Unequal Distribution of Returns to Education: Overeducation of Academics in Germany

What are the impacts of gender, migration status and educational background?

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Abstract

The present paper investigates the risk of academics in Germany to be employed below their educational level. The focus is on the impact of the characteristics of gender, migration status and educational background and their interdependencies. Overeducation exists if the formal educational level of a person is higher than that required for the occupation held on the labour market (subjective measurement method). Based on data from the survey among adults of the National Educational Panel (NEPS) it can be seen that women, migrants and persons with an educationally disadvantaged background have a higher risk of being overeducated than the respective comparison groups. Taking into account the interdependencies of these three factors, there is no particular disadvantage for female migrants, but for migrants with an educationally disadvantaged background. The risk increases additively for women who have an educationally disadvantaged background; a multiplicative disadvantage only exists for men. The most privileged group are men with academically oriented parents, regardless of whether or not a migration background exists.

1 Introduction

In order to utilise the education investments of a society appropriately, the labour market and the training/education system must be synchronised (cf. e.g. Büchel 2007; Fehse/Kerst 2007; Kleibrink 2013; Leuven/Oosterbeek 2011; Rukwid 2012). An indicator of the extent to which the employment system is adjusted to the qualification structure of the population is, besides the unemployment rate, the education adequacy of the job. If the employment of a person does not match their qualification, i.e. the employment is inadequate, the human capital acquired in the education system cannot be utilised in its entirety and converted into appropriate returns (Büchel 2007; McGuiness 2006; Pollmann-Schult/Büchel 2002). On the individual level, this results in returns to education not being appropriate. Thus, the aspired standard of living cannot be reached, since inadequate employment relationships, besides a lower occupational status, go along with a relatively low income or income profile (Büchel 1998; Diem/Wolter 2013). Moreover, empirical findings indicate a lower occupational satisfaction (Berlingieri/Erdsiek 2012; Boll/Leppin 2013a). From a macro-perspective point

of view, there are unused potentials due to the total amount of not utilisable qualifications within the society, which results in an inefficient utilisation of public resources (McGuiness 2006).

For other aspects of the labour market and also regarding the education system, social inequalities are adequately documented - see e.g. wage inequalities between the genders (Aisenbrey/Brückner 2008; Levanon/England/Allison 2009; Liebeskind 2004) or unequal opportunities depending on gender and background at the respective decision levels of the education system (cf. e.g. Becker 2000; 2008; Geißler 2004; 2006; Schimpl-Neimanns 2000). Since the training adequacy of the job can be seen as a kind of quality measurement for the correlation between the education system and the labour market, the phenomenon of overeducation is most likely also subject to social disparities and inequalities across different demographic groups.

Since the mid-1990s, the subject of inadequate employmenthas been investigated empirically in Germany. However, the current state of research is not sufficient to make a clear statement about social disparities. Against this background, the subject of this paper is to investigate to what extent overeducation is affected by social inequalities and occurs to various degrees in certain demographic groups. In empirical studies on social inequalities in the education system and on the labour market, the ascriptive characteristics gender, social background (educational background) and migration status dominate as the factors responsible for inequalities (cf. e.g. Becker 2000; Becker/Müller 2011; Bender/Seifert 1996; Buche/Gottburgsen 2012; England 2005; Geißler 2005; 2006; Schimpl-Neimanns 2000; Seibert 2011). Findings on overeducation also suggest a dominating impact of exactly these three characteristics on the risk of inadequate employment (Büchel 1998, Fehse/Kerst 2007; Rukwid 2012); however, there are relatively few findings, and they are inconsistent. Therefore, this paper intends to answer the question as to what the impacts of gender, migration status and educational background are on the risk of overducation. The effect of the ascriptive characteristics mentioned above will be investigated in a multi-dimensional way, i.e. both individually and in their mutual interdependency, in the context of employment of academics. Due to the relatively high level of education investments of academics (compared to persons without a tertiary course of education), a strong ambition towards an adequate return to education can be assumed. In the following, the focus will thus be on this group.

The paper is structured as follows: First, an overview of the state of research regarding overeducation in Germany will be provided. Subsequently, theoretical explanatory approaches on social inequalities with a focus on varying utilisation opportunities will be outlined and

explained. Research hypotheses will then be derived from the findings obtained. After a short description of the data basis, its operationalisation and the analysis method used, these will be reviewed using the data of the National Educational Panel (NEPS). Finally, a summary and discussion of the results including an outlook on further research needs will be provided.

2 State of research

Studies show that the extent of overeducation in Germany within the group of university graduates has increased continually and regardless of the economic situation as of 1984. Since the mid-2000s, it has declined slightly (Rukwid 2012, p. 34). The findings on the share vary between approx. 19 percent (Rukwid 2012, p. 26) and approx. 33 percent (Boll/Leppin 2013b, p. 38).

As already mentioned, overeducation results in the insufficient utilisation of education investments. Income deductions for persons in inadequate employment as compared to persons with the same formal education but a full utilisation of their acquired qualifications are sufficient documented (cf. e.g. Bauer 2000; Büchel 1998; 2001; Diem/Wolter 2013). Moreover, according to Büchel and Mertens (2000) especially persons in inadequate employment are excluded from opportunities of "on the job training", which, in the long run, leads to a devaluation of the human capital endowment of these persons. Lower occupational satisfaction is considered a non-monetary consequence of overeducation (Berlingieri/Erdsiek 2012; Boll/Leppin 2013a).

The existing literature discusses the age and thus labour market experience as influencing factors on the risk of inadequate employment in Germany. However, there actually is evidence for a higher risk at the beginning of professional life (Jensen/Gartner/Rässler 2006; Boll/Leppin 2013b; Büchel/Pollmann-Schult 2001; Plicht/Schober/Schreyer 1994), but also for a consistent risk over the entire occupational history (Büchel 1996) and of an increased risk for employees at the age of 50 and above (Rukwid 2012, p. 31). As overlaying circumstances, unemployment before the entry into employment as well as poor job prospects due to the economy in the respective field of activity increase the risk (Trappe 2006). Moreover, there are differences regarding the course of studies chosen: graduates of humane and educational sciences more frequently have inadequate positions (Berlingieri/Erdsiek 2012; Büchel/Matiaske 1995; Fehse/Kerst 2007; Plicht/Schober/Schreyer 1994; Rehn/Brandt/Fabian/Briedis 2011). Furthermore, it can be seen that persons with a university

of applied sciences degree are more often affected by overeducation than university graduates (Büchel 1996; 1998; Fehse/Kerst 2007; Plicht/Schober/Schreyer 1994).

