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Advanced further training or dual higher education study: a choice experiment on the influence of employers' preferences on career advancement

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Abstract

Although the number of graduates with a bachelor's degree has risen over recent years, little information is available as to which position such persons hold within an establishment and whether they compete on the career ladder with persons from the vocational sector with advanced further training, for example master craftsmen, technicians or certified senior clerks. This article presents the results of a choice experiment in which decision makers at German establishments had to choose between three candidates to fill a vacant project management position. The candidates had completed either advanced further training or a bachelor's programme in dual courses of study (training- or practice-integrated). They further differed in other characteristics, such as the place of training, final mark, occupational experience and specialisation. The results show that the training strategy of the establishments as well as their general experience with bachelor's graduates plays an important role when the chances of career advancement are assessed. Persons with advanced further training certificates are only preferred if the establishments exclusively support advanced training programmes. For all other establishments the qualification path of the candidates does not matter. The results give rise to the supposition that dual higher education studies will represent an attractive alternative for young people as opposed to advanced further training if such dual programmes are expanded and awareness of them increases.

Keywords: Choice experiment, Establishment survey, Higher education, Vignette study, Bachelor's, Advanced further training, Dual study programmes, Germany

JEL Classification: C12, C25, C51, C88, C91, D22, D46, D83, I21, I23, J24

1 Introduction

In Bologna in 1999, Germany agreed with other European countries to create a European Higher Education Area to ensure comparability in the standards and quality of higher-education qualification in Europe. The implementation of the so-called Bologna-Reform, with bachelor's and master's degrees, introduced a new aspect to the German education system, because until then an initial vocational qualification within approximately 3 years' time could only be acquired in the (dual) vocational training system and not within higher education. Furthermore, the newly introduced short-track academic bachelor's programmes are formally considered to impart the same level of competence as advanced further training programmes (such as master craftsman, technician or certified senior clerk) which mark the end of the vocational education path.

Due to this constellation, the fear was expressed that employees trained in the prominent dual system could be substituted by persons with a bachelor's degree (Drexel

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2012) and the attractiveness of the vocational sector in Germany could be jeopardised (e.g. Deissinger 2015). Contrary to the substitution hypotheses, the first empirical studies highlighted the complementary aspects of the vocational and academic study programmes as they focus on different (practical versus theoretical) tasks (Hippach-Schneider et al. 2012; Bahl et al. 2011; Bott and Wünsche 2014). However, at the time the studies were conducted, there was little experience with bachelor's graduates in the labour market, and the conclusions were rather preliminary, especially because a large proportion of bachelor's graduates did not participate in the labour market but continued studying in a master's programme (Briedis et al. 2011). Since then, we can observe a stagnation in the number of apprentices in the vocational sector and in advanced further training in Germany, whereas the amount of persons with bachelor's degrees is continuously increasing (Ertl 2020). At the same time, employer surveys indicate, on the one hand, that persons with a bachelor's degree have a high chance of being given responsibility for a project or even a business unit (Konegen-Grenier et al. 2015; Briedis et al. 2011). On the other hand, there are claims that bachelor's graduates lack competencies due to their younger age and lack of experience and practical knowledge (DIHK 2015; Briedis et al. 2011). These diverse findings thus leave two important questions unanswered. First, it is still not clear whether employers regard bachelor's graduates as substitutes for persons with advanced training degrees, especially if they have to choose between applicants with different qualification types. Second, it is unclear to what degree this decision-making process depends on the knowledge and experience of the decision makers with respect to bachelor's graduates (Briedis et al. 2011).

In this paper, I will address these two questions by introducing a choice experiment in an establishment survey,[1] in which human resources decision makers have to choose between three applicants for a project management position. According to the German Qualification Framework (GQF), the purpose of both bachelor's degrees and advanced training programmes is to deliver competencies "for the planning, processing and evaluation of comprehensive technical tasks and problems." In addition, persons holding such qualifications should be able to "assume responsibility when working within expert teams or demonstrate responsibility in leading groups or organisations".[2] This makes it clear that employees with bachelor's and advanced vocational education and training qualifications may well compete with one another within the company hierarchy to secure senior skilled worker positions or junior or middle management jobs. A project manager position represents the first rung on this career ladder.

Choice experiments are methodologically designed for action and decision theories (Auspurg and Liebe 2011). They are therefore suitable for identifying decision-making behaviour in the recruitment process. It is assumed that the decision-makers make a rational choice (c.f. Lindenberg 1992) and select the applicant, who is most likely to have the skills required for the specified tasks and who incurs the lowest costs for the company, e.g. in terms of training time or wages. From an establishment perspective, it is therefore crucial to identify as many productivity-relevant characteristics of the applicants as possible in the recruitment process. However, in reality, decision-makers can only be boundedly rational utility maximisers because they have only limited knowledge of the market and on the productivity of the applicants. Furthermore, they have to consider the additional costs for obtaining missing information. In these situations of imperfect information, actors (can only) rely on existing knowledge gained in previous situations. Esser (1990, p. 236) argues that this preservation of previously successful "habits" and "frames" can be interpreted as a very rational matter. Due to differences in company experience and knowledge, it is therefore rational for companies to evaluate objectively identical personal attributes or signals of applicants (Spence 1973), such as educational qualifications, differently with regard to the tasks to be performed in the establishment (or the institutional context, see Di Stasio and Van de Werfhorst 2016).

I argue that establishments have heterogeneous knowledge and experience of the rather newly introduced bachelor degrees and that this knowledge and experience influences the choice for applicants with this educational certificate. I differentiate between three ways in which establishments can obtain information about the actual skills and abilities that are certified in a training curriculum. First, they can infer the possible heterogeneity of skills among applicants with the same certificate from the degree of standardisation of the certificate (Damelang et al. 2018). Second, they can engage in the training process. And third, they can infer the skills from persons with an equal or similar degree who already work at the establishment.

The majority of the German workforce is trained in nationally standardised training courses governed by the Vocational Training Act (BBiG) and Crafts and Trades

[1] Establishments are subordinate to the associated company; their primary goal is their own profitability.

[2] The German Qualifications Framework for Lifelong Learning: https://www.dqr.de/content_en/2336.php. Accessed 1 January 2020.

Regulation Code (HwO).[3] Training courses governed by the BBiG/HwO are regulated on the federal state level and therefore comparable across Germany. Damelang et al. (2018) show that a standardisation of an occupation facilitates the matching process because information for both employers and job seekers is enhanced. Advanced further training programmes can only be accessed after a successful apprenticeship according to BBiG/HwO and are also, to some extent, nationally standardised (§ 53 BBiG/§ 42 HwO). But even if responsibility for the advanced training regulation is transferred to the competent bodies (§ 54 BBiG/§ 42 a HwO), advanced training, such as to become a master craftsman, technician or certified senior clerk, has a long tradition and is widely disseminated and known in the German labour market. It can thus be assumed that employers have less transaction costs (Williamson 1975) in assessing the expected productivity of applicants with an advanced further training degree as they should have some confidence in the quality of this educational signal (Breen 2005). Even though, it has to be admitted that one of the aims of the Bologna process was to standardise curricula for different degrees and to gain clarity over different degrees` skills, the degrees` standardisation within Germany is still less than in the vocational sector. This is because the design of the training curricula of bachelor programmes is the responsibility of the universities (of applied science). Furthermore, the rather new educational certificate is less rooted in the German labour market than advanced further training programmes. Without further information on the applicants, the following hypothesis should therefore apply:

H1 Applicants with advanced further training have a higher chance of being recruited for a project management position than persons with a bachelor's degree when recruited from the external labour market.

