated coefficients. This unexplained part also picks up the share of the raw differential due to differences in unobservable characteristics, i.e. unobserved heterogeneity between groups  $L$  and  $H$ . Therefore, the unexplained part can not be interpreted as a single measure for discrimination such that the same bundle of characteristics is less valuable for one group only because of group membership.

Equations (2) and (3) differ in terms of the weights used for the evaluation of the endowments effect. The selection of the weighting scheme hinges on the question whether members of group  $L$  or members of group  $H$  are expected to be discriminated. Optimally, the nondiscriminatory coefficients should be used for the evaluation but these are unknown and have to be approximated. If it is assumed that group  $H$  is being discriminated, the endowments effect is evaluated by the coefficients of group  $L$  ( $\beta_L$ ) (Equation 2). Conversely, the coefficients of group  $H$  ( $\beta_H$ ) are used to determine the contribution of the differences in the predictors if discrimination is directed against group  $L$  (Equation 3). In many cases, it remains unclear which group is solely discriminated. As pointed out by Oaxaca (1973), this leads to an “index-number problem”. Since the choice of the weight influences the segmentation into the explained and unexplained part, researches often present decomposition results for both weighting schemes.<sup>8</sup>

The outcome variable in the present study is binary, therefore, I employ the methodology by Yun (2004) enabling Blinder-Oaxaca decompositions for non-linear models. Suppose that the binary outcome variable  $Y$  indicates overqualification and two types of graduates exist who either originate from low/mid SES families ( $j = L$ ) or high SES families ( $j = H$ ). Given the probit model  $prob(Y_j = 1) = \Phi(X_j\beta_j)$  with  $\Phi$  representing

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<sup>7</sup>The auxiliary regressions for groups  $L$  and  $H$  are:  $Y_L = F(X_L\beta_L)$  and  $Y_H = F(X_H\beta_H)$

<sup>8</sup>Another approach uses coefficients from a pooled regression over both groups as an estimate for the nondiscriminatory coefficients (Neumark, 1988).

the cumulative normal distribution function, the group differential in overqualification risk can be formulated as

$$\bar{Y}_L - \bar{Y}_H = \sum_{k=1}^K W_{\Delta X}^k [\overline{\Phi(X_L \beta_L)} - \overline{\Phi(X_H \beta_L)}] + \sum_{k=1}^K W_{\Delta \beta}^k [\overline{\Phi(X_H \beta_L)} - \overline{\Phi(X_H \beta_H)}], \quad (4)$$

where

$$W_{\Delta X}^k = \frac{(\bar{X}_L^k - \bar{X}_H^k) \beta_L^k}{(\bar{X}_L - \bar{X}_H) \beta_L}, \quad W_{\Delta \beta}^k = \frac{\bar{X}_H^k (\beta_L^k - \beta_H^k)}{\bar{X}_H (\beta_L - \beta_H)}, \quad \text{and} \quad \sum_{k=1}^K W_{\Delta X}^k = \sum_{k=1}^K W_{\Delta \beta}^k = 1.$$

Similarly to the standard Blinder-Oaxaca decomposition, the first term in Equation (4) represents the explained part due to differences in endowments and the second term measures the relevance of differences in coefficients (including the constant). In particular, the explained part indicates to what extent the difference in the probability to be overqualified can be attributed to differences in observed characteristics of graduates from low/mid SES families and high SES families. Since the endowments effect is weighted with the coefficients of group  $L$  ( $\beta_L$ ), Equation (4) represents the probit equivalent to the linear decomposition presented in Equation (2). In order to test the robustness with respect to the ‘‘index-number problem’’, I also apply the probit decomposition using the coefficients of group  $H$  ( $\beta_H$ ) for the evaluation of the endowments effect.

The presented methodology by Yun (2004) not only allows the decomposition into the endowments effect and coefficients effect at the aggregate level. It is also suited to indicate the contribution of each variable to the raw differential, i.e. to compute the detailed decomposition. I will use the detailed decomposition to analyse which pathways are particularly relevant for generating the social overqualification gap.

## 5 Results

### 5.1 Probit Results

Results from probit estimations of overqualification on family background and relevant control variables are provided in Table 3. The marginal effect of originating from a high SES family is significant if the proxy variables of cognitive skills and the socio-demographic controls are included in the probit model (specification 1). The coefficient indicates that the likelihood of being overqualified is 6.2 percentage points lower for graduates from high SES families than for graduates from low/mid SES families. Better grades in the school leaving certificate or the university examination significantly reduce the probability of being overqualified. The effect size for university grades is twice as big as for school

grades. Since university grades are standardised within subjects and university types, the results suggest that the probability to be overqualified reduces by 5 percentage points if university grades increase by one standard deviation.

