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Immigrants' Chances of Being Hired at Times of Skill Shortages: Results from a Factorial Survey Experiment Among German Employers

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Abstract Within the context of increasing international labour migration, this article analyses immigrants' chances of being hired in a foreign country by identifying key criteria in employers' recruitment decisions. We focus on the German labour market because the prospering economy and demographic change led to an increase in the number of vacant positions, particularly in medium-skilled occupations. The German government, therefore, facilitated labour market access for foreign skilled workers with the intention of minimising shortages on the labour market by means of evaluating the foreign education investments of individuals. However, employers' perception of the labour market integration of foreign skilled workers has barely been examined. In order to directly consider human resources professionals, we use a factorial survey experiment to simulate different hiring scenarios for applicants from Germany and both European and non-European countries. Our design can distinguish between the effects of external circumstances, such as applicant shortages, and applicant-specific characteristics, including nationality, foreign certificates or language skills. The findings reveal that immigrants experience greater chances of being hired in the German labour market in understaffed occupations and in businesses which expect future skill shortages. Language skills and country-specific work experience also substantially improve immigrants' chances of being hired. However, foreign qualifications are viewed more critically during recruitment processes.

Keywords Labour migration · Recruitment strategies · Rational choice · Selection criteria · Factorial survey

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Introduction

Economic, social or political crises are known to stimulate migration. Such crises cause people to leave their home behind and attempt to integrate into a different society. Since the European economic crisis in 2008, Germany has been perceived as an attractive immigration destination due to its relatively good economic and employment situation (Bertoli et al. 2013). This is important when making decisions regarding immigration because finding employment in the new destination is one of the key factors for successful integration into a foreign society. Thus, to pave the way for integration, it is crucial to identify the key criteria that improve foreigners' chances of being hired. As employment participation is positively correlated with qualifications, skilled immigrants with an attested level of vocation-specific training should experience higher job-finding rates.

Nonetheless, foreigners face problems with labour market integration in Germany, even if they are well trained. In particular, foreign certificates of immigrants have not been or have not been fully recognised (e.g. Bauder 2005; Konietzka and Kreyenfeld 2001), which means higher unemployment rates, lower wages or lower occupational positions for foreign skilled workers than for Germans. Furthermore, the differences remain when immigrants hold a German certificate (Seibert and Solga 2005). The reason for these differences between foreigners and natives, which cannot be explained by education or other human capital characteristics (such as language skills or work experience), is often labelled as 'ethnic penalties' in the labour market (e.g. Heath and Cheung 2006). Ethnic penalties in hiring processes are more likely to occur when employers can be selective, i.e. they can decide from several suitable and mainly native applicants. This imbalance of decision-making power between, in most cases, few employers and many applicants results, especially for foreigners, in the so-called 'monopsonistic discrimination' (Hirsch and Jahn 2015). In such situations, employers often rely on ascriptive characteristics, such as the applicants' nationality or sex. At times of skill shortages in some occupations, many companies receive only a few applications for their vacant positions and, therefore, employers can no longer be very selective in their decision process. They lose more and more decision-making power, which can result in a decreasing influence of ethnic penalties in hiring processes and, consequently, in higher recruitment chances for immigrants in skill shortage situations.

In Germany, current labour market demand often cannot be satisfied through domestic labour supply. Firms experience less labour supply particularly in 'medium-skilled' occupations, where vocational education and training (VET) is required (Attström et al. 2014). One strategy to address these skill shortages is the labour market integration of foreign skilled workers. The German government is therefore actively supporting the integration of foreign skilled workers into these occupations and has recently introduced reforms for this purpose. The Employment Regulation (July 2013), for example, provides access to the German labour market in specially defined shortage occupations for persons who have completed VET.

In looking at Germany, therefore, we are focusing on an attractive country for immigrants, where access to the labour market for foreigners has been facilitated—at least in shortage occupations in the VET sector. However, it is unclear whether, in reality, establishments offer immigrants higher recruitment chances in shortage situations. Thus, it is necessary to investigate how recruitment probabilities change when

filling vacancies in shortage occupations and, additionally, how human resource (HR) decision-makers value different nationalities or human capital variables (such as foreign certificates, language skills, work experience). While other studies could already show that foreign nationalities or certificates influence the chances of being hired (e.g. Damelang and Abraham 2016), the unique contribution of this study is in detecting differences in the hiring of foreign skilled workers in shortage occupations compared to non-shortage occupations in the VET sector.