The connection of social disparities and the risk of overeducation have rather played a secondary and also mostly unclear role in research so far. The following findings have been discussed in literature regarding the three determinants in the focus of interest:

In connection with the *educational background*, Büchel and Pollmann-Schult (2001) reach the conclusion that persons whose parents have a low school education are more frequently overeducated, even if they have the same formal levels of education as other persons[1]. Also the analyses of Fehse and Kerst (2007) as well as Erdsiek (2013) confirm, on the basis of German data, a negative connection between educational background and the probability of inadequate employment (cf. e.g. Capsada-Munsech 2014; Caroleo/Pastore 2013 for international findings).

There are no clear findings regarding possible *differences between the sexes*. On the one hand, there are significant differences between the sexes with women being at a disadvantage in most cases: As compared to men, women have a higher risk of being in inadequate employment (Büchel 1996; 1998; Fehse/Kerst 2007; Hall 2011; Plicht/Schober/Schreyer 1994; Rohrbach-Schmidt/Tiemann 2011; Rukwid 2012; cf. e.g. Dumont/Monso 2007 for international findings). According to Rukwid (2012), overeducation is twice as likely among women as among men. However, these differences decrease in the course of life (i.e. with increasing labour market experience) (Fehse/Kerst 2007). Moreover, it could be shown that women need remarkably more time after their university degree to find adequate employment than men (Rehn/Brandt/Fabian/Briedis 2011). On the other hand, there are findings which show that there are no or only very few differences between men and women. This means both sexes have the same risk of being affected by overeducation (Büchel/Neubäumer 2001; Büchel/Pollmann-Schult 2001; Pollmann-Schult 2006). Current studies even show a higher share of male persons in inadequate employment (Boll/Leppin 2014; Pellizzari/Fichen 2013).

A similar inconsistent picture exists for persons with a *migration background*. On the one hand, it is evident that migrants of the first and even the second generation living in Germany have a significantly higher risk of inadequate employment (Büchel 1998; Rukwid 2012; cf. e.g. Nieto/Matano/Ramos 2013; Piracha/Vadean 2012 for international findings). However, there are also indications that a migration background has no impact on the probability of

[1] This finding, however, is no longer justifiable in multivariate analyses (Büchel/Pollmann-Schult 2001).

overeducation (Büchel/Pollmann-Schult 2001; Pollmann-Schult 2006; Rohrbach-Schmidt/Tiemann 2011).

Because of the partially contradicting results, no clear statements about social inequalities regarding the factors of gender, migration status and educational background within the phenomenon of overeducation can be made so far. Moreover, a combination of different attributes has been completely ignored to date. The interdependency of personal factors, which are very important in the generation of social inequalities when the different group affiliations and their various interconnections are focussed on, has thus been completely neglected.

To correct this deficit, the theoretical and empirical approach of this paper is in line with the concept of intersectionality from gender research (Crenshaw 1989). It suggests that the combination of individual attributes should be considered in order to detect connections and interdependencies of individual effects. This can account for the fact that persons always belong to several social categories at the same time. With his "statistical artificial character" (Geißler 2005, p. 72) of the "catholic daughter from a working class family from the country", Dahrendorf (1965, 1966) already points out the importance of multi-dimensional and also cumulative effects of structural disadvantages in the German education system. The necessity of such a perspective is emphasised by various studies of inequality research: The characteristics of gender, educational background and migration status in particular lead, depending on the combination, to different success and/or returns to education in the education system and on the labour market (cf. e.g. Bender/Seifert 1996; Geißler 2005; Gottburgsen/Gross 2012).

3 Theory and hypotheses

Empirical literature focusses on different labour market theories explaining the phenomenon of overeducation on the individual and on the structural level (cf. Pollmann-Schult 2006 for a detailed overview). Among the commonly applied individualistic approaches are the *job matching theory* (Jovanovic 1979) and the *theory of career mobility* (Sicherman/Galor 1990). The former explains inadequate employment using market imperfections such as information deficits on the part of employers and employees. The latter postulates a purposefulness of inadequate employment and thus a relatively low earned income when above-average career opportunities exist. On the aggregate level, the *job competition model* (Thurow 1975) explains

inadequate employment compared to training with the existence of an imbalance between job offers and demand.

However, using these theoretical reasoning only statements regarding possible reasons for the phenomenon of overeducation can be made, but not regarding the particular disadvantage for individual groups of society. To this end, further theoretical inequality reasoning is required, which is shown in the following.

In sociological and economic literature, different mechanisms are being discussed which may be the reasons for disadvantages of women and persons with a migration background on the labour market. The most immediate kind of disadvantage on the labour market is covered by discrimination theories. According to the *theory of statistical discrimination*, employers try to compensate for the information deficit regarding the productivity of the potential work force by looking at the average behaviour of certain groups of persons and using characteristics which can easily be determined, such as the gender or migration status, to project the productivity to be expected (Arrow 1971; Phelps 1972). However, if individual persons are more productive than they are expected to be due to their group affiliation, this is discrimination. According to the *tastes for discrimination* (Becker 1971), however, even personal preferences or prejudices manifesting themselves as non-monetary cost factors for employers are sufficient to lead to discriminatory mechanisms for women and persons with a migration background on the labour market.

However, we can only refer to discrimination, i.e. a disadvantage despite equal human capital endowment and productivity, if other determining factors can be excluded. For gender inequalities, most of all the career orientation and the *self-selection* of certain occupational segments or activities within the occupations are important factors (Hakim 2000; 2006). Women more often need to decide between family and career, while men (can) more easily focus on both at the same time (Hakim 2006; cf. also Ochsenfeld 2012). This largely impacts the career orientation and training/labour market behaviour (England 2005). This can be seen, for example, from the gender-specific choice of courses (Blossfeld et al. 2009)[2], a higher part-time rate (Vogel 2009), an overrepresentation of women working in the public sector (Leuze/Rusconi 2009)[3] and a lower share of women in management positions (Ochsenfeld

[2] Figures of the Federal Statistical Office show that the largest part of all female students exists in courses of study which are equally popular among men and women. However, the share of women especially in humane, educational and social sciences courses is absolutely overproportional (Blossfeld et al. 2009). What is problematic is the fact that these courses of study in particular are associated with a difficult entry into employment and unsecure and unstable careers (Gebel/Gernandt 2008; Haak/Rasner 2009).

[3] Leuze and Rusconi (2009) argue that the low regulation of career design in the private sector is less attractive for women than for men.

2012). Considering these observations, it can be assumed that women, due to a relatively low career orientation and the search for the combinability of family and professional obligations, are more likely to take up an inadequate position than men if this allows for the compatibility of family and career.