In specification 2, further study characteristics are included into the model. The explanatory power of the model nearly triples, the value of the Pseudo  $R^2$  increases from 0.047 to 0.126. The coefficient of family background decreases but remains highly significant. In contrast, the effect of school grades diminishes. The favourable effect of good school grades on the risk of overqualification, therefore, might work through the selection into subjects promising a good transition into the labour market. Including further study characteristics hardly change the effect of university grades. A possible interpretation could be that university grades are more important to potential employers who use this information as a signal for job related skills. Similarly, the significant and positive coefficient of study duration could indicate that an above-average study duration sends a negative signal regarding a graduate's ability or motivation.<sup>9</sup> The incidence of overqualification is found to strongly differ across subjects, where the university subject Social & Cultural Sciences constitutes the reference group. In comparison to this subject, overqualification is less likely among graduates from all other subjects except for individuals graduating in Business & Economics at a university of applied sciences. The coefficients of the subject dummies vary considerably. Compared to the reference group, graduates in Medicine & Law obtain a 20.5 percentage points lower probability to be overqualified whereas the coefficient for university graduates in the subject Business & Economics amounts to 3.8 percentage points. Due to self-selection into subjects these estimated effects can not be interpreted in a causal manner.

Specification 3 includes further individual characteristics into the probit model that could mediate the relationship between family background and overqualification. The explanatory power of the model is remarkably improved as indicated by the value of the Pseudo  $R^2$  of 0.166. The coefficient of family background reduces but stays significant at the five percent level. The results indicate that originating from a high SES family reduces the probability to be overqualified by 3.3 percentage points even if study characteristics and proxy variables for cognitive skills and several mediating factors are accounted for. The effects of university grades and study duration are also robust against the additional control variables. The coefficients of the subject dummies remain largely unaltered. Only the coefficient for the subject Business & Economics studied at a university becomes insignificant.

Information on a graduate's social capital is included in terms of job search channels. The search channel employed to find a job appears relevant for overqualification. Gradu-

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<sup>9</sup>Remember that study duration is standardised within subjects and university types.

ates who found their job through the agency of parents/friends, a job while studying or a job before studying are more often overqualified than the remaining graduates. Only finding a job through an internship is associated with a reduction in overqualification. Since the jobs graduates have held before or during the study usually do not require tertiary education, these social networks might be less favourable in terms of a transition into a matching job. In contrast, social connections based on internships support a good start into the career cycle.

The financial capital of graduates' families is measured indirectly through working experience, financial support and mobility. Working in a job related to the subject while studying decreases the probability of overqualification compared to not working at all. This favourable effect is not found for working in jobs unrelated to the subject. Regarding the financing of the study, no significant effect is found for the share of parental support while a higher share of own work comes along with an increase in overqualification. A lower share of overqualification is also found for graduates whose working place is more distant from the native place. For instance, graduates working more than 100 kilometers away from their native place obtain a 5.5 percentage points lower probability to be overqualified than graduates working within a circuit of 50 kilometers from their native place. Of course, this effect cannot be interpreted in a causal way since the decision to move or commute itself is probably determined by the job quality. With respect to the focus of the analysis, however, it could be relevant if social differences in the graduates' mobility contribute to the overqualification gap.

Concerning the proxies for career orientation and aspiration, I find significant effects for some variables. Graduates who have shown commitment to the job, gained experiences abroad or report they have been mobile in order to improve job prospects obtain a lower risk of overqualification. Moreover, the share of overqualification is lower among graduates who have the future goal to perform above-average.

Summarizing the probit results, there are two striking findings. First, family background seems to be a relevant determinant of overqualification at an early stage of the career cycle. Graduates originating from high SES families obtain a lower probability to be overqualified than graduates from low/mid SES families. Second, including the proxy variables for potential mediating factors reduces the size of the family background effect substantially. Originating from high SES families, however, is significantly associated with a lower probability to be overqualified even if cognitive skills, study characteristics and further mediators are accounted for. The additional individual characteristics are relevant determinants of overqualification and strongly improve the explanatory power of the model. Graduates with higher cognitive skills measured in terms of grades obtain a lower probability to be overqualified than less able graduates. The favourable effect of

school grades, however, primarily works through the channel of selection into subjects promising a rapid transition into a matching job. The risk of overqualification strongly differs across subjects and university types. This result points to the important role of the horizontal dimension of higher education in the context of an advantageous transition into the labour market. The social capital of graduates as measured by job search channels is a strong predictor of overqualification. Indirect measures suggest that the families' financial capital also affect overqualification. Similarly, higher career orientation and aspiration are related to a lower overqualification risk.