However, the degree of standardisation is not the only difference between advanced further training programmes and bachelor degrees. Training courses governed by BBiG/HWO impart rather specific skills, whereas academic programmes rather concentrate on generic skills. This is because in the German vocational sector, responsibility for training is shared between establishments and vocational schools, whereas in the academic sector, study programmes are organised by universities (of applied science) and concentrate rather on theoretical than practical knowledge. Without specifying the tasks of a project management position, it should remain unclear for establishments, which skill set of the applicants (specific or generic) is best suited for the position. However, the shared training responsibility in the vocational sector has the advantage that establishments get informed about the productivity of the apprentices during the apprenticeship (Acemoglu and Pischke 1998) and in the following advanced further training. Establishments have usually less screening possibilities of bachelor's students (Neeß 2015). Dual courses of higher education study constitute a distinctive aspect in this context. They enable establishments to engage in the training process of bachelor's degree students (Graf 2016; Ertl 2020). On the one hand, *Practice-integrated programmes of study* merely require students to complete longer practical placements at establishments. These practical phases are credited as academic achievements (Wissenschaftsrat 2013). *Training-integrated programmes of study,* on the other hand, provide a curriculum that combines nationally standardised training courses governed by BBiG/HwO and higher education study.

Similar to advanced further training programmes, students in a dual course of study should acquire specific rather than generic skills. Furthermore, possible information asymmetries are reduced, if the establishment is actually engaged in the training of bachelor's students in a dual course of study. Therefore, no preference for one of the two educational certificates should be apparent.

H2 Establishments, which train bachelor's students in dual courses of study, do not prefer applicants with advanced further training to applicants with bachelor's degrees for a project management position.

The application of "habits" and "frames" in situations of imperfect situations as suggested by Esser (1990) signifies that human resources decision makers rely on knowledge and experiences gained from similar situations in the past. Instead of acquiring information while engaging in the training of students in dual courses of study, decision makers could also base their judgement on workers with bachelor degrees, who already work for the establishment. Furthermore, in case of insecurity this similar qualified "personal contacts" (Granovetter 1995) within the establishment could be asked to gain additional information on the quality of the educational signal.

[3] Federal Statistical Office Germany—GENESIS-Online: Result 12,211–0041 (destatis.de) (Access 19.02.2021.

Table 1 Attributes and attribute values of applicants in RCS-choice-experiment

Attributes	Attribute values		
Type of qualification	Bachelor's degree (training-integrated)	Bachelor's degree (practice-integrated)	Advanced further training (e.g. master craftsmen, technician)
Place of training	Own establishment	External establishment	
Final mark	Very good	Satisfactory	
Occupational experience	None	2 years in an external establishment	2 years in own establishment
Occupational specialisation	Fully corresponds to the task area	Partly corresponds to the task area	

H3 Establishments, which employ persons with bachelor's degrees within their establishment, do not prefer applicants with advanced further training to applicants with bachelor's degrees for a project management position.

2 Methods

To test the hypotheses, I rely on the Reference Company System (RCS) of the German Federal Institute for Vocational Education and Training (BIBB). The RCS comprises an Access Panel, i.e. a stable pool of establishments, which have declared their willingness to be available for BIBB surveys. Around 1350 establishments are surveyed once or twice a year on the latest issues affecting establishment-based vocational education and training (VET). The present investigation represents the fortieth occasion on which the establishments have been surveyed within the framework of the RCS.[4] The establishment survey was conducted in 2017. The questionnaire used a choice experiment to simulate the appointment of a project manager to oversee up to three persons. A choice experiment is a form of vignette experiment. It identifies the preferences of respondents by presenting them with descriptions of objects or persons (vignettes), from which they select their preferred option. The attributes pre-stipulated for the vignettes are randomly varied according to certain characteristics. This experimental design allows a causal interpretation to be made of the effects of the characteristics on the likelihood of selection (Auspurg and Liebe 2011; McFadden et al. 2005).

Given the nature of the access panel, it is important to note that the establishments surveyed are not representative for all German establishments, as they display a high degree of affinity with VET. Although it would be desirable to generalise the effects on all establishments by a random sample, the selectivity of the selected establishments does not mean that causal effects are not actually observed. On the contrary, measurements of the causal inference are never possible in the social sciences without essential assumptions, which must be as well-founded as possible (Legewie 2012). For the specific research question on hand, the high VET-affinity of the establishments might even be an advantage as they are particularly suited to measuring the substitution probability of persons with advanced further training by persons with a bachelor's degree. Being informed about at least one qualification is a basic prerequisite for being able to uncover any competition situations that may arise between persons with different qualifications.

2.1 Specification of candidate attributes

In the case of a hypothetical decision-making situation, as required in a choice experiment, it is important for the measurement of a causal effect that all those factors are listed, which are also relevant to the attitude in an actual decision-making situation (Louviere et al. 2000) and that the experiment is manageable in its complexity. Five to nine attributes are often used as orientation variables (Auspurg and Liebe 2011). Table 1 summarises the attributes and attribute values used. In total there are five attributes—two attributes with three values and three attributes with two values. Their selection is based on the following considerations.

As discussed above, the extent to which establishments are familiar with the skills and abilities, which are learned and certified during a certain programme of training or study is of particular relevance for this paper. I differentiate between the traditional advanced further training (for example, master craftsman, technician) and bachelor's degrees in dual studies—one training-integrated, the other practice-integrated. All three education forms offer the opportunity for establishments to engage in the training process. The applicants can therefore be trained within their own or an external establishment. This differentiation is important, as training within one's own establishment gives greater insights into the actual skills of the applicants.

[4] Further information on the RCS can be accessed on www.bibb.de/de/12471.php (as of: 24.01.2019).

As previous studies on recruitment show that a good final grade can have a positive impact on employers' recruitment preferences (Engel et al. 2009; Hippach-Schneider et al. 2012; Humburg and van der Velden 2015; Neeß 2015; Di Stasio and Van de Werfhorst 2016), the final mark is therefore taken into account as an applicant characteristic in the choice experiment. A clear distinction is made between the certified skills and abilities on the basis of "very good" and "satisfactory" marks. In addition to the certificate or qualification, occupational experience is known as an important indicator when estimating the productivity of applicants (Engel et al. 2009; Humburg and van der Velden 2015; Neeß 2015; European Union 2014; Mergener and Maier 2019; Damelang and Abraham 2016). I distinguish between people who have no work experience after completing their training and people with 2 years of work experience in and outside the establishment. This is because the hiring of an external specialist always entails costs that reflect the opportunity income when an internal specialist fills a higher position. These recruitment costs consist of recruitment and induction costs (Mühlemann and Pfeifer 2016) According to this consideration, internal applicants always have the advantage of lower training costs compared to external applicants, *ceteris paribus*. In a direct survey, it is hardly possible to distinguish between internal and external applicants and internally and externally trained persons, because both correlate with each other. Nevertheless, career paths in which internally trained applicants are interested in a position as external applicants are plausible. In favour of a qualitative differentiation between external and internal work experience, a linear illustration of the occupational years (c.f. Humburg and van der Velden 2015) is omitted. This has the advantage that all applicants can have a similar age.

The suitability of the skills offered to the demanded task appears to be of great importance for university graduates (Humburg and van der Velden 2015; Engel et al. 2009; European Union 2014; Di Stasio and Van de Werfhorst 2016). It is therefore checked whether the occupational specialisation of the applicant "fully corresponds to the task area" or "partly corresponds to the task area". I exclude persons with an inappropriate qualification, since it is a question of filling a content project management position and there would be a fear that persons who are inappropriate would be excluded regardless of the other attribute characteristics.

In addition to the above-mentioned characteristics, which are mainly to be found in the CV or cover letter of the applicants, social and personal skills, or "soft skills", are also important recruitment criteria (Piopiunik et al. 2018). In some cases, they are even considered to be more important than the applicants' specialist knowledge acquired during their studies (Deutscher Akademischer Austauschdienst, Institut der deutschen Wirtschaft (eds.) 2016; DIHK 2015; Piopiunik et al. 2018). Due to the research focus on the facts to be found in the CV, I do not, however, include a variation of soft skills in the applicant vignettes. Instead, in the introductory text of the experiment it is emphasised that the application procedure has been completed and that the interviews have shown that "everyone has convinced us of their personal and social abilities" (see questionnaire in ESM). This formulation has the following two objectives:

The candidate characteristics are chosen so that all candidates would, in principle, be suitable for the job, which is why they were all invited for an interview. As a result, respondents have to make a final decision for one or against all of them. The number of additional applicants is therefore analytically irrelevant. If the hiring process was aimed at an invitation to an interview, it would be implausible if only one person out of three could be selected and not two or three. In addition, the decision can then also depend on how many other candidates have applied.