Regarding persons with a migration background, the following factors lead to disadvantages on the labour market besides discrimination. On the one hand, the migration into another country may devaluate human capital acquired (Kalter 2008). This happens due to the lack of acknowledgement of foreign certificates or due to the inequality of qualifications acquired. But it also happens due to the lack of transferability of acquired skills and knowledge to the host country - e.g. language and communication skills and knowledge about the mechanisms on the labour market. For the offspring of migrants (referred to as the second generation), the social integration of the family may impact their labour market success: If the education system has been passed successfully despite relatively difficult starting conditions[4], the social capital specific to the country of origin may have unfavourable impacts on the labour market placement. This happens if existing networks are oriented segregatively towards the country of origin and if they are in the way of integrative information exchanges regarding processes specific to the host country (Kalter 2008). Against the background of this reasoning, the following is assumed:

H1: Women have a higher risk of being overeducated than men.

H2: Persons with a migration background have a higher risk of being overeducated than persons without a migration background.

Especially the educational background has an important impact on the opportunities in the education system (cf. e.g. Becker 2000; 2006; 2008). Empirical findings indicate that the educational background should not be neglected as an influencing factor even for the investigation of inequalities on the labour market (thus after leaving the education system) (cf. e.g. Fluder/Stohler/von Gunten 2010; Groh-Samberg/Hertel 2011; Hartmann/Kopp 2001; Mayer/Blossfeld 1990). For this reason, it is assumed that the educational background has an effect on (in)adequate employment. For theoretical support, the *conflict-theoretical reasoning of Bourdieu (1977)* can be used as an explanatory approach. According to this reasoning, education serves to maintain the social status of the family. In order to fulfil the motif of maintaining the status (Boudon 1974), certain education certificates are required, whereas the

[4] The intergenerational transmission of education capital as well as the lack of experience and knowledge of the education system of the host country influences the educational opportunities of children of migrants (Kalter 2008).

probability of obtaining such certificates depends on the respective educational background (Breen/Goldthorpe 1997). The educational expansion and thus the quantitative increase of higher-quality qualification levels reduced their "scarcity value and thus their function as a selection characteristic on the labour market" (Gottburgsen/Sixt 2012, p. 10). Therefore, this requires other distinction characteristics such as the endowment with cultural capital.[5] The reasoning of the *theory of cultural reproduction* thus indicates that persons with an educationally advantaged background have a larger amount of cultural capital, which provides them with advantages in their educational development as compared to persons with an educationally disadvantaged background (Bourdieu 1983). When transferred to the situation on the labour market, cultural capital in its incorporated form can be assumed to be an advantage when accessing certain activities and/or positions. On the one hand, habitus-typical behaviours can facilitate the access to academically oriented fields of society. On the other hand, the umbrella term of cultural capital also comprises knowledge and skills of the family of origin, e.g. on the academic labour market, and upstream education aspirations which again may affect the professional success of the next generation in a positive way (Bourdieu 1983; cf. also Brüsemeister 2008).

With regards to the motif of maintaining the status (Boudon 1974), it can be assumed that persons with a relatively low-level educational background more easily accept inadequate employment and thus end their job search at this point, since the parental status has already been reached or exceeded and thus there is no further motivation to search for actually adequate employment. From the economic point of view (economic capital), it can be assumed that persons from the top social classes have more time to look for a job due to the financial protection by the family and may reject inadequate employment offers until they find an appropriate job. The family background also determines the value of social capital: If persons come from an academic family, a network useful for the academic labour market can be assumed. Consequently, the following is assumed regarding inadequate employment:

H3: Persons with a low-level educational background have a higher risk of being overeducated than persons with a high-level educational background.

Quantitative inequality research is dominated by primarily separate investigations of individual inequality determinants (both with respect to education inequalities and inequalities

[5] The devaluation of educational titles leads, besides the increased importance of other capital types (besides human capital), to a greater importance of preferably high formal education qualifications to be able to assert oneself on the labour market. In order to maintain the status of the family, the investments in education need to be increased steadily, and also the necessity of life-long learning has been growing (Quenzel/Hurrelmann 2010; cf. also Becker 2006; Allmendinger et al. 2011).

on the labour market) (Klinger/Knapp 2007; Schwinn 2007). However, individual studies show that an investigation of the interaction of individual factors is important to analyse social inequalities and disadvantages. For example, if in the context of school education the characteristics male sex, migration background and low educational background occur all together, this has unfavourable effects (Geißler 2005; Gottburgsen/Gross 2012; cf. also Becker/Müller 2011). Especially women from abroad or with a migration background are disadvantaged on the labour market (Bender/Seifert 1996), and in the university context as a place of work, a negative effect of the simultaneous presence of the factors parenthood and female sex could be detected with regards to the chance of full-time employment (Buche/Gottburgsen 2012). These findings indicate that the simultaneous presence of several factors which individually have been identified as disadvantage-generating factors lead to a multiplicative increase in disadvantages. Using the concept of intersectionality, it is suggested that the overlapping of individual socio-demographic characteristics leads or may lead to different patterns of disadvantages, depending on the combination. Conceptionally, no direction for the changes of the disadvantage is given here. The observations above suggest that women, persons with a migration background and persons with a low-level educational background have a higher risk of overeducation than their respective counterparts. In the following it will be assumed that the risk increases when some or all of these disadvantageous characteristics occur at the same time. The last hypothesis thus is:

H4: A combination of several inequality-generating factors leads to a cumulative increase of the already existing risk (when only one of the characteristics is considered) of being overeducated.

4 Analysis approach

4.1 Data base, study population and model selection

The survey among adults of the National Educational Panel (NEPS) (Blossfeld/Roßbach/von Maurice 2011), "Adult Education and Lifelong Learning", serves as the data basis for the investigation of the hypotheses given.[6] The observation period extends over the first three

[6] This paper uses the data of the National Educational Panel (NEPS) start cohort 6 (adults), doi:10.5157/NEPS:SC6:3.0.1. The NEPS data were collected from 2008 to 2013 as part of the supporting programme to promote empirical education research, which was funded by the German Federal Ministry of Education and Research (BMBF). Since 2014, the NEPS has been carried on by the Leibniz-Institut für Bildungsverläufe e.V. (LIfBi) at the University of Bamberg in cooperation with a German-wide network. The National Edu-

waves (corresponds to the years 2007/08, 2009/10 and 2010/11). This data basis is suitable for the underlying research project since the education adequacy of the job can be easily operationalised, there is a broad range of socio-economic factors, it is a combination of a retrospective study on the course of life and a prospective panel study, and there is a suitable amount of case numbers.

The analyses incorporate all persons who at the time of the survey are graduates from a university or university of applied sciences and are between 25 and below 67 years of age. Persons who are still in the training/education system as well as trainees and individuals performing military or civilian service, but also self-employed persons are excluded from the study population. Moreover, the study population is limited to the respective first observation per person. Its advantage is that it acts contrary to any selectivity issues of an unbalanced panel[7].