The robust family background effect could be the result of both unobserved heterogeneity and discrimination. An important source for unobserved heterogeneity might be that the proxy variables employed are imprecise measures of mediating factors. The theoretical importance of several pathways of family background effects have already been discussed. The robust family background effect, therefore, might reflect the fact that these pathways cannot be fully accounted for with the data at hand. I try to account for differences in ability and cognitive skills by using school grades and university grades. However, social differences in specific skills like numeracy or literacy are not observed but could impact overqualification. A further important component of an individual's human capital are non-cognitive skills which predict overqualification and various other labour market outcomes. The literature on human capital acquisition generally concludes that the offspring of wealthy families have higher non-cognitive skills. In this case, including a proxy for non-cognitive skills would reduce the conditional correlation between social origin and overqualification. The present study, however, focuses on a highly selective group of individuals who completed tertiary education. Whether significant social differences in the amount of non-cognitive skills exist among graduates is unclear. Graduate originating from low/mid SES families might only have been able to complete higher education because they compensated the less favourable parental support by higher non-cognitive skills.

Proxy variables for the different kinds of capital transmitted within families might also be imprecise. For instance, I cannot observe whether graduates accepted a job offer because of financial constraints due to low financial capital of the parents. Furthermore, I cannot control for social differences in cultural capital. Graduates from high SES families might be more familiar with hiring procedures and the functionality of the high-skilled labour market. Graduates might also differ in terms of transmitted preferences and opinions that lower the risk of overqualification. Finally, it is likely that my measures for career orientation and aspiration cannot account for the entirety of this phenomena. For instance, some career choices might be the result of unconscious decision processes related to innate aspiration.

The family background effect could also be attributed to preferences of potential employers. Recruiters could use the family background as a signal for ability and skills. Furthermore, they could value individual characteristics differently depending on social origin of the applicants. The latter case implies discrimination if recruiters favour applicants from high SES families without any other reason than group membership. As a consequence, graduates exhibiting the same characteristics could differ in the number and quality of jobs they get offered.

## 5.2 Results of the Decomposition Analysis

The purpose of the decomposition analysis is to reveal the extent to which differences in observable characteristics contribute to the overqualification gap. Using this approach, individual characteristics can be identified that mediate the effect of family background on the probability to be overqualified.<sup>10</sup>

In a first step, the group specific coefficients are estimated by running probit regressions separately for graduates from low/mid SES families and high SES families. The probit results presented in Table 4 show that several observable characteristics have similar effects for the groups of graduates from low/mid SES families (specification 1) and graduates from high SES families (specification 2).

The significant and negative effect of university grades on overqualification has a similar size for both groups of graduates. The estimated coefficients for most subject dummies are also relatively consistent. Regarding the influence of the job search channel, no group differences are found. In particular, finding the job through the guidance of parents/friends significantly increases the probability of overqualification for both groups. Therefore, I find no direct indication that parental networks are more profitable for graduates from high SES families if job placement is used as a proxy.

Results concerning the further potential mediating factors are more mixed. Having a job related to the subject during the study decreases the overqualification risk for low/mid SES graduates while the share of own work for financing the study is positively correlated with overqualification. Both variables have no impact on the overqualification of high SES graduates. A higher distance between working place and native place is negatively correlated with overqualification for both groups but the coefficients are higher for low/mid graduates.

Trying to improve career prospects by showing commitment to the job reduces the probability of overqualification for high SES graduates but not for low/mid SES graduates. Establishing social networks for the same sake is related to an increase in overqualification only for the former group. Low/mid SES graduates who stated that they have been

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<sup>10</sup>Decomposition results were computed in Stata employing the “Oaxaca” command by [Jann \(2008\)](#).

mobile to improve career prospects are found to obtain a lower risk of overqualification than graduates who have the same social origin but have not been mobile. Gaining experience abroad is the only strategy to improve career prospects that reduces the risk of overqualification for both groups of graduates.

Future goals have no impact on overqualification for low/mid SES graduates. High SES graduates who have the future goal of above-average performance obtain a lower overqualification risk, while overqualification is more likely among those who plan to fully exploit their own potential. The latter effect, however, may result from a reversed simultaneity issue because overqualified workers might set this future goal as a reaction to the current underutilization of skills.