2.2 Selection of choice sets

Combining all possible combinations of the attributes and attribute values, the set of all possible characteristic combinations consists of $3^2 \times 2^3 = 72$ different applicant types. From these 72 possible applicant types, three applicants are to be compared with each other. This results in $(3^2 \times 2^3)^3 = 373{,}248$ possible choice sets as a full-factorial design. To prevent possible correlations between the selected choice sets and thus be able to estimate effects without loss of efficiency, care should be taken to make a conscious selection when drawing samples from the full factorial design (Steiner and Atzmüller 2006). In addition to the uncorrelatedness of the attributes (orthogonality), an even distribution of the attributes (level-balance), minimal overlapping of the applicant attributes in a choice set (minimal-overlap) and almost equivalent alternatives (utility-balance) should be aimed for (Huber and Zwerina 1996). Since it is not possible to use all four principles at the same time, I choose a procedure that directly maximises D-efficiency (Zwerina et al. 2010). The D-efficiency attaches particular importance to the orthogonality and balance of the selected candidates (Kuhfeld et al. 1994) and can be achieved with the additional macros of the statistics program SAS developed by Kuhfeld (eds.) (2010b). To approximate both properties, first a subgroup is selected from the 373,248 possible pair comparisons and compared with each other. On the basis of an information criterion, the pairs with the applicant

characteristics that are most efficient are selected (Zwerina et al. 2010).

From a content point of view, all main effects as well as the interactions between the "type of qualification" with all other variables and "place of training" x "occupational experience" and "occupational experience" x "occupational specialisation" must be uncorrelated. In the first step, the SAS macro %MktRuns suggests that with half of the 72 possible different candidates, orthogonal and balanced design construction should be possible. The 36 candidates are selected according to the restrictions with regard to the main and interaction effects using the macro %MktEx. The search algorithm combines the modified Fedorov algorithm (Cook and Nachtsheim 1980; Fedorov 1972) and a coordinate-exchange algorithm (Meyer and Nachtsheim 1995). The relative D-efficiency under consideration of these 36 applicants corresponds to 100% in comparison to the full factorial design.

The pre-selected 36 applicants of the fractional factorial design are then divided into choice sets with three alternatives each using the macro %ChoiceEff (modified Fedorov Candidate Set Search Algorithm) in a second step. The candidates are exchanged with each other until the efficiency reaches a local maximum. In the procedure, the main and interaction effects as well as the expected sample size (around 400 establishments) and the expected parameter estimators are taken into account (Kuhfeld 2010a). From the 36 applicants, 36 choice sets with three applicants each can ultimately be generated. The same applicants thus appear three times on average, but always in context with other applicants (no duplicates). Since all respondents are asked to evaluate three choice sets, the 36 most D-efficient choice sets are distributed among 12 different questionnaires after 100 iterations (out of 373,248 possible choice sets). Here, the macro %MktBlock is used, which controls the distribution in such a way that the attribute values of the applicants and the applicant alternatives are uncorrelated from the block structure (Kuhfeld 2010a).

Since vignette experiments are susceptible to sequence effects due to their complexity (Auspurg et al. 2009), the sequence of the three choice sets was rotated within one questionnaire, so that 72 ($=12 \times 3!$) different questionnaires resulted with regard to the choice set constellation. As a further alternative to the three applicants, the establishments were also free to choose "none of these persons" in order not to provoke an unwanted decision (Auspurg and Liebe 2011).

2.3 Analytic strategy

I base my analysis of the choice experiments on the random utility theory (RUT) (Manski 1977) and characteristics theory of value (CTV) (Lancaster 1966). The RUT originates in psychology and was formulated to describe inconsistent human decision-making behaviour with regard to the same stimuli in changing circumstances (Thurstone 1927). From the RUT it follows that the benefit of different alternatives exists as a latent construct in the minds of persons and that a good with its attributes is classified on this continuum. The CTV assumes that only its attributes and not a certain good itself is beneficial. Given this theoretical framework, the latent "utility" of an applicant for an establishment cannot be measured directly, but indirectly through the known attributes, such work experience, qualifications, etc. The choice of an applicant depends on the characteristics of the other, alternative applicants, on the characteristics of the decision maker and on an interaction between the applicant and the decision-maker characteristics. A conditional logit model (McFadden 1973) is therefore suitable for statistical analysis, as it allows the differentiation of the systematic part of the u_{ia} utility component between the characteristics of the applicants a and the decision makers i (establishments):

$$u_{ia} = c_a + X_{ia\beta} + (s_i Z_i)' + \varepsilon_{ia} \quad (1)$$

The alternative-specific matrices X_{ia} vary between applicants (and between establishments). s_i is a vector of establishment-specific characteristics. Accordingly, β represents the alternative-specific and Z establishment-specific regression coefficients. By considering alternative-specific constants c_a, the unobserved utility part ε_{ai} receives the mean value 0. The constants capture the mean benefit effect of all unobserved factors (Train 2009). To identify the coefficients, one alternative must be normalised (e.g. set to 0). The model can then be solved by maximum likelihood estimation.

The alternative specific constant and/or variables are especially suited to seeing whether one choice is significantly chosen over other choices. This is, for example, the case if we want to know why some establishments chose none of the applicants presented. If there is no interest in an alternative itself, the alternative specific constant can also be left out of the equation. In the following, I will therefore first assess why some establishments did not select any of the applicants and then I will concentrate on all choice sets in which one of the applicants was selected.

In the conditional logit, the independent variable is to be interpreted as a kind of utility scale. The absolute values of the regression coefficients, on the other hand, are not very meaningful because the terms for the categorical characteristics in the regression can be set arbitrarily. Instead, the relative differences in the level of utility should be considered for different expressions of the same explanatory characteristic (Train 2009).