The multivariate analyses are conducted using binary logistic regressions. In the logistic model, a linear connection between the logarithmised chance of success (= inadequate employment) and each independent variable is assumed. To ensure the comparability of the different models, the average marginal effects (AME) are designated as estimated results (Best/Wolf 2010; Kohler/Kreuter 2012).

In non-linear models, the first derivation of the interaction term cannot be used - as in the linear case - for the interpretation of interactions. The interaction effect (x_1*x_2) results from the extent to which the derivation from the expected value of the dependent variable changes with regards to x_1 if x_2 changes by one unit (Buis 2010; Cornelißen/Sonderhof 2009). For this reason and since the statistical significance of the interaction effects which are of interest cannot be measured using a t test based on the coefficient of the interaction term (Ai/Norton 2003), the interaction effects are interpreted as follows: Based on the overall model, the average marginal effects for each combination of the respective interactions are calculated. The difference of these marginal effects again represents the direct marginal effect of the

cational Panel (NEPS) is a system of longitudinal studies depicting education decisions, learning processes, development of competencies and returns to education in different learning environments over the entire course of life. In start cohort 6 (stage 8), the education and employment histories as well as the development of competencies over the course of life of adults of working age, i.e. from the age of 23 to retirement and beyond, are collected.

[7] Different robustness checks suggest such a procedure. On the one hand, there are hardly any changes of the persons across the three waves. This is why no direct panel effect can be assumed. On the other hand, too many observations would be lost and therefore no significant results could be obtained if a limitation to a balanced panel would take place. The gain by utilising the panel structure was weighted lower than the gain by a higher number of cases.

interaction, i.e. the variation with the individual groups. By means of a Wald test, the corresponding significance is calculated.

4.2 Operationalisation and descriptive results

With regards to the measurement concept on overeducation, no uniform procedure has prevailed so far. Consequently, there are no internationally standardised indicators as is the case e.g. for the phenomenon of unemployment (Büchel 1998).[8]

The procedures applied so far can be divided into subjective, empirical and objective procedures. With the *subjective* approach, the level of educational requirements for the job is directly inquired. This means that the questioned persons conduct a self-assessment (Pollman-Schult/Büchel 2002). The question can aim either directly at a classification as an inadequate employment relationship or at an assessment of the level of educational requirements for the current job.

Objective procedures are based on specific job titles and the corresponding qualification requirements. In case of *empirical* procedures (also referred to as "realised matches"), the qualification level within a certain profession or group of professions is used and compared to the qualification acquired in the individual case.[9]

The present paper uses a subjective procedure. However, no question regarding a self-assessment of the training adequacy of the individual employment is asked, but the "… *training usually required for this job"* is acquired.[10] This question refers to the current job. This results in the following categories: "no training required", "training as semi-skilled worker required", "completed vocational training required", "technical training, master craftsman or technician required" and "university/university of applied sciences qualification, doctorate, habilitation required". According to the categorisation scheme developed by Büchel and Weißhuhn (1997) and Büchel (1998), the inquired level of educational requirements for the job is compared to the acquired formal qualification level of the persons. Thus, the training adequacy can be determined directly, and a dichotomous variable can be derived with the manifestations "adequate employment according to training" and "inadequate

[8] Inadequate employment represents a so-called mismatch situation. In this context, it must be differentiated between educational mismatch and skill mismatch. This paper focusses exclusively on the educational mismatch. However, it must be taken into consideration that even in case of adequate employment (according to qualificational criteria), a skill mismatch can exist (and vice versa).

[9] For a discussion about the advantages and disadvantages of the individual measurement methods, please see e.g. Büchel (1998, p. 66 et seq.), Berlingieri/Erdsiek (2012, p. 9 et seq.) and Verhaest/Omey (2010).

[10] The precise questioning and all operationalization steps are included in the Annex.

employment". In order to optimise the reliability of this classification and detect any lack of clarity and inconsistencies, the employment status is used as a control variable in addition to the classification scheme.

The explanatory variables have been operationalised as follows: The *educational background* is represented by the formal level of education of the parents. A dichotomous variable has been created which indicates whether the person has an educationally advantaged background (at least one parent has a university degree) or an educationally disadvantaged background (no parent has a university degree). Whether or not a *migration background* exists is also represented by a dichotomised variable. No distinction is made between first and second migration generation for model and case number reasons. As mentioned in Section 3, it is assumed that the lack of recognition of many foreign qualifications is an important factor for persons with a migration background. For this reason, the information about whether the university degree has been obtained in Germany or in another country has also been considered in the multivariate analyses and additionally interacted with the migration variable.

In order to keep constant additional influencing variables besides the effects of interest, a number of control variables have been integrated in the models: In order to control both cohort effects and effects of individual labour market experience, dummies for the respective birth cohort and also the individual professional experience (adjusted for career breaks) have been included. The partnership or family situation is an important factor when decisions regarding the labour market are (to be) made (Bielby 1992; for mobility decisions cf. e.g. Abraham/Schönholzer 2009). It is assumed that especially in case of married persons, the partner influences the labour market-relevant decisions. Therefore, the marital status with the conditions "married" and "not married" has been captured, where the group of non-married persons includes single, divorced and widowed persons. Also the existence of children in the household is an important and decision-relevant factor. This is controlled by a dichotomous variable containing the value of 1 if children under the age of 18 are living in the same household. It must be assumed that the existence of children influences labour market-relevant processes, in this case employment in an inadequate position, and this influence varies by gender. For this reason, the existence of children will be interacted with the gender and included as a control variable[11]. In order to keep constant the gender-specific self-

[11] For the same reasons, it was also planned to include an interaction term between the gender and the status of "married" as a control variable. However, since neither AIC, BIC nor a likelihood ratio test indicates a model improvement by using this multiplicative term, its inclusion in the model has been discarded.

selection of professional orientation, the main subject studied will be operationalised using the 1988 occupation classification. Moreover, a dummy controls for whether the degree was obtained from a university or a university of applied sciences and whether full-time or part-time employment exists. Furthermore, structural differences between urban and rural areas should be controlled. For this information, a dummy "city vs. country" (urban area = 1) is generated from the data from (political) municipality size classes the threshold of which is at 50,000 residents. In addition to that, the location of the federal state applicable to the place of residence (Eastern or Western Germany) has been controlled. However, these variables only serve as a control and thus to avoid unobserved heterogeneity and are not interpreted any further.

The connection of individual interdependencies (hypothesis 4) is represented by interaction terms. Therefore, the common (multiplicative) effect of two or more explanatory variables on the probability of inadequate employment can be depicted beyond the additive impact of individual effects. From the three main independent variables *gender*, *educational background* and *migration status*, all interactions have been generated and gradually included in the multivariate models.

The averages and shares of all variables are described in Table 1.