For this study, we propose a factorial survey design (Rossi 1979) to isolate all the different factors suspected of exerting an influence on successful recruitment. We implemented this experimental design in a Germany-wide online survey addressed to HR managers, who were asked to imagine recruiting for a certain vacancy at VET level in their company. This simulates recruitment processes by systematically varying the different characteristics of a candidate. Our analysis is based on unique survey data with 2883 applicant profiles that have been evaluated in 485 establishments of all sizes and from all sectors in Germany.

In the following section, we consider recruitment decisions in the context of the rational choice theory and derive our hypothesis, taking the observable labour market situation of foreigners in Germany into account.

Theory and Hypotheses

The hiring decision process in companies can be reflected by the rational choice theory. We ascribe rational behaviour to HR professionals. This is defined as achieving a maximisation of benefits by choosing the course of action that best meets a company's own aims (Green and Shapiro 1999). In the case of hiring skilled employees, preference is given to the candidate who has the most suitable qualifications and skills for the given tasks while at the same time causes the company to incur the lowest costs, e.g. in terms of training period. In this regard, the evident problems of immigrants on the German labour market can be linked to a rational choice setting within the hiring process because cultural differences or communication problems can be identified as a risk as regards increasing (transaction) costs (Lazear 1999).

However, the fact that recruitment processes embody social procedures that are not sufficiently depicted by benefit maximisation must be considered. This is because decision-makers do not have all the essential information at their disposal and therefore simplify situations by referring to their own experiences and signals. Consequently, they inevitably arrive at their decision under conditions of uncertainty. This is known as 'bounded rationality' (Simon 1972), meaning that anticipating every single change which may occur and thereby maximising the utility is not possible when the information is limited. Considering that information gathering always leads to high costs, a maintenance of established action patterns and the choice of merely sufficient alternatives ('satisficing') can be considered as a rational selection decision (Esser 1990; Simon 1972). Within this process, signals for productivity (Spence 1973) may also play a role in minimising the costs of the search process. Applicants with poor language skills, foreign certificates or no country-specific work experience may therefore seem less productive than native workers with country-specific human capital.

The Value of Human Capital Variables in Hiring Decisions

Whereas data shows us that immigrants face problems with labour market integration in Germany (e.g. Höhne and Schulze Buschoff 2015; Heath et al. 2008; Kogan 2011), the structure among immigrants is heterogeneous. Compared to immigrants from EU member states, immigrants from third countries in general, and of Turkish origin in particular, encounter the most difficulties with regard to employment opportunity, occupational position or wages (Granato and Kalter 2001; Seibert and Solga 2005). However, even among EU member states, eastern Europeans face more difficulties than those from northern or western Europe (Kogan 2011; Höhne and Schulze Buschoff 2015). One explanation for unsuccessful labour market integration may be an inadequate recognition of foreigners' human capital characteristics that affect their productivity (Friedberg 2000). This means, more specifically, a lack of recognition of their vocational qualifications, labour market experiences and language skills by employers or HR decision-makers.

Germany is known to be a coordinated market economy with a strong link between qualification credentials and occupational status (Bol and Van de Werfhorst 2011). Its national VET system with common quality standards reduces information asymmetries between labour supply and demand and, as a result, employers trust German certificates and credentials when evaluating employees' performances (Allmendinger 1989). Access to employment in an occupation is thus usually linked to a corresponding VET certificate, which excludes persons with credentials that are either not equivalent to those in demand or not considered as trustworthy by the employers. The labour market success of immigrants therefore depends on the usability of the skills acquired in their countries of origin (Friedberg 2000; Borjas 1994). A recent study that started by looking at access to the labour market shows that applicants are most likely to be invited to a job interview if they obtained their vocational certificate in Germany (Damelang and Abraham 2016). In addition, immigrants with a foreign qualification have lower labour market participation rates and fewer working hours on average than persons who hold a German certificate (Höhne and Schulze Buschoff 2015; Brück-Klingberg et al. 2007). There is also evidence that persons completing VET outside Germany experience lower wages, positions and status when controlling for other competencies relevant to the labour market (Konietzka and Kreyenfeld 2001; Weins 2010). This leads to our first hypothesis: *Immigrants with a VET certificate from abroad have lower recruitment chances than applicants with a German VET certificate* (H1).

In addition to the high degree of credibility enjoyed by German VET certificates, the organisational principle of the German VET system, which includes practical placement periods within companies during the apprenticeship, may also play a role. Immigrants with a foreign VET certificate can only learn this specific, practical labour market knowledge through work experience in relevant areas (Borjas 1994). This specific knowledge or country-specific human capital (Kalter 2006) has been proven to be relevant for successful labour market integration in Germany in particular and in many other countries in general. There is, for example, evidence for the labour markets in Denmark (Husted et al. 2001) and the USA (Chiswick 1978) showing that differences between immigrants and natives could be offset by duration of stay and work

experience. Hence, the second hypothesis is: *Work experience in Germany increases recruitment chances* (H2).