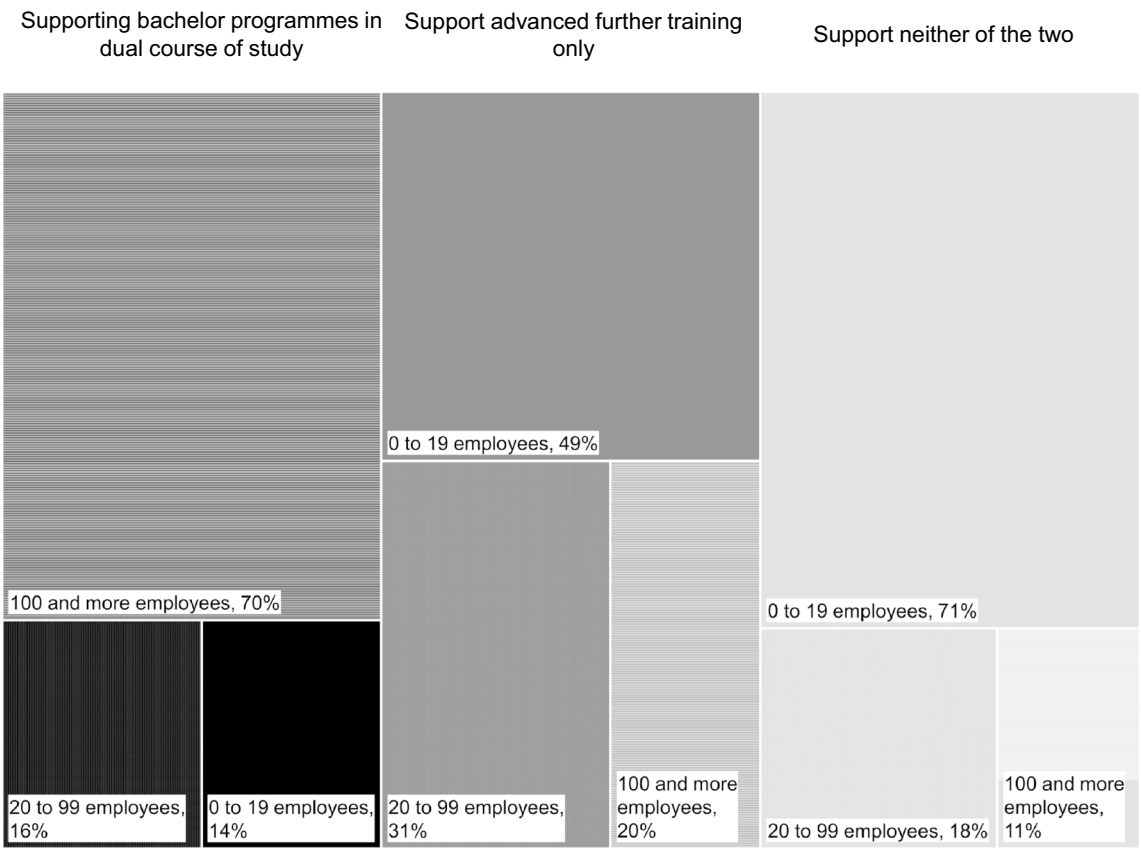

Fig. 1 Establishments by training strategy and size. RCS 40 (2017), N = 265 establishments, establishments with missing values on the displayed variables excluded. Own calculations

However, for easier interpretation, I will calculate the average probability of being chosen, given the different applicants' characteristics.

3 Results

Of around 1350 RCS establishments, a total of 278 establishments took part in the survey, 124 of them by e-mail and 154 by post. This corresponds to a response rate of 20.6% (21.1% for e-mails with three reminders and 20.2% for postal surveys with one reminder). Over half (54%) of the establishments which responded are based in the "producing and processing industries" while around 20% operate in the area of "business-related services". 37% of these establishments have fewer than 20 employees. 42% have more than 100 employees. As Fig. 1 shows, establishments with 100 employees or more are far more likely to provide training via dual higher education study. At the same time, they also show a high willingness to engage in training in general. 94% of the larger establishments which support bachelor's students in dual courses of study also support their employees by paying costs or by allowing time off for advanced further training measures. By way of contrast, a fifth of establishments did not fund either of the training programmes. 71% of those establishments employ less than 20 persons.

A chi-quadrat test shows that the distribution of the twelve different questionnaires with three different choice sets each does not differ systematically between establishments which were asked by e-mail or post. In total, 824 recruitment situations were evaluated. In 41 (5%) of them, the decision maker chose to select none of the applicants. Table 2 in the appendix shows the different odds ratio for the alternative specific conditional choice model (see Eq. 1). The option to not select any of the candidates was mainly taken if the description of the applicants was either too specific or too non-specific. Furthermore, the option was chosen significantly more often if the task area of the applicants was imagined as being in the technical area. However, smaller establishments were more likely to find the description too

specific. As Table 3 in the appendix shows, the descriptions of the applicants were, in general, either too specific or too non-specific. Whether the decision was perceived as easy or difficult did not have any significant influence, and nor did the size of the establishment. The results create the impression that the relevant decision makers were not able to put themselves in the corresponding decision-making position. Therefore, and because of the relatively low selection of the opt-out option, I will exclude these choice sets from the following analysis.

Excluding the opt-out option, the likelihood that one applicant will be chosen should be around 33% on average. Figure 2 shows the average probability of the applicants being selected differentiated by type of qualification, place of training and occupational experience. All three variables have been included with interaction effects in the conditional logit model. As we can see, we observe the highest hiring probability for an internal applicant with advanced further training (45%). Independent of the qualification type, the hiring probability is below the average probability of 33% if the applicants have no further occupational experience. Surprisingly, applicants with a training-integrated bachelor's degree have a lower probability of being selected than applicants with a practice-integrated bachelor's degree. Due to the simultaneous acquisition of a standardised IVET, different probabilities would have been expected in the event that the applicant was internal or the training had taken place in an external establishment. Referring to *H1*, it can therefore be concluded that the hiring probabilities do not differ if the applicants are trained within the establishment and apply from a position within the establishment. However, if either the training was in an external establishment or the applicants apply from an external establishment, the decision makers prefer persons with advanced further training for the project management position.[5]

In the next step, we will look at how the training strategy of the establishments (see Fig. 1) influences the preferences of the decision makers for one particular type of certificate. Due to the smaller sample size, Fig. 3 shows the 90% confidence levels of the average marginal effects on the hiring probability, differentiated by training strategies. What is striking is that the variables included in the model do not really explain the hiring decisions for establishments, which support bachelor's programmes in dual course of studies. Except for the final mark, none of the other applicant characteristics contributes significantly to the explanation as to why the applicant was chosen. Only establishments, which exclusively support advanced further training within their establishment, seem to have clear preferences: they are significantly less inclined to choose persons with bachelor's degrees from the less standardised practice-integrated study programmes for project management positions than persons from advanced further training programmes.[6] Furthermore, they especially value further occupational experience. Establishments which support neither bachelor's nor advanced further training programmes have no significantly different preference for one of the three different qualification types. However, they do significantly prefer internal candidates. Concerning *H2,* it can therefore be concluded that establishments, which train students in dual courses of study (or do not engage in training at all) do not prefer applicants with advanced further training to applicants with bachelor's degrees for a project management position.

To test *H3*, I only consider establishments, which do not engage in the training of bachelor's students in dual courses of study. I differentiate between those, which employ persons with a bachelor's degree within the establishment, and those, which do not. Figure 4 shows that those who have no practical experience with bachelor's graduates show no preference for one of the degrees shown when filling the project management position. For them, the occupational experience gained after the qualification plays a more important role. For establishments that have knowledge about persons with a bachelor's degree, the importance of the occupational experience varies a lot. However, persons with a practice-integrated bachelor's degree have a significantly lower probability of being selected for the project management position.

3.1 Experience with bachelor's graduates

To get more insight as to why this is the case, Fig. 5 presents the answers of direct questions asked right after the experiment, separated by the two groups. It shows that those establishments which employ persons with bachelor's degrees think that bachelor's graduates have higher chances of exclusively exercising theoretical and research-based tasks or analytic and strategic tasks compared to establishments which have no experience with bachelor graduates. Furthermore, they think that bachelor's graduates can also inspect and assure quality to the same extent as master craftsmen, technicians or senior clerks. More surprising is, however, the assessment

[5] A statistically different effect with a likelihood of error of 5% can, however, only be detected if the probabilities differ by 8.5 percentage points or more.

[6] There is no significant difference with confidence levels at 95%.