Figure 1 shows the share of overeducated relationships according to the three socio-demographic groups of interest. It can be seen that women are significantly more often in inadequate employment than men. Also the shares of persons with and without a migration background differ in so far as migrants are more frequently employed inadequately. With regards to the educational background it can be seen that persons with an educationally disadvantaged background are more frequently overeducated than persons with academically oriented parents. The biggest intra-group differences are between persons with and without a migration background, the smallest differences exist for the educational background. Even without considering third variables, the picture assumed as part of the hypotheses can already be seen.

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Table 1: Summary statistics of all variables (weighted)

	Variable	Characteristics	N	Mean/ Share	Standard deviation
DV	Overeducated	yes	1636	0,23	0,42
		no	1636	0,77	0,42
Independent Variables	Sex	woman	2274	0,44	0,49
		man	2274	0,57	0,49
	Migration status	migrant	2274	0,27	0,44
		native	2274	0,73	0,44
	Educational background	educationally disadvantaged	2151	0,65	0,48
		educationally advantaged	2151	0,35	0,48
Controls	Children under the age of 18 in household	yes	2274	0,65	0,99
		no	2274	0,63	0,48
	Marital status	married	2274	0,67	0,47
		not married	2274	0,34	0,47
	Birth cohort	1944 to 1986	2274	1965,13	11,23
	East Germany	yes	2274	0,25	0,43
		no	2274	0,76	0,43
	Urban area	yes	2274	0,55	0,49
		no	2274	0,45	0,49
	Volume of employment	full-time	2255	0,71	0,45
		part-time	2255	0,29	0,45
	Labour market experience	1-12 months	2274	0,68	
		13-36 months	2274	2,28	
		37-60 months	2274	4,41	
		61-120 months	2274	13,09	
		120-360 months	2274	53,22	
		more than 361 m.	2274	18,82	
	Main subject studied	operationalized with KldB88	2274		
	University	U. of applied sc.	2274	0,38	0,49
		University	2274	0,62	0,49
	Final degree	good	2274	69,91	
		medium	2274	20,75	
		poor	2274	8,44	
	Degree obtained in Germany	yes	2268	87,54	
		no	2268	12,46	

Source: NEPS Starting cohort 6, waves 1-3; unweighted.

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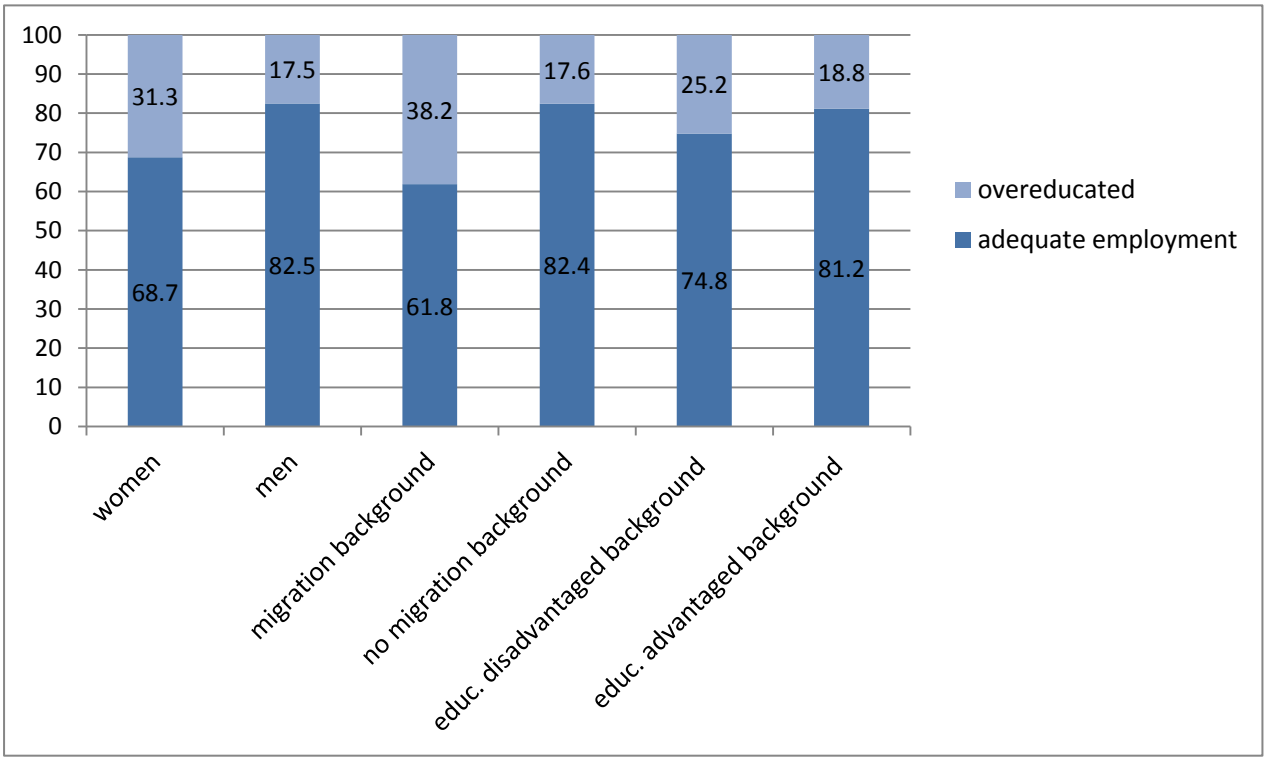
Figure 1: Share of overeducation according to gender, migration status and educational background (NEPS, start cohort 6, 2010/11, in percent, weighted)



5 Results

In Table 2, all models of logistic regression analyses are shown which are necessary for a gradual inclusion of all interactions of the explanatory variables gender, educational background and migration status. Due to the characteristics of interaction effects in non-linear models shown in Section 4.1, the marginal effects of the interaction terms are not included in this table, but further down.