Even if foreign skilled workers are experienced, lower levels of labour market integration can be explained by a lack of applicability of human capital based on the effect of linguistic (in)competencies (McManus et al. 1983). There is already evidence that German language proficiency improves immigrants' employment chances (Kalter 2006). This is especially important at the intermediate qualification level where German is the primary (spoken) language. Language barriers automatically influence individuals' productivity because existing knowledge and competencies cannot be adequately realised. In addition, team communication within the organisation is fraught with difficulty. For this reason, it is assumed that: *An absence of German language skills reduces the recruitment chances of foreign applicants* (H3a).

It can, however, be expected that workplace characteristics will influence the required language skills. Presumably, there will be a difference between workers who work in silence and those who have to speak to colleagues or customers. Therefore, we assume that: *Foreign applicants without fluent German skills have higher recruitment chances if less knowledge of the German language is expected of the applicants* (H3b).

Or Do Nationality Effects Persist?

Furthermore, there is some evidence that employers associate certain negative characteristics with (predominantly male) foreigners (Diehl et al. 2009). There are differences between Germans and immigrants on the labour market in circumstances where immigrants have obtained their VET certificate in Germany. Seibert and Solga (2005), for example, argue that this discrimination refers to an 'ethnic' signal value of German VET certificates. This is especially relevant to persons of Turkish or non-Western origin completing VET, who receive fewer job opportunities. Significantly lower hiring probabilities for non-Western immigrant applicants have already been detected for the Norwegian labour market (Horverak et al. 2013). Some field experiments based on correspondence tests concerning recruitment decisions in German firms show discrimination effects in the form of lower callback rates for applicants with Turkish names, even given equal characteristics and qualifications compared to applicants with German-sounding names (Kaas and Manger 2012). Similar results have been shown for the Swedish labour market (Agerström et al. 2012), for the Netherlands (Andriessen et al. 2012), for Belgium (Baert et al. 2013) and for England (Wood et al. 2009). These differences between foreigners and natives cannot be explained by applicants' human capital characteristics and therefore seem to be ethnic penalties of the employers (e.g. Heath and Cheung 2006). In addition to ethnic penalties, legal differences between EU and non-EU countries must be considered when analysing nationality effects on foreigners' chances of being hired. In contrast to non-EU citizens, EU citizens have the right to reside and to engage in economic activity in every other EU country at a level equal to that of the nationals of that member state (Act on the General Freedom of Movement for EU Citizens). For non-EU nationals, it is much more difficult to obtain a residence permit. This leads us to the hypothesis: *Foreign nationalities have a negative effect on recruitment chances, whereby the chances for non-EU nationals are lower than for EU nationals* (H4).

Effects of Skill Shortage Situations on Immigrants' Chances of Being Hired

In addition to apparent signals of productivity or low transaction costs, boundary conditions also need to be included within the decision-making process. The ethnic penalties on the German labour market described above indicate that foreign applicants are disadvantaged compared to German candidates. However, HR decision-makers must be able to afford these ethnic penalties. Referring to the theory of monopsonistic discrimination (Manning 2003; Hirsch 2010), a large number of applicants face only a few employers. Employers possess monopsony power, more so over immigrants than over natives (Hirsch and Jahn 2015), and can therefore be extremely selective in their decision processes. In such a situation, they have the choice and could apply ethnic penalties.[1] However, in some cases, many companies receive only a few applications for their vacant positions are therefore unable to be this selective in their decision process. So far, skill shortages in Germany are proving challenging in specific regions and particularly in medium-skilled occupations where vocational training is required, for example in technical or care professions (Attström et al. 2014). In these shortage situations, it is reasonable to assume that employers are losing their monopsony power and cannot be so selective any more in terms of ethnic penalties. In the Belgium labour market, for example, discrimination effects in hiring have been shown to disappear if employers have difficulties in filling a vacancy (Baert et al. 2013).

In Germany, immigration reforms have recently also been introduced to support the integration of foreign skilled workers into shortage occupations. Since 2012, the *EU Blue Card Regulation* facilitates the immigration and employment of highly skilled immigrants from non-EU countries into shortage occupations. Since 2013, the *New Employment Regulation* provides access to the German labour market in specially defined shortage occupations for persons who have completed VET. These shortage occupations are selected and regularly updated based on the Federal Employment Agency's skilled worker bottleneck analysis and are included in the so-called white list.[2]

With regard to the assumption of employers losing more and more of their monopsony power and political reactions to the shortages, the following hypothesis is derived: *Foreign workers have higher chances of being recruited to vacancies with less labour supply* (H5).