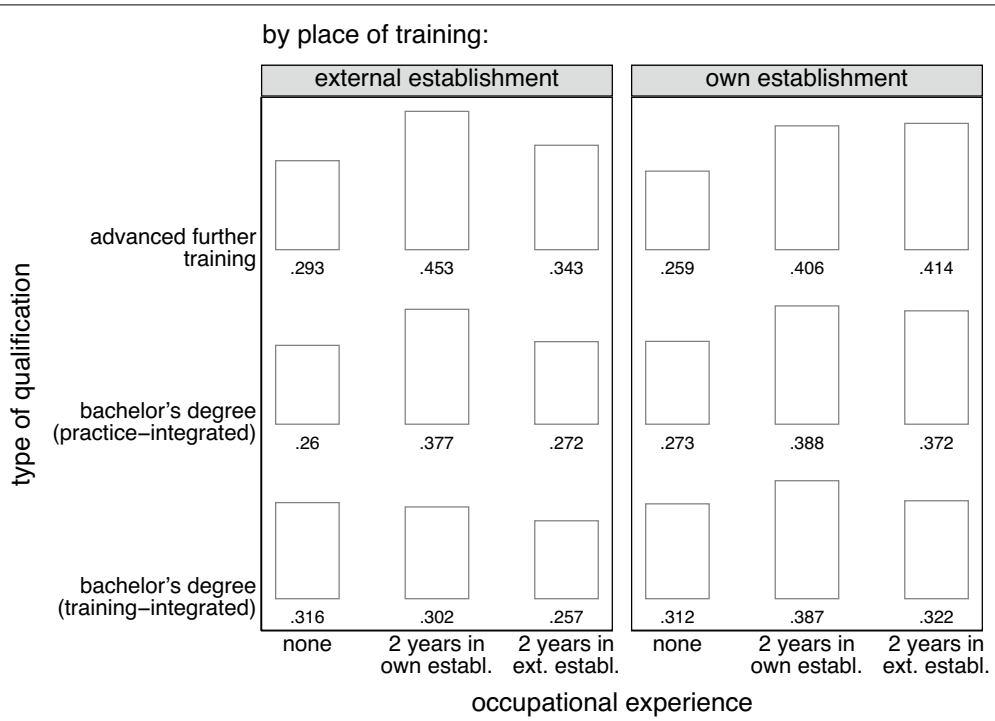

Fig. 2 Effects of applicant characteristics on the hiring probability for a project management position. RCS 40, Pseudo R^2: 0.05, N = 2 262, standard errors adjusted for 264 cluster. The conditional logit model controls for: alternatives, difficulty of the decision, description, task area, training strategy of establishment, position of the choice set, final mark of the applicant, matching occupational specialisation of the applicant and interaction effects between applicant's "qualification" × "experience", "qualification" × "place of training" and "experience" × "place of training". The calculation excludes missing values. Probabilities are statistically different with a 5% likelihood of error if the probabilities differ by 8.5 percentage points or more.

regarding the chance of filling a project management position: 42% of the establishments with bachelor's graduates in the establishment think that bachelor's graduates have a higher chance of filling a project management position, whereas only 17% of the establishments with no bachelor's graduates think the same way. This contradicts the results of the experiment presented in Fig. 4. Either the decision makers made their decision independently of the expected chances for bachelor's graduates or the experiment lacked variables that reflect the apparent advantage of bachelor's graduates.

4 Discussion

The aim of this study was to find out whether establishments see graduates with bachelor's degrees as substitutes for persons with advanced further training. Instead of asking the establishments directly, the novelty of the study design lies in the simulation of an actual hiring situation for a project management position. It was of special interest to see how the actual experience of the establishments with bachelor's students or graduates influences the decision-making behaviour. To detect significant interaction effects and differences between certain groups of establishments, a sample size of around 400 establishments would have been necessary. However, this average sample size of the RCS could not be achieved. Based on the comments to the questionnaire, the main reason for the non-response can be traced to the fact that many of the decision makers surveyed were not able to put themselves in the decision-making situation, not least because bachelor's graduates do not play a role in their establishments. If this increases the probability that the decision makers who responded were able to put themselves into the fictive recruitment situation, this is at least an acceptable reason.

Due to the smaller sample size in the separate models for the training strategy, it was not possible to estimate average marginal effects if the difficulty of the decision, description of applicants, and the task area were controlled for. Therefore, I used seemingly unrelated regressions to test whether the coefficients of the applicants' characteristics differ significantly if controlled for establishment-specific characteristics. This is not the case. The same is the case in the models that control for the

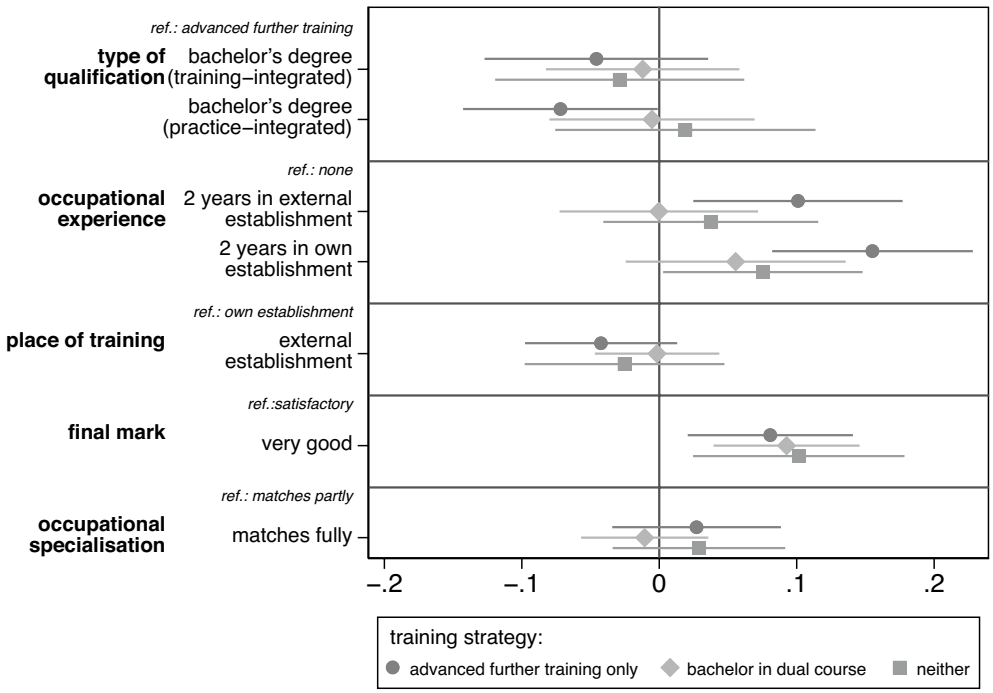

Fig. 3 Average marginal effects of applicant characteristics on the hiring probability for a project management position—differentiated by establishments' training strategy. RCS 40, N "advanced training only": 1098, standard error clustered by 128 establishments, Pseudo $R^2 = 0.03$; N "bachelor in dual course": 735, standard errors clustered by 85 establishments, Pseudo $R^2 = 0.07$; N "neither": 459, standard errors clustered by 55 establishments, Pseudo $R^2 = 0.07$. All three conditional logit regressions control for alternatives and interactions between applicants' "qualification" × "experience", "qualification" × "place of training" and "experience" × "place of training". The calculations exclude missing values. Confidence levels at 90%.

establishments' experience with bachelor's graduates (Fig. 4).

The experiment revealed that the final mark, in particular, appears to be an important selection criterium in the decision-making situation. This is somehow surprising, because one could have expected that in an occupation-segmented labour market as the German one (Müller and Shavit 1998), the occupational match should have a larger impact than the final mark (Di Stasio and van de Werfhorst 2016). Following Di Stasio and van de Werfhorst (2016) this could indicate that the final mark was interpreted as an indicator of a general performance capacity or trainability, which would be consistent with the above assumption that decision makers in establishments, which employ but do not train bachelor's graduates, focus on characteristics that have not been displayed in detail in the experiment. For those decision makers, the final mark showed by far the strongest effect. In a real decision-making situation, such a tendency could, however, be problematic as grades between different types of study programme (IVET and universities of applied science) and even between different institutions within the same type of study programme are not necessarily comparable.

5 Conclusion

The German education system offers two career paths: either people start an apprenticeship training in IVET and build on this with advanced further training, or they study in universities (of applied science) with a bachelor's programme and continue with a master's programme. According to the GQF, both advanced further training and bachelor's degrees qualify participants for the planning, processing and evaluation of comprehensive tasks and problems and leading groups or organisations. The attractiveness of the vocational versus the academic system is therefore decided in recruitment situations in which persons with different qualification paths compete for a vacancy. In this paper, I presented the simulation of such a recruitment situation with a choice experiment. Decision makers in establishments with VET-affinity had to choose between three candidates with different characteristics for a project management position.