In the hypotheses (H1 & H2) it is assumed that women and persons with a migration background have a higher risk of being overeducated than men and/or persons without a migration background. The results of the multivariate analyses shown are clearly in line with these assumptions. Across all models, women show a significantly higher (predicted) risk of inadequate employment than men. As of model 3, the interaction term between women and children under the age of 18 in the household has been included. The manifestation and significance of the main effect for women decreases in these cases, but as expected, it still remains in place. The higher risk of persons with a migration background as compared to persons without a migration background (model 1) is also significant. However, if it is controlled for whether a person with a migration background has obtained his/her university

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Table 2: Logistic regression of the risk of overeducation (average marginal effects; standard errors in parentheses)

Logistic Regressions. Separate Models	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
DV = overeducated	**AME (S.E.)**	**AME (S.E.)**	**AME (S.E.)**	**AME (S.E.)**	**AME (S.E.)**	**AME (S.E.)**	**AME (S.E.)**
Sex (0/1)	0.0557**	0.0525**	0.0517*	0.0517*	0.0515*	0.0506*	0.0507*
(1=woman)	(0.0203)	(0.0202)	(0.0202)	(0.0202)	(0.0202)	(0.0201)	(0.0200)
Migration status (0/1)	0.1124***	0.0551	0.0552	0.0557	0.0569	0.0532	0.0536
(1=Migrant)	(0.0274)	(0.0297)	(0.0297)	(0.0299)	(0.0298)	(0.0296)	(0.0298)
Educ. background (0/1)	0.0672***	0.0695***	0.0697***	0.0697***	0.0691***	0.0724***	0.0713***
(1=disadvantaged)	(0.0200)	(0.0199)	(0.0199)	(0.0199)	(0.0199)	(0.0196)	(0.0197)
Migrant * German degree		*controlled*	*controlled*	*controlled*	*controlled*	*controlled*	*controlled*
Woman * Children in HH			*controlled*	*controlled*	*controlled*	*controlled*	*controlled*
Woman * Migration				*controlled*			
Migration * educ. disadvantaged					*controlled*		
Woman * educ. disadvantaged						*controlled*	
Woman * educ. disadvantaged * Migration							*controlled*
Constant	-0.6649	0.3077	0.2775	0.2725	0.2726	0.0874	0.1793
	(0.6924)	(0.8640)	(0.8651)	(0.8660)	(0.8648)	(0.8744)	(0.8774)
N	1911	1906	1906	1906	1906	1906	1906
Nagelkerke R^2	0.1935	0.2013	0.2017	0.2017	0.2020	0.2039	0.2052
AIC	1998.36	1980.04	1981.01	1982.99	1982.29	1978.01	1980.95

Source: NEPS Starting cohort 6. Waves 1-3; unweighted; * p<0.05, ** p<0.01, *** p<0.001
Note: Controlled for children under 18 in household, marital status, east Germany, urban area, full-time, subject studied, university of applied sciences, degree obtained in Germany, final degree, individual labour market experience and birth cohort.

degree in Germany or in another country (*migration*studies in Germany*), the main effect of the migration status loses its significance completely. According to the descriptive and multivariate results, hypothesis 1 can be confirmed; hypothesis 2, however, is no longer justifiable when a university degree from a German university exists.

For hypothesis testing it is also interesting how the educational background affects the risk of inadequate employment (H3). Across all models it can be seen that persons without an academic background of the family have a significantly higher risk for inadequate employment than persons with an academic background of the parents. In line with hypothesis 3 it can be argued that the socio-economic background is equally important on the labour market.

It is assumed that a combination of several factors leads to a multiplicative increase of the already existing risk (which can be seen when only one of the characteristics is considered) of inadequate employment (H4). It is assumed that the impact of the migration background varies depending on the gender. As already mentioned, the statistical significance of the interaction effect of interest cannot be measured using a t test based on the coefficient of the interaction term (Ai/Norton 2003). The individual consideration of marginal effects is more informative with regard to the manifestation and significance of the interaction effects. The estimated probabilities of different combinations of the characteristics are shown in Table 3. Model 7 shows that women with a migration background have the biggest and men without a migration background have the smallest predicted risk of overeducation. Moreover, it can, however, also be seen that the gender does not lead to a multiplicative change of the risk of inadequate employment of persons with a migration background. The group differences are not significant (Wald test). Therefore, there is no indication of an increased disadvantage of female migrants as compared to male migrants.

For the interaction of the educational background with the migration status, the following effects emerge when using the same approach (model 8). The biggest predicted risk of being in inadequate employment applies to persons with a migration and an educationally disadvantaged background; the smallest risk applies to persons without a migration background and an educationally advantaged background. The findings shown also indicate that for persons with a high-level educational background, there is no distinguishing significance as to whether or not they have a migration background. In the group of persons with a low-level educational background, migrants have a higher risk (significant at the 5 % level) of being in inadequate employment than persons without a migration background. However, the overall interaction effect is not significant - there is no multiplicative increase

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Table 3: Interactions of all groups; main interaction effects gray (marginal effects based on model 7; standard errors in parentheses)

Delta-method	Model 7		Model 8		Model 9	
	AME	(S.E.)	AME	(S.E.)	AME	(S.E.)
Man * Native	0.261***	(0.014)				
Man * Migration	0.317***	(0.036)				
(Man * Migration) – (Man * Native)	0.056	(0.039)				
Woman * Native	0.312***	(0.017)				
Woman * Migration	0.357***	(0.037)				
(Woman * Migration) – (Woman * Native)	0.044	(0.040)				
((Man * Migration) – (Man * Native)) – ((Woman * Migration) – (Woman * Native))	0.012	(0.052)				
Educ. adv. * Native			0.244***	(0.017)		
Educ. adv. * Migration			0.249***	(0.035)		
(Educ. adv. * Migration) – (Educ. adv. * Native)			0.005	(0.039)		
Educ. disadv. * Native			0.305***	(0.014)		
Educ. disadv. * Migration			0.379***	(0.034)		
(Educ. disadv. * Migration) – (Educ. disadv. * Native)			0.074*	(0.037)		
((Educ. adv. * Migration) – (Educ. adv. * Native)) – ((Educ. disadv. * Migration) – (Educ. disadv. * Native))			-0.069	(0.050)		
Man * Educ. adv.					0.198***	(0.021)
Man * Educ. disadv.					0.303***	(0.023)
(Man * Educ. Disadv.) – (Man * Educ. adv.)					0.113***	(0.026)
Woman * Educ. adv.					0.311***	(0.016)
Woman * Educ. disadv.					0.332***	(0.018)
(Woman * Educ. disadv.) – (Woman * Educ. adv.)					0.029	(0.029)
((Man * Educ. disadv.) – (Man * Educ. adv.)) – ((Woman * Educ. disadv.) – (Woman * Educ. adv.))					0.083*	(0.039)

Source: NEPS Starting cohort 6, waves 1-3; unweighted. * p<0.05, ** p<0.01, *** p<0.001

with respect to the impact of the educational background in connection with a migration background.