Based on the presented auxiliary probit regressions, the social overqualification gap can be decomposed into two parts that are explained or unexplained by differences in observable characteristics. The explained part, i.e. the endowments effect, can be either evaluated with the coefficients estimated in specification (1) or specification (2) of Table 4. The choice of the weighting scheme alters the decomposition results. In order to test the robustness of the results, I present the decomposition of the overqualification gap for both specifications. The results of the non-linear Blinder-Oaxaca decompositions when the low/mid SES graduate coefficients ( $\beta_L$ ) are used for evaluating the endowments effect are presented in Table 5. The results of the decomposition analysis using the slope parameters of high SES graduates ( $\beta_H$ ) as weights are presented in Table 6. A share of 23.5% of the graduates from low/mid SES families are overqualified, while only 16.1% of the graduates from high SES families are overqualified. The total overqualification gap amounts to 7.4 percentage points.

A substantial proportion of the total overqualification gap can be explained by differences in observable characteristics, i.e. the endowments effect. If coefficients of low/mid SES graduates are used as weights, a share of 60.6% ( $=0.045$  of  $0.074$ ) of the overqualification gap can be attributed to the fact that graduates differ in observable characteristics depending on family background (Table 5). The endowments effect can be interpreted in the following way: If high SES graduates had the same average observable characteristics as low/mid SES graduates, the overqualification gap would be reduced by 4.5 percentage points.

In order to identify through which pathways family background affects the risk of overqualification, I carry out a detailed decomposition of the endowments part. Several factors are found to significantly contribute to the endowments effect. Social differences in university grades explain a significant share of 6.1% ( $=0.003$  of  $0.045$ ) of the endowments effect. The unconditional overqualification gap would, *ceteris paribus*, reduce to 7.1 percentage points ( $=0.074 - 0.003$ ) if high SES graduates had the same average uni-

versity grades as low/mid SES graduates. This result is in line with the previous findings that university grades are better among graduates from high SES families and that better grades reduce the risk of overqualification.

The most important contributor to the endowments effect is the choice of university type and subjects. A share of 66.4% of the endowments effect can be attributed to social differences in the choice of university type and subjects. If graduates studied the same subjects at the same university type, the social overqualification gap would decrease by 3 percentage points.

Differences in the usage of job search channels significantly account for 8.1% of the endowments effect. The main cause for this contribution is that low/mid SES graduates more often find their job through a job they had before studying.<sup>11</sup> If high SES graduates found their job through this channel as often as low/mid SES graduates, the overqualification gap would significantly narrow. The decomposition results do not confirm the assumption that graduates from high SES families obtain a lower risk of overqualification because they profit from parental networks. Graduates do not differ in terms of how often they found their job through the guidance of parents/friends. In addition, finding the job through this channel increases the risk of overqualification for both high SES graduates and low/mid SES graduates.

A significant part of the endowments effect can be attributed to differences in actions undertaken to improve career prospects. In particular, the higher share of high SES graduates who gained experiences abroad contribute to the endowments effect. None of the further actions are significant mediators.

The previous results of the Blinder-Oaxaca decomposition are strongly robust against changing the weighting scheme. The size of the explained part of the overqualification gap hardly changes if the endowments effect is evaluated using the high SES graduates coefficients. For this weighting scheme, the explained part of the overqualification gap amounts to 58.9% ( $=0.044$  of  $0.074$ ) as shown in Table 6. The results concerning the pathways for the link of family background and overqualification also change little. Social differences in university grades, subject choices, and job search channels remain significant contributors to the endowments effect. The overall contribution of the variables on improving career prospects become insignificant but social differences in gaining experiences abroad are still a significant mediator. In contrast to the first weighting scheme, the graduates' regional mobility significantly contributes to the endowments effect if coefficients of high SES graduates are used for the evaluation. The share of individuals working more than 100 km away from the native place is higher among high SES graduates which reduces the

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<sup>11</sup>The detailed decomposition results presenting each variable separately are not shown in this paper but are available upon request.

probability to be overqualified. Independently of the weighting scheme, I find no indication that the proxy variables accounting for financial support and aspiration significantly contribute to the endowments effect. This results might be driven by the lack of precision of the measures for these potential mediating factors.

Differences in endowments are an important force behind the overqualification gap but a substantial part of approximately 40% of the gap remains unexplained.<sup>12</sup> This unexplained part captures how differences in the coefficients of observable characteristics as well as group differences in unobserved characteristics contribute to the overqualification gap. The bulk of the unexplained part can be attributed to the group difference in the constant reflecting unobserved heterogeneity.<sup>13</sup> Unobserved heterogeneity could arise because of missing proxies for relevant characteristics, such as non-cognitive skills, or because of imprecise measurement of mediators included in the analysis.

Discrimination could represent a further cause for the significant unexplained part. Employers could value individual characteristics differently for graduates from high SES or low/mid SES families. However, I find no indication that the overqualification gap widens because employers value the graduates' characteristics differently. Differences in the group specific coefficients only play a minor role for the social overqualification gap in my analysis. This means that the individual characteristics, such as university grades, seem to be equally evaluated by the labour market. However, it is possible that employers discriminate applicants on the basis of characteristics that I cannot observe with the data at hand.