To ensure comparability between persons with advanced further training and graduates with bachelor's degrees, the choice experiment focused on a specialty of the academic sector–dual higher education programmes. Students of those programmes spend a substantial amount of time within an establishment during

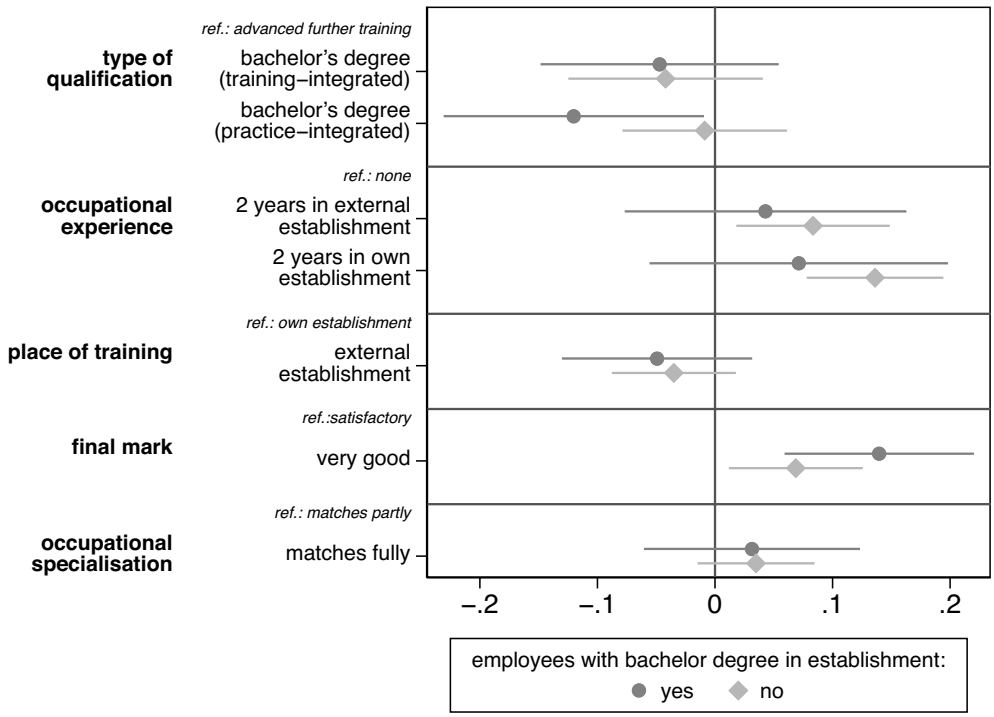

Fig. 4 Average marginal effects of applicant characteristics on the hiring probability for a project management position—differentiated by establishments'. RCS 40, N "employees with bachelor's degree in establishment": 435, standard error clustered by 51 establishments, Pseudo $R^2 = 0.10$; N "no employees with bachelor's degree in establishment": 732, standard errors clustered by 85 establishments, Pseudo $R^2 = 0.07$. Both conditional logit regressions control for alternatives and interactions between applicants'"qualification" × "experience", "qualification" × "place of training" and "experience" × "place of training". Only establishments, which do not train in dual courses of study. The calculations exclude missing values. Confidence levels at 90%.

their studies, which allows them—similar to persons with advanced further training—to apply for vacancies on the internal labour market after completing their studies, while their abilities are also well known by the establishments that train them.

Coming from a rational choice perspective, I assumed that the knowledge and experience of establishments regarding the actual skills of graduates from different qualification paths would play an important role when filling the project management position. Especially in establishments with VET-affinity like the one asked in the survey, advanced further training programmes are more familiar, because they build on the standardised IVET system and have a long tradition. Graduates of training- or practice-integrated bachelor's programmes are rather new on the labour market and they have, as far as practice-integrated studies are concerned, no standardised training curricula.

The results show that applicants from dual higher studies have indeed a lower chance of filling the project management position compared to persons with advanced further training if they apply from an external establishment or if they have been trained externally. The effect can be traced back to the general involvement of the establishments in the training of bachelor's students in dual courses of higher-level study. Only establishments which exclusively support advanced further training are significantly less inclined to choose persons with bachelor's degrees from the less standardised practice-integrated study programmes for project management positions than persons from advanced further training programmes. Establishments which support neither bachelor's nor advanced further training programmes have no significantly different preference for one of the three different qualification types. To the extent that an establishment's training strategy does not explicitly state the aim of funding advanced further training programmes, it is thus revealed that there is mutual competition between the qualifications with regard to career advancement in an establishment—assuming that project responsibility represents the first rung on the career ladder. Establishments which do not train graduates from dual study bachelor's programmes seem to have difficulties in judging their abilities. If they do not employ graduates with bachelor's degrees in general, they seem to mainly rely on occupational experience. If they employ

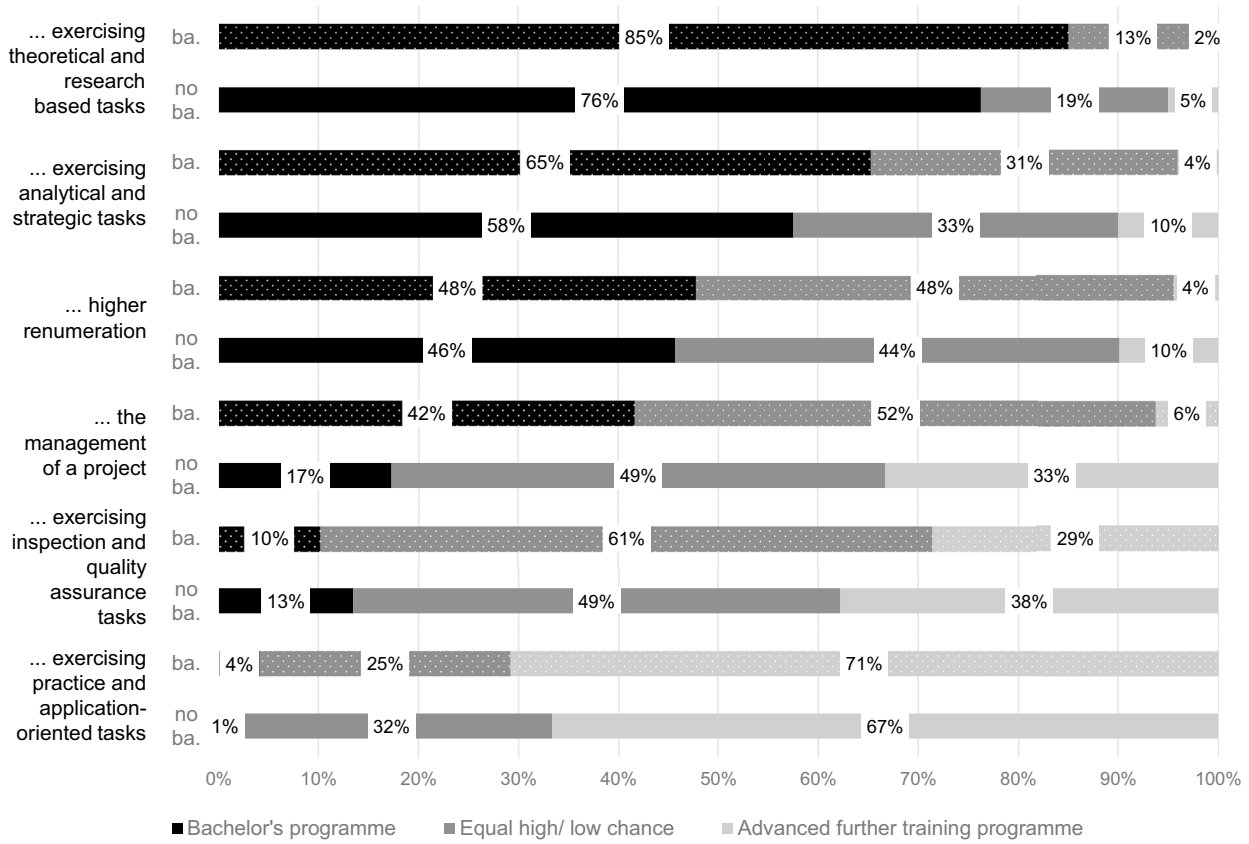

Fig. 5 Evaluation of the establishment representatives of areas of deployment according to qualification—differentiated by establishments' experience with bachelor's graduates. RCS 40, N "employees with bachelor's degree in establishment (ba.)": 80. N "no employees with bachelor's degree in establishment (no ba.)": 47. Only establishments, which do not train in dual courses of study. The calculations exclude missing values. Percentage values rounded to whole numbers.

bachelor's graduates within the establishment, they show a strong focus on the final mark, possibly as proxy for the applicant's productivity.