When considering the gender in combination with the educational background (model 9), the biggest predicted risk applies to women with a low-level educational background, and the smallest risk applies to men with a high-level educational background. The further findings indicate that the educational background has an additionally increasing impact on the risk of inadequate employment for men only (significant at the 5 % level) and not for women. Taken as a whole, there is a gender effect with regard to the impact of the educational background on the risk of inadequate employment (significant at the 5 % level): Collectively, women have a

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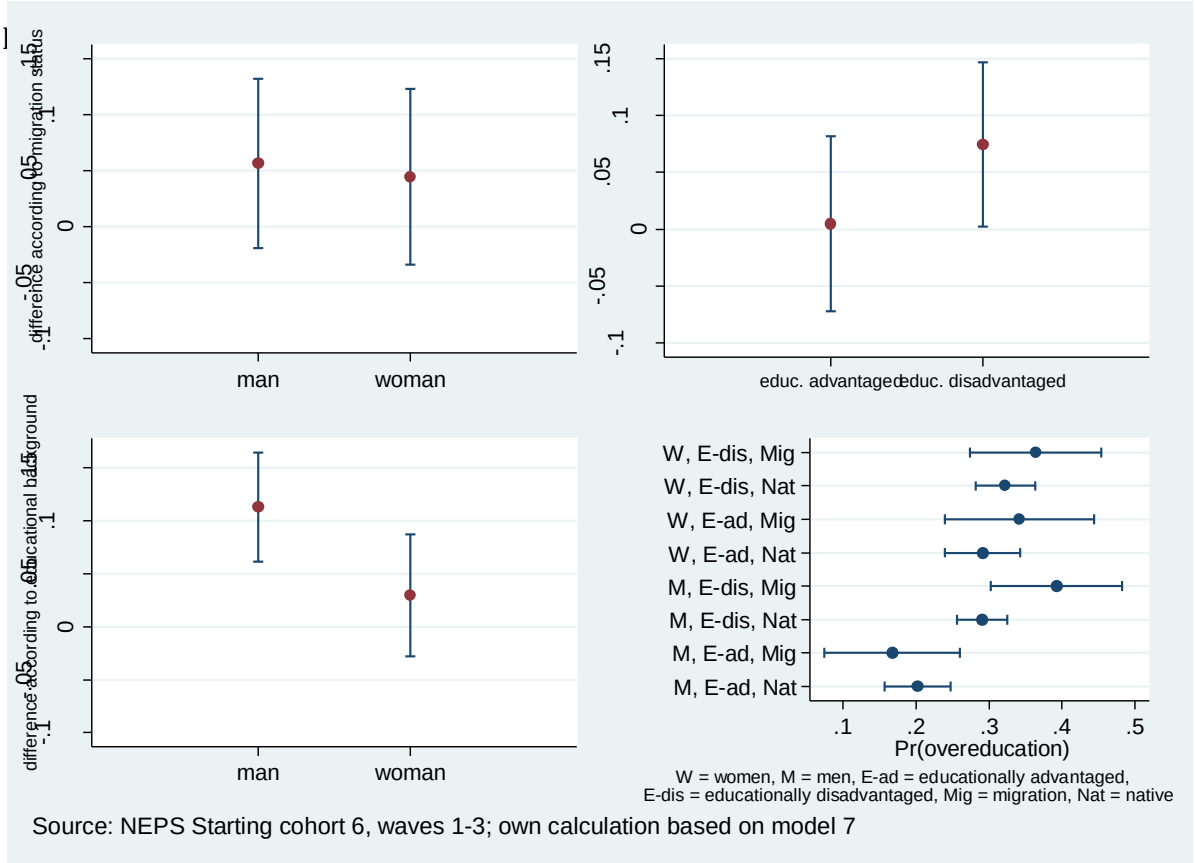
higher predicted risk of being in inadequate employment; however, the risk of men depends more on the educational background than that of women.

Figure 2 shows a graph summary of the individual interaction effects as well as the three-fold interactions of the variables of interest. As stated above, there are no significant differences between female and male migrants (top left), and there is no interaction effect between the migration status and the educational background (top right). The interaction effect (significant at the 5 % level) between the educational background and the gender is shown on the bottom left side. When looking at the graphic representation of the three-fold interaction, it can be seen that migrants with a low-level educational background have the highest risk of being overeducated. This is immediately followed by female migrants with an educationally disadvantaged background. Men with an educationally advantaged background are the most privileged group within the analysed groups; this is independent of whether or not a migration background exists.

Figure 2: Interaction effects of gender, migration status and education background and



Source: NEPS Starting cohort 6, waves 1-3; own calculation based on model 7

Using these results, the assumption of hypothesis 4 can be partially confirmed: Not every combination of characteristics which create a risk when considered individually shows a multiplicative increase of the effects. However, due to this perspective it could be detected that women are significantly more disadvantaged than men, but the latter "suffer" more strongly from an educationally disadvantaged background and benefit more strongly from an educationally advantaged background. It can thus be seen that the risk of inadequate employment interacts with the respective group affiliations, depending on the perspective, and that such differentiated insights would not be possible solely on the basis of the main effects.

6 Summary and discussion

If persons are employed below their acquired qualification level, the accumulated human capital cannot be converted into adequate returns to education. This has consequences for the individuals, but also for the entire society. With the current state of research, we cannot make clear statements regarding social disparities and/or an uneven distribution across different social groups. In order to close this gap, this paper aims at investigating the impact of the three factors gender, migration status and educational background on the risk of being overeducated using the NEPS data (survey among adults). Based on the finding by Dahrendorf (1965; 1966) of a multi-dimensionality of socio-structural disadvantages ("catholic daughter from a working class family from the country"), the mutual interdependencies of the three mentioned inequality factors with regards to the risk of inadequate employment have been investigated in the course of the concept of intersectionality.

Following the theory-based hypotheses, individual effects of gender, migration status and educational background on the risk of inadequate employment can be seen initially: Women have a significantly higher risk of inadequate employment than men. It can therefore be concluded that despite the decrease of gender differences when acquiring education, the professional success and thus the utilisation of the qualifications obtained in the education system is still affected by significant differences between women and men. By means of the analyses performed, however, it cannot be clearly determined what this disadvantage may be attributed do. The gender-specific self-selection could partially be compensated for by the control for the course of study, the scope of employment (part-time vs. full-time employment) and for university or university of applied sciences. However, it can be imagined that the

general "work orientation" affects the labour market behaviour of the persons beyond those factors. If persons are rather career-oriented or if the professional life plays an important role, it can be assumed that the ambitions regarding an adequate position are high. If, however, professional life plays a rather subordinate role as compared to family life, the persons are presumably more prepared to take up inadequate employment if thus children, family and work can be combined than to focus solely on an adequate employment (cf. Hakim 2000). Whether or not there is an indication of gender-specific discrimination, as also mentioned in the theoretical part, cannot be seen from these analyses, though.

Persons with a migration background also have a relatively high risk of inadequate employment. If, however, the analyses are controlled for whether or not the university degree has been obtained in Germany, there is no longer a significant difference between persons with and without a migration background. This indicates that the human capital acquired in the country of origin is not "transferrable" in every case without problems. A formalised process of this is the possibility of having foreign qualifications recognised. For further analyses it seems to be necessary to depict the success or non-success of the recognition. Also language and communication skills, as a kind of acquired human capital, can be devaluated in case of migration. Therefore, an indicator regarding the proficiency in the German language should also be considered in future research work. It is much more difficult to find a suitable indicator for the possible lack of host country-specific capital, e.g. the knowledge about mechanisms of the German labour market.