## 6 Conclusion

This study finds that family background is a crucial determinant of overqualification of graduates at labour market entry. One year after graduation, the unconditional overqualification gap between graduates from low/mid SES families and high SES families amounts to 7.4 percentage points. The main aim of this study was to uncover which pathways mediate the link between family background and overqualification. In order to account for potential mediators, proxy variables for cognitive skills, study characteristics, social capital, financial capital, and aspirations are included in the empirical analysis. Graduates are found to strongly differ in these potential mediators. The effect of family background is reduced but remains highly significant if the potential pathways are accounted for in a probit regression.

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<sup>12</sup>In particular, a proportion of 3 percentage points of the overqualification gap remains unexplained. The size of the unexplained part, therefore, nearly equals the marginal family background effect of 3.3 percentage points estimated in the probit regression including all observable mediators.

<sup>13</sup>The detailed decomposition of the unexplained part is available upon request.

Employing a Blinder-Oaxaca approach, I show that roughly 60% of the overqualification gap can be attributed to the fact that graduates differ in observable characteristics, i.e. the endowments effect. Concerning social differences in cognitive skills, I find that differences in university grades significantly contribute to the overqualification gap. In contrast, social differences in school leaving examination grades are found to primarily affect overqualification through the selection into promising subjects. The most important mediator of the family background effect is the social difference in the choice of university type and subjects. This result points to the importance of the horizontal dimension of higher education in the context of social mobility.

A substantial part of approximately 40% of the overqualification gap remains unexplained by differences in observable mediators. Most of the unexplained part can be attributed to unobserved heterogeneity between graduates from low/mid SES families and graduates from high SES families. An important source for unobserved heterogeneity might be that the proxy variables employed are imprecise measures of mediating factors. Other potentially important factors, such as non-cognitive skills, are not observed.

The unexplained family background effect could also arise because of discrimination based on preferences of potential employers. Employers could value individual characteristics differently for graduates from high SES or low/mid SES families. Concerning the individual characteristics included in the present analysis, I find no indication that the overqualification gap widens because employers value characteristics differently. This means that the individual characteristics, such as university grades, seem to be equally evaluated by the labour market. However, it is possible that employers discriminate applicants on the basis of characteristics that are not included in the analysis.

Although it is not possible to identify causal family background effects on overqualification, this analysis suggests that overqualification is a transmission channel for the intergenerational earnings persistence. Even if children from low/mid SES families accomplish a social advancement in terms of educational attainment, the optimal utilization of their acquired skills is hampered more often due to overqualification as compared to graduates from high SES families. As suggested by the previous empirical literature, overqualification is related to significant wage penalties. Therefore, social differences in the probability of being overqualified could mediate the intergenerational earnings persistence over and above the transmission channel of educational attainment. This result casts light on the relevance of factors hampering graduates from low/mid SES families to find matching jobs for policies attempting to increase social mobility. These policies mainly try to overcome social differences in educational attainment. Accompanying the educational expansion with the provision of targeted measures to prevent graduates raised in low/mid SES families from overqualification could improve social mobility. Regarding

the transmission channel of ability and skills, research on skill formation proposes that policies should concentrate on assistance in the early childhood (Cunha and Heckman, 2007). This could also reduce horizontal differences in higher education choices, as my findings suggest that the favourable effect of good school grades on overqualification primarily works through selection into promising subjects. Furthermore, the present study shows that the social difference in the choice of university type and subject is the most relevant pathway for the overqualification gap. Selective measures aiming to motivate students from low/mid SES families to attend traditional universities or to choose subjects with low overqualification rates may decrease the correlation of social origin and overqualification, even though the effects of studying in a particular subject partly arise due to self-selection.

As this study focuses on graduates observed one year after graduation, no conclusions can be drawn on the correlation between family background and overqualification at later stages of the career cycle. Being overqualified shortly after labour market entry could send negative signals for potential employers in the future. It is a question for further research whether the persistence of overqualification depends on the social origin of graduates.