Given the fact that the chances of advancement are equal at establishments, which have knowledge of the training contents it has to be noted that the duration of training of a bachelor's degree programme (approximately 3 years) is shorter than an IVET apprenticeship followed by advanced further training. This gives rise to the supposition that dual higher education study will represent an attractive alternative for young people as opposed to dual training and subsequent advanced training if such dual programmes are expanded and awareness of them increases. The fact that the surveyed establishments have a high VET-affinity seems to speak more for than against a stronger trend in this direction.

The experimental design further shows that very good final marks exert a significantly positive effect on the likelihood of recruitment compared to the occupational match of the specialisation, regardless of the training strategy of the establishment. This may be interpreted as an indication that a higher degree of significance is accorded to the cognitive ability of applicants as represented by marks than is accorded to specific professional specialisation traditionally imparted during a programme of advanced further training. Further investigation of this would need to take place in which, for example, the match of the occupational specialisation is more precisely defined and researched.

Appendix

See Tables 2 and 3.

Table 2 Utilities of applicant's characteristics for project management position: odds ratios of the alternative-specific conditional choice model

Explaining variables	Odds ratio
Applicant's characteristics (first alternative)	
Qualification of applicant (ref.: advanced training)	
Bachelor's degree (training-integrated)	0.854
Bachelor's degree (practice-integrated)	0.878
Place of training applicant (ref.: own establishment)	
External establishment	0.89
Final mark applicant (ref.: very good)	
Satisfactory	0.653***
Occupational experience applicant (ref.: none)	
2 years in external establishment	1.239 +
2 years in own establishment	1.550***
Occupational specialisation of applicant (ref.: matches partly)	
Matches fully	1.084
Alternatives (ref.: first applicant)	
Second applicant	0.395*
Third applicant	0.785
None of the applicants	0.000***
Interaction effects with other alternatives	
Applicant X severity of the job decision (ref: "partly, partly")	
Second applicant X "easy"	0.633*
Second applicant X "difficult"	0.839
Third applicant X "easy"	0.584*
Third applicant X "difficult"	0.815
None of the applicants X "easy"	0.891
None of the applicants X "difficult"	0.291
Applicant X description of the persons (ref: "sufficient")	
Second applicant X "too specific"	2.002 +
Second applicant X "too non-specific"	1.795
Third applicant X "too specific"	1.001
Third applicant X "too non-specific"	0.91
None of the applicants X "too specific"	872,677.7***
None of the applicants X "too non-specific"	1,259,874.3***
Applicant X task area (ref: technical area)	
Second applicant X commercial area	0.812
Second applicant X technical and commercial area	0.687
Second applicant X other area	0.929
Third applicant X commercial area	0.92
Third applicant X technical and commercial area	1.136
Third applicant X other area	1.37
None of the applicants X commercial area	0.296*
None of the applicants X technical and commercial area	0.472
None of the applicants X other area	0.000***
Applicants X training strategy (ref: bachelor in dual studies)	
Second applicant X advanced further training only	1.585*
Second applicant X neither	1.739*
Third applicant X advanced further training only	1.077
Third applicant X neither	1.152
None of the applicants X advanced further training only	0.844
None of the applicants X neither	2.13

Table 2 (continued)

Explaining variables	Odds ratio
Applicants X no. choice set (ref.: first)	
Second applicant X second choice set	1.305
Second applicant X third choice set	1.39
Third applicant X second choice set	1.169
Third applicant X third choice set	1.349
None of the applicants X second choice set	1.357
None of the applicants X third choice set	1.329
N	3159
AIC	1938.81
LL	− 926.405

RCS 40 (2017). Establishments with missing values on the displayed variables excluded. Own calculations. Standard errors adjusted for 265 clusters (establishments)
+ p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001

Table 3 Establishment size and description of applicants in percent

Description of the applicants	Amount of employees			Total
	0 to 19	20 to 99	100 and more	
Too specific	70.4	56.9	44.6	56.7
Sufficient	6.1	5.2	3.6	4.9
Too non-specific	23.5	37.9	51.8	38.4
Total	100	100	100	100

RCS 40 (2017). N = 268. Establishments with missing values on the displayed variables excluded. Own calculations. Pearson $Chi^2(4) = 17.74$ Pr = 0.001

Abbreviations

BBiG: Vocational training act; BIBB: German Federal Institute for Vocational Education and Training; CTV: Characteristics theory of value; CV: Curriculum vitae; GQF: German Qualification Framework; HwO: Crafts and Trades Regulation Code; IVET: Initial vocational education and training; RCS: Reference Company System; RUT: Random utility theory; VET: Vocational education and training.

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Author contributions

TM drafted the questionnaire and the manuscript and analysed the data. He read an approvedthe final manuscript.

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Availability of data and materials

The datasets used and analysed during the current study are not yet available in the repository of the RCS (http://dx.doi.org/10.7803/277.15.1.2.10). However, they are available from the corresponding author on reasonable request.

Declarations

Competing interests

The author declares no competing interests.

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References

Acemoglu, D., Pischke, J.-S.: Why do firms train? Theory and evidence. Q. J. Econ. **113**(1), 79–119 (1998)
Auspurg, K., Hinz, T., Liebig, S.: Complexity, Learning Effects, and Plausibility of Vignettes. Paper presented at the ASA-Conference 2009
Auspurg, K., Liebe, U.: Choice-Experimente und die Messung von Handlungsentscheidungen in der Soziologie. KZfSS Kölner Zeitschrift Für Soziologie Und Sozialpsychologie **63**(2), 301–314 (2011)
Bahl, A., Dietzen, A., Dorsch-Schweizer, M.: Vielfalt statt Konkurrenz und Verdrängung. Ausdifferenzierung Der Betrieblichen Berufsbildung Als Strategie Zur Fachkräftesicherung Berufsbildung in Wissenschaft Und Praxis **3**, 34–38 (2011)
Bott, P., Wünsche, T.: Verdrängung oder Komplementarität? Rekrutierungsstrategien von Betrieben bei Positionen für gehobene Fachkräfte. In: Severing, E., Weiß, R. (eds.) Weiterentwicklung von Berufen-Herausforderungen für die Berufsbildungsforschung, pp. 229–242. Bertelsmann, Bielefeld (2014)
Breen, R.: Explaining cross-national variation in youth unemployment. Market and institutional factors. Eur. Sociol. Rev. **21**(2), 125–134 (2005)
Briedis, K., Heine, C., Konegen-Grenier, C., Schröder, A.-K.: Mit dem Bachelor in den Beruf. Arbeitsmarktbefähigung und-akzeptanz von Bachelorstudierenden und-absolventen. Stifterverband für die Deutsche Wissenschaft, Essen (2011)
Cook, R.D., Nachtsheim, C.J.: A Comparison of algorithms for constructing exact D-optimal designs. Technometrics **22**(3), 315–324 (1980)
Damelang, A., Abraham, M.: You can take some of IT with you! A vignette study on the acceptance of foreign vocational certificates and ethnic inequality in the German labor market. Z. Soziol. **45**(2), 91–106 (2016)
Damelang, A., Stops, M., Abraham, M.: Occupations as labour market institutions. Occupational regulation and its effects on job matching and occupational closure. Soziale Welt **69**(4), 406–426 (2018)
Deissinger, T.: International education policy: Its influence on the conception of VET and the VET system in Germany. Res. Comp. Int. Educ. **10**(4), 607–621 (2015)
Deutscher Akademischer Austauschdienst, Institut der deutschen Wirtschaft Köln (eds.): Hochschulabsolventen mit Auslandserfahrung auf dem deutschen Arbeitsmarkt. inpuncto:asmuth, Bonn/Köln (2016)
Di Stasio, V., Van de Werfhorst, H.G.: Why does education matter to employers in different institutional contexts? A Vignette study in England and the Netherlands. Soc. Forces **95**(1), 77–106 (2016)
DIHK: Kompetent und praxisnah - Erwartungen der Wirtschaft an Hochschulabsolventen. Ergebnisse einer DIHK-Online-Unternehmensbefragung. DIHK, Berlin (2015)