In the analyses, no significant interaction effect between gender and migration status could be shown. The disadvantage of women increases only additively and not multiplicatively if a migration background exists additionally.

However, steady individual effects of the educational background can be found. If persons have no academically oriented family, this has a negative effect on the risk of inadequate employment. The inter-generational transmission of opportunities thus refers not only to the successes in the education system, but also affects the placement and/or performance on the labour market. Since this study does not include young professionals in their first or max. second employment after their studies, but the average professional experience of the study population is approx. 16 years, a persistent influence of the educational background of the parents and the related cultural and material endowment on the labour market can be assumed. The interacted models show that even if for persons with an educationally disadvantaged background in combination with a migration background the risk of inadequate employment significantly increases, the overall interaction effect between migration status and educational

background is not significant. If the educational background is interacted with the gender, a significant increase of the investigated risk can be seen. When the individual group differences are considered, it becomes apparent that the risk increases additively for women who are educationally disadvantaged, but a multiplicative disadvantage only exists for men.

Taken as a whole it can be concluded that with 23.5 percent (2010/11), overeducation among academics in Germany, on the one hand, is a share that cannot be neglected. On the other hand, there are noticeable social disparities. Depending on the perspective, all three of the factors being in the focus influence the risk of inadequate employment. Men with an educationally disadvantaged background and a migration background have the highest risk; the most privileged group, however, is also men: in cases where there is an educationally oriented family.

Further research needs to be done based on this paper. On the one hand, it has been unclear so far why the educational background of men has a stronger impact on the risk of inadequate employment than that of women. Since the individual labour market experience (adjusted for all career breaks) has already been controlled, inherent role allocations may be possible influencing factors; women become well-established on the labour market, but despite a high-level educational background of the parents, they do not necessarily strive for an adequate employment according to training. The combinability of family and career can be a trigger here. In case of educationally disadvantaged persons it can be argued, on the other hand, that women who have successfully passed the tertiary course of education despite the non-academic education level of the parents are interested in adequate returns to education - in the form of adequate employment. These arguments suggest that the motif of maintaining the status according to Boudon (1974) cannot be assumed for both sexes to the same extent. For this reason, the "work orientation" of the persons should be included in the analyses and checked for gender-specific effects.

Up to now, also differences regarding the countries of origin in case of migrants have not been considered. It can be assumed that persons immigrating to Germany, for example, from the western parts of Europe in order to study or to become established in specialised segments of the labour market have a relatively low risk of inadequate employment. While persons coming to Germany from abroad because of poverty or persecution have difficulties to utilise their education investments in an adequate way even if they have the same formal level of education. Moreover, an individual consideration of the first and second migration generation is substantial in order to gain deep insight.

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The existing inconsistency of the findings in literature, as mentioned in the previous chapters, can above all be attributed to the multiplicity of measurement and operationalisation possibilities. To review the validity of the results, several measurement methods should be compared with each other in future research work. This is particularly challenging with regard to the data basis to be used. Moreover, inadequate employment in the paper at hand refers to an educational mismatch only. Studies show that a formal inadequate employment is not equivalent to skill mismatching (Green/Zhu 2010; Rohrbach-Schmidt/Tiemann 2011; Pellizzari/Fichen 2013; Verhaest/Omey 2010). Therefore, persons can be employed in a formally inadequate way, but at the same time their skills can match the skills required for their job, and vice versa. An empirical differentiation of these mismatch situations should be the starting point for further research work.

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Annex

The operationalisation of inadequate employment relationships is based on the categorisation scheme developed by Büchel and Weißhuhn (1997a) and Büchel (1998) which shows the training adequacy by means of the level of educational requirements for the job, the employment status and the formal qualification level of the persons.

The level of educational requirements for the job is acquired in the NEPS (start cohort 6) by the following question:

What kind of training is generally required for doing this job?

1: no training
2: training as a semi-skilled worker
3: completed vocational training
4: completed technical training
5: master craftsman's certification, technician certification
6: completed university education (university or university of applied sciences)
7: doctorate or habilitation

The categories 4 and 5 as well as 6 and 7, respectively, have been consolidated so that at the end, there are 5 levels of educational requirements for the job for comparison.

The comprehensively inquired *employment status* has been consolidated in the following seven categories: "unskilled/semi-skilled worker", "skilled worker/foreman/master craftsman", "employee with simple activity", "qualified employee", "highly qualified employee" and "civil servant".

The following Table 4 shows the classification scheme with regard to the three mentioned factors. However, there are some minor deviations from the original by Büchel (1998: 189 et seq.). On the one hand, no difference is made between the different levels of overeducation (depending on qualification loss), but only the vertical training adequacy is shown by means of the manifestations "adequate employment" and "inadequate employment". On the other hand, the acquired qualification level is limited to university or university of applied sciences degrees. For classification, persons with implausible value combinations or value combinations from the central determination variables (level of educational requirements for the job, qualification level and employment status) which cannot be clearly categorised have been excluded from the underlying population of employed persons.

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Table 4: Classification scheme with regard to overeducation (qualification level x level of educational requirements for the job x employment status)

Level of educational requirements for the job	**Employment status**	**Classification regarding the employment adequacy** Qualification level acquired:
		University/university of applied sciences
No training required	Unskilled/semi-skilled worker	oe
	Skilled worker/foreman/master craftsman	-
	Employee with simple activity	oe
	Qualified employee	oe
	Highly qualified employee	-
	Civil servant	-
Semi-skilled training required	Unskilled/semi-skilled worker	oe
	Skilled worker/foreman/master craftsman	-
	Employee with simple activity	oe
	Qualified employee	oe
	Highly qualified employee	-
	Civil servant	-
Completed vocational training required	Unskilled/semi-skilled worker	oe
	Skilled worker/foreman/master craftsman	oe
	Employee with simple activity	oe
	Qualified employee	oe
	Highly qualified employee	ad
	Civil servant	oe
Completed technical training or master	Unskilled/semi-skilled worker	-
	Skilled worker/foreman/master	+

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craftsman's certification or technician certification required	craftsman	
	Employee with simple activity	oe
	Qualified employee	oe
	Highly qualified employee	ad
	Civil servant	ad
Completed university education (university or university of applied sciences) required Doctorate/habilitation required	Unskilled/semi-skilled worker	-
	Skilled worker/foreman/master craftsman	-
	Employee with simple activity	-
	Qualified employee	+
	Highly qualified employee	ad
	Civil servant	ad

ad: adequate employment according to training
oe: overeducated
+: adequacy cannot be clearly classified
-: implausible combinations
Source: based on Büchel (1998: 189 et seq.)