# Tables

Table 1: Descriptive Statistics

	Mean	SD	Min	Max
Overqualification	0.201	0.401	0	1
High SES family	0.461	0.499	0	1
<i>(Pre-)Study characteristics:</i>				
Vocational education	0.373	0.484	0	1
School grade <sup>a</sup>	0.000	0.998	-3.16	2.53
University grade <sup>b</sup>	0.000	0.998	-4.12	2.42
Duration of study <sup>b</sup>	0.000	0.998	-2.54	6.29
Univ. of applied sciences (UAS)	0.253	0.435	0	1
<i>University types, Subjects:</i>				
Univ.: Medicine & Law	0.111	0.314	0	1
Univ.: Teaching	0.112	0.315	0	1
Univ.: STEM Subjects	0.247	0.431	0	1
UAS: STEM Subjects	0.172	0.377	0	1
Univ.: Business & Economics	0.145	0.352	0	1
UAS: Business & Economics	0.046	0.209	0	1
Univ.: Social & Cultural Sciences	0.133	0.340	0	1
UAS: Social & Cultural Sciences	0.035	0.184	0	1
<i>Job found through:</i>				
Agency of parents/friends	0.077	0.267	0	1
Job while studying	0.126	0.332	0	1
Internship	0.162	0.369	0	1
Job before studying	0.048	0.214	0	1
<i>Worked during study:</i>				
Yes: related to subject	0.569	0.495	0	1
Yes: not related to subject	0.189	0.392	0	1
Not worked during study	0.242	0.428	0	1
<i>Study was financed by:</i>				
Own work (in %)	28.453	22.538	0	99
Parental support (in %)	44.766	31.489	0	99
<i>Distance work and native place:</i>				
Less than 50 km	0.470	0.499	0	1
Between 50 km and 100 km	0.146	0.353	0	1
More than 100 km	0.385	0.487	0	1
<i>Improve career prospects:</i>				
Commitment to the job	0.433	0.496	0	1
Gained experience abroad	0.313	0.464	0	1
Established social networks	0.406	0.491	0	1
Have been mobile	0.300	0.458	0	1
Attended additional courses	0.415	0.493	0	1
<i>Future goals:</i>				
Above-average performance	0.685	0.465	0	1
Fully exploit own potential	0.801	0.399	0	1
Fill a leading position	0.547	0.498	0	1
Observations	3706			

Note: <sup>a</sup> Standardised within federal states; <sup>b</sup> Standardised within subjects and university types. Source: HIS-Graduate Panel 1997.

Table 2: Descriptive Statistics by Parental SES

	Low/mid SES	High SES	
	Mean	Mean	Diff.
<i>Dependent variable:</i>			
Overqualification	0.235	0.161	0.074***
<i>(Pre-)Study characteristics:</i>			
Vocational education	0.468	0.263	0.205***
School grade <sup>a</sup>	-0.116	0.136	-0.252***
University grade <sup>b</sup>	-0.038	0.044	-0.082**
Duration of study <sup>b</sup>	-0.009	0.011	-0.020
Univ. of applied sciences (UAS)	0.342	0.148	0.194***
<i>University types, Subjects:</i>			
Univ.: Medicine & Law	0.078	0.149	-0.071***
Univ.: Teaching	0.101	0.124	-0.023**
Univ.: STEM Subjects	0.207	0.293	-0.086***
UAS: STEM Subjects	0.237	0.095	0.143***
Univ.: Business & Economics	0.150	0.139	0.012
UAS: Business & Economics	0.063	0.026	0.037***
Univ.: Social & Cultural Sciences	0.121	0.147	-0.026**
UAS: Social & Cultural Sciences	0.042	0.028	0.014**
<i>Job found through:</i>			
Agency of parents/friends	0.076	0.079	-0.003
Job while studying	0.136	0.115	0.020*
Internship	0.160	0.164	-0.004
Job before studying	0.063	0.030	0.033***
<i>Worked during study:</i>			
Yes: related to subject	0.560	0.580	-0.020
Yes: not related to subject	0.223	0.150	0.073***
Not worked during study	0.217	0.270	-0.053***
<i>Study was financed by:</i>			
Own work (in %)	32.243	24.025	8.218***
Parental support (in %)	33.948	57.407	-23.46***
<i>Distance work and native place:</i>			
Less than 50 km	0.492	0.444	0.048***
Between 50 km and 100 km	0.162	0.126	0.036***
More than 100 km	0.346	0.430	-0.084***
<i>Improve career prospects:</i>			
Commitment to the job	0.435	0.431	0.004
Gained experience abroad	0.254	0.381	-0.127***
Established social networks	0.393	0.422	-0.030*
Have been mobile	0.295	0.305	-0.011
Attended additional courses	0.409	0.422	-0.013
<i>Future goals</i>			
Above-average performance	0.686	0.685	0.001
Fully exploit own potential	0.798	0.804	-0.006
Fill a leading position	0.553	0.541	0.013
Observations	1997	1709	3706

Note: <sup>a</sup> Standardised within federal states; <sup>b</sup> Standardised within subjects and university types; Significant at 1% \*\*\*, significant at 5% \*\*, significant at 10% \*. Source: HIS-Graduate Panel 1997.