Drexel, I.: Gesellschaftliche und politische Folgen von Akademisierung. In: Kuda, E.S., Jürgen, Spöttl, Georg und Bernd Kaßebaum (eds.) Akademisierung der Arbeitswelt? Zur Zukunft der beruflichen Bildung, pp. 36–51. Verlag, Hamburg (2012)
Engel, C., Janson, K., Schomburg, H., Teichler, U.: Der berufliche Ertrag der ERASMUS-Mobilität-Die Auswirkungen internationaler Erfahrung auf die Berufswege von ehemals mobilen Studierenden und Lehrenden. Bundesinstitut für Berufsbildung, Berlin (2009)
Ertl, H.: Dual study programmes in Germany: blurring the boundaries between higher education and vocational education? Oxf. Rev. Educ. **46**(1), 79–95 (2020)
Esser, H.: „Habits "„Frames "und „Rational Choice ": Die Reichweite von Theorien der rationalen Wahl (am Beispiel der Erklärung des Befragtenverhaltens). Z. Soziol. **19**(4), 231–247 (1990)
European Union. The ERASMUS Impact Study-Effects of mobility on the skills and employability of students and the internationalisation of higher education institutions, Luxembourg (2014)
Fedorov, V.V.: Theory of optimal experiments. Academic Press, New York/London (1972)
Graf, L.: The rise of work-based academic education in Austria, Germany and Switzerland. J. Voc. Educ. Train. **68**(1), 1–16 (2016)
Granovetter, M.: Getting a Job: A Study of Contacts and Careers (orig 1974), 2nd edn. University of Chicago Press, Chicago (1995)
Hippach-Schneider, U., Weigel, T., Gonon, P.: Are graduates preferred to those completing initial vocational education and training? Case studies on company recruitment strategies in Germany, England and Switzerland. J. Voc. Educ. Train. **65**(1), 1–17 (2012)
Huber, J., Zwerina, K.: The importance of utility balance in efficient choice designs. J. Mark. Res. **33**, 307–317 (1996)
Humburg, M., van der Velden, R.: Skills and the graduate recruitment process: evidence from two discrete choice experiments. Econ. Educ. Rev. **49**, 24–41 (2015)
Konegen-Grenier, C., Placke, B., Schröder-Kralemann, A.K.: Karriereweg für Bachelorabsolventen Ergebnisbericht zur Unternehmensbefragung 2014. Stifterverband für die Deutsche Wissenschaft, Essen (2015)
Kuhfeld, W.F.: The Macros. In: Marketing Research Methods in SAS Experimental Design, Choice, Conjoint, and Graphical Techniques, pp. 803–1211. SAS Institute Inc, Cary NC (2010a)
Kuhfeld, W.F. (ed.): Marketing Research Methods in SAS. Experimental Design, Choice, Conjoint, and Graphical Techniques. SAS Institute Inc., Cary NC (2010b)
Kuhfeld, W.F., Tobias, R.D., Garratt, M.: Efficient experimental design with marketing research applications. J. Mark. Res. **31**(4), 545–557 (1994)
Lancaster, K.J.: A new approach to consumer theory. J Polit Econ **74**, 132–157 (1966)
Legewie, J.: Die Schätzung von kausalen Effekten: Überlegungen zu Methoden der Kausalanalyse anhand von Kontexteffekten in der Schule. Kölner Zeitschrift Für Soziologie Und Sozialpsychologie **64**, 123–153 (2012)
Lindenberg, S.: The Method of Decreasing Abstraction. In: Coleman, J.S., Fararo, T.J. (eds.) Rational Choice Theory, pp. 3–20. SAGE, Newbury Park/London/New Delhi (1992)
Louviere, J.J., Hensher, D.A., Swait, J.: Stated choice methods. Analysis and application. Cambridge University Press, Cambridge (2000)
Manski, C.F.: The structure of random utility models. Theor. Decis. **8**, 229–254 (1977)
McFadden, D.: Conditional logit analysis of qualitative choice behavior. In: Zarembka, P. (ed.) Frontiers in Econometrics, pp. 105–142. Acad. Press., New York (1973)
McFadden, D.L., Bemmaor, A.C., Caro, F.G., Dominitz, J., Jun, B.-H., Lewbel, A., Matzkin, R.L., Molinari, F., Schwarz, N., Willis, R.J., Winter, J.K.: Statistical analysis of choice experiments and surveys. Mark. Lett. **16**(3–4), 1–22 (2005)
Mergener, A., Maier, T.: Immigrants' chances of being hired at times of skill shortages: results from a factorial survey experiment among German employers. Int. Migr. Integr. **20**, 155–177 (2019)
Meyer, R.K., Nachtsheim, C.J.: The coordinate-exchange algorithm for constructing exact optimal experimental designs. Technometrics **37**(1), 60–69 (1995)
Mühlemann, S., Pfeifer, H.: The structure of hiring costs in Germany–Evidence from firm-level data. Ind. Relat. **55**(2), 193–218 (2016)
Müller, W., Shavit, Y.: Bildung und Beruf im institutionellen Kontext Eine vergleichende Studie in 13 Ländern. Zeitschrift für Erziehungswissenschaft **4**(1), 501–533 (1998)
Neeß, C.: Worauf achten Arbeitgeber im Auswahlprozess von Absolventen wirtschaftswissenschaftlicher Studiengänge? Ergebnisse eines Faktoriellen Surveys. J. Labour. Mark. Res. **48**(4), 1–19 (2015)
Piopiunik, M., Schwerdt, G., Simon, L., Woessmann, L.: Skills, Signals, and Employability: An Experimental Investigation In. Centre for Vocational Education Research. Research Discussion Paper 012, London (2018)
Spence, M.: Job market signaling. Q. J. Econ. **87**(3), 355–374 (1973)
Steiner, P., Atzmüller, C.: Experimentelle Vignettendesigns in faktoriellen Surveys. Kölner. Zeitschrift. Für. Soziologie. Und. Sozialpsychologie. **58**(1), 117–146 (2006)
Thurstone, L.L.: A law of comparative judgment. Psychol. Rev. **34**, 273–286 (1927)
Train, K.: Discrete Choice Methods with Simulation. Cambridge University Press, Cambridge (2009)
Williamson, O.E., Wachter, M.L., Harris, J.E.: Understanding the employment relation: the analysis of idiosyncratic exchange. Bell. J. Econ. **6**(1), 250–278 (1975)
Wissenschaftsrat: Empfehlungen zur Entwicklung des dualen Studiums. Positionspapier, Drs. 479-13, Mainz (2013)
Zwerina, K., Huber, J., Kuhfeld, W.F.: A General Method for Constructing Efficient Choice Designs. In: Kuhfeld, W.F. (ed.) Marketing Research Methods in SAS. Experimental Design, Choice, Conjoint, and Graphical Techniques, pp. 265–283, SAS Institute Inc, Cary NC (2010)

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