Table 3: Probit Regressions, Overqualification One Year After Graduation

	Dependent variable: Overqualification					
	(1)		(2)		(3)	
High SES family	-0.062***	(0.013)	-0.041***	(0.013)	-0.033**	(0.014)
<i>(Pre-)Study characteristics:</i>						
Vocational education			0.021	(0.017)	0.011	(0.017)
School grade	-0.023***	(0.007)	-0.010	(0.007)	-0.004	(0.007)
University grade	-0.050***	(0.007)	-0.053***	(0.007)	-0.041***	(0.007)
Duration of study			0.017**	(0.007)	0.014**	(0.007)
<i>University types, Subjects:<sup>a</sup></i>						
Univ.: Medicine & Law			-0.205***	(0.008)	-0.194***	(0.008)
Univ.: Teaching			-0.136***	(0.013)	-0.134***	(0.012)
Univ.: STEM Subjects			-0.164***	(0.014)	-0.146***	(0.014)
UAS: STEM Subjects			-0.103***	(0.017)	-0.091***	(0.017)
Univ.: Business & Economics			-0.038**	(0.019)	-0.020	(0.020)
UAS: Business & Economics			0.019	(0.032)	0.031	(0.033)
UAS: Social & Cultural Sciences			-0.085***	(0.023)	-0.078***	(0.023)
<i>Job found through:</i>						
Agency of parents/friends					0.143***	(0.029)
Job while studying					0.086***	(0.022)
Internship					-0.069***	(0.015)
Job before studying					0.109***	(0.035)
<i>Worked during study:<sup>b</sup></i>						
Yes: related to subject					-0.042**	(0.018)
Yes: not related to subject					-0.012	(0.019)
<i>Study was financed by:</i>						
Own work (in %)					0.001*	(0.000)
Parental support (in %)					0.000	(0.000)
<i>Distance work and native place:<sup>c</sup></i>						
Between 50 km and 100 km					-0.034**	(0.016)
More than 100 km					-0.051***	(0.014)
<i>Improve career prospects:</i>						
Commitment to the job					-0.031**	(0.013)
Gained experience abroad					-0.035***	(0.014)
Established social networks					0.006	(0.013)
Have been mobile					-0.027*	(0.014)
Attended additional courses					0.011	(0.013)
<i>Future goals:</i>						
Above-average performance					-0.029**	(0.014)
Fully exploit own potential					0.019	(0.015)
Fill a leading position					-0.002	(0.013)
<i>Socio-demographics<sup>d</sup></i>						
	Yes		Yes		Yes	
Observations	3706		3706		3706	
Pseudo $R^2$	0.047		0.126		0.166	

*Note:* Probit estimations; Marginal effects (at the average); Standard errors in parentheses; <sup>a</sup> Reference: Univ: Social & Cultural Sciences; <sup>b</sup> Reference: Not worked during study; <sup>c</sup> Reference: Less than 50 km; <sup>d</sup> Socio-demographic controls include age and dummies for gender, being married, and having children; Significant at 1% \*\*\*, significant at 5% \*\*, significant at 10% \*.

Table 4: Probit Regressions by Family Background, Overqualification

	Dependent variable: Overqualification			
	Low/mid SES		High SES	
	(1)		(2)	
<i>(Pre-)Study characteristics:</i>				
Vocational education	0.003	(0.025)	0.019	(0.022)
School grade	-0.012	(0.011)	0.006	(0.009)
University grade	-0.041***	(0.010)	-0.037***	(0.008)
Duration of study	0.020*	(0.011)	0.007	(0.009)
<i>University types, Subjects:<sup>a</sup></i>				
Univ.: Medicine & Law	-0.216***	(0.013)	-0.163***	(0.012)
Univ.: Teaching	-0.144***	(0.022)	-0.111***	(0.012)
Univ.: STEM Subjects	-0.147***	(0.024)	-0.131***	(0.017)
UAS: STEM Subjects	-0.081***	(0.030)	-0.086***	(0.016)
Univ.: Business & Economics	0.024	(0.035)	-0.045**	(0.020)
UAS: Business & Economics	0.085	(0.052)	-0.025	(0.035)
UAS: Social & Cultural Sciences	-0.117***	(0.032)	-0.021	(0.036)
<i>Job found through:</i>				
Agency of parents/friends	0.129***	(0.041)	0.151***	(0.041)
Job while studying	0.102***	(0.033)	0.070**	(0.029)
Internship	-0.088***	(0.024)	-0.050***	(0.018)
Job before studying	0.086*	(0.045)	0.175***	(0.065)
<i>Worked during study:<sup>b</sup></i>				
Yes: related to subject	-0.081***	(0.027)	-0.001	(0.021)
Yes: not related to subject	-0.043	(0.028)	0.028	(0.028)
<i>Study was financed by:</i>				
Own work (in %)	0.001**	(0.000)	-0.000	(0.000)
Parental support (in %)	0.000	(0.000)	-0.000	(0.000)
<i>Distance work and native place:<sup>c</sup></i>				
Between 50 km and 100 km	-0.073***	(0.022)	0.017	(0.025)
More than 100 km	-0.073***	(0.021)	-0.035**	(0.017)
<i>Improve career prospects:</i>				
Commitment to the job	-0.016	(0.020)	-0.041**	(0.016)
Gained experience abroad	-0.038*	(0.022)	-0.030*	(0.016)
Established social networks	-0.012	(0.020)	0.030*	(0.016)
Have been mobile	-0.044**	(0.022)	-0.009	(0.018)
Attended additional courses	0.008	(0.020)	0.017	(0.016)
<i>Future goals:</i>				
Above-average performance	-0.023	(0.021)	-0.041**	(0.018)
Fully exploit own potential	0.001	(0.024)	0.034*	(0.018)
Fill a leading position	0.007	(0.020)	-0.013	(0.017)
<i>Socio-demographics<sup>d</sup></i>				
Yes			Yes	
Observations	1997		1709	
Pseudo $R^2$	0.150		0.202	

*Note:* Probit estimations; Marginal effects (at the average); Standard errors in parentheses; <sup>a</sup> Reference: Univ: Social & Cultural Sciences; <sup>b</sup> Reference: Not worked during study; <sup>c</sup> Reference: Less than 50 km; <sup>d</sup> Socio-demographic controls include age and dummies for gender, being married, and having children; Significant at 1% \*\*\*, significant at 5% \*\*, significant at 10% \*.

Table 5: Decomposition of the Overqualification Gap, Weighted by Coefficients of Low/mid SES Graduates ( $\beta_L$ )

	Coef.	Std. Err.	$P >  z $	% of Total gap	% of Ex-plained part
Low/mid SES family	0.235	0.009	0.000		
High SES family	0.161	0.009	0.000		
Total overqualification gap	0.074	0.013	0.000		
<b>Explained part</b>	0.045	0.009	0.000	60.6	
<b>Unexplained part</b>	0.029	0.013	0.026	39.4	
<i>Contribution to explained part</i>					
Vocational education	0.001	0.004	0.893		1.2
School grade	0.002	0.002	0.280		5.4
University grade	0.003	0.001	0.035		6.1
Study duration	0.000	0.001	0.556		-0.7
University types, Subjects	0.030	0.006	0.000		66.4
How job was found	0.004	0.002	0.051		8.1
Worked during study	-0.001	0.002	0.442		-3.0
Financing of study	0.000	0.007	0.983		-0.3
Dist work, native place	0.003	0.002	0.119		6.4
Improve career prospects	0.005	0.002	0.063		10.2
Future goals	0.000	0.000	0.885		0.1
Socio-demographics	0.000	0.003	0.986		0.1

*Note:* Probit decomposition computed in Stata employing the procedure by Jann (2008); Explained part evaluated by coefficients of graduates from low/mid SES families.

Table 6: Decomposition of the Overqualification Gap, Weighted by Coefficients of High SES Graduates ( $\beta_H$ )

	Coef.	Std. Err.	$P >  z $	% of Total gap	% of Ex-plained part
Low/mid SES family	0.235	0.009	0.000		
High SES family	0.161	0.009	0.000		
Total overqualification gap	0.074	0.013	0.000		
<b>Explained part</b>	0.044	0.011	0.000	58.9	
<b>Unexplained part</b>	0.030	0.016	0.058	41.1	
<i>Contribution to explained part</i>					
Vocational education	0.004	0.004	0.364		9.2
School grade	-0.002	0.002	0.504		-3.5
University grade	0.003	0.001	0.032		7.2
Study duration	0.000	0.000	0.621		-0.3
University types, Subjects	0.023	0.007	0.000		53.0
How job was found	0.005	0.002	0.016		12.2
Worked during study	0.002	0.002	0.247		4.6
Financing of study	0.001	0.007	0.902		2.0
Dist work, native place	0.004	0.002	0.027		8.4
Improve career prospects	0.003	0.002	0.228		6.5
Future goals	0.000	0.001	0.579		-1.0
Socio-demographics	0.001	0.003	0.813		1.6

*Note:* Probit decomposition computed in Stata employing the procedure by Jann (2008); Explained part evaluated by coefficients of graduates from high SES families.

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