To test the different hypotheses, we use self-collected data including a factorial survey which has been explicitly prepared, in terms of rational choice theory, to reveal causal correlations of individual decision-making behaviour (Rossi 1979; Jasso 2006).

Method and Data

Current German employer surveys do not include relevant variables for testing our hypotheses for several reasons. One of the major reasons is that, while some

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[1] Studies have already recorded a native-immigrant wage discrimination in such monopsonistic situations (Hirsch 2010; Hirsch and Jahn 2015).
[2] See white list of the Federal Employment Agency, https://www3.arbeitsagentur. de/web/wcm/idc/groups/public/documents/webdatei/mdaw/mta4/~edisp/L6019022DSTBAI777367.pdf [last downloaded 6 December 2017].

information about the real numbers of foreign employees in companies by sectors and occupations does exist, this data only describes successful hiring. In this study, attributes which are formative factors within the recruitment process and which are responsible for positive or negative hiring decisions are of specific interest. In recruitment situations, more than one factor influences willingness to hire a skilled worker from abroad. A separate query by single-item questions is not constructive in such a case as different factors need to be evaluated comprehensively.

This study relies on self-collected data using a quasi-experimental method of data collection: a factorial survey (or vignette study) conducted via an online investigation. In a factorial survey, respondents are asked to evaluate fictional situations or persons with systematically varying attributes (Auspurg and Hinz 2015; Rossi 1979), in our case a hiring situation with different applicant profiles. Factorial surveys are being increasingly deployed to study employers' behaviour and recruitment decisions (Karpinska et al. 2013; Damelang and Abraham 2016; Di Stasio and Gërxhani 2015). As this method seems to be less sensitive to social desirability bias than conventional survey items (Wallander 2009; Auspurg and Hinz 2015), factorial surveys are particularly suited for measuring delicate and sensitive topics, which are also difficult to discuss openly in public situations (Beyer and Liebe 2015).

Implementation of Survey

As an experimental design was selected, it had to be ensured that respondents were presented with a realistic hiring situation. For this reason, this study was performed as a follow-up to a German employer survey (BIBB Recognition Monitoring). The BIBB Recognition Monitoring (BMBF 2015) was conducted via computer-assisted telephone interviews (CATI) on the basis of a representative random sample of businesses. As the last question of this questionnaire, we asked respondents if they would participate in a second study. Two thousand one hundred thirty HR professionals agreed to do so and were therefore invited to participate in the factorial survey (using computer-assisted web interviews, CAWI). Based on previous information from the BIBB Recognition Monitoring, it was possible to tailor the factorial survey to VET occupations that are performed within the enterprise. The analysis sample includes 485 HR managers who took part in the factorial survey and answered the additional questions during the online survey (22.8% of contacted HR professionals).

Factorial Survey

In our CAWI survey, we asked HR professionals to assess a number of different hypothetical recruitment scenarios (vignettes) with systematically varying application situations and applicant characteristics (dimensions), as well as their respective values (levels). Although a hiring process involves several complex decisions, it could be assumed that the final decision could be reduced to a few variant applicant-specific factors that are mutually dependent and therefore hard to separate in reality. Under the conditions of an experimental approach, all dimensions and levels were combined with one another, and the variables given in the scenarios were randomly varied in order to disentangle the effects of each variable (Auspurg and Hinz 2015). This uncorrelated or orthogonal design allows the estimation of causalities that are not given in a common

survey (Wallander 2009). Additionally, the factorial survey enables a combination of vignette answers and person-specific characteristics at the respondents' level, which is why an investigation of theoretically interesting cross-level interactions (e.g. hypothesis 3b) is also possible.

The aim of the experiment was to find out which applicant characteristics increased the chance of being hired for a job that usually requires a VET certificate (intermediate skill level). The HR professionals, therefore, were explicitly not asked about the probability of invitation to a job interview, because this is less meaningful than the recruitment chances. The barrier to inviting an applicant for interview is far lower than giving her or him the job. Additionally, some firms have quotas for inviting applicants. By asking only for the chances of invitations, we would miss the information concerning the decision after the invitation. Therefore, we chose a seven-point rating scale from 'very low chance' to 'very high chance' to evaluate the subjective chance of the applicant filling a vacant position. In the vignettes, seven different dimensions were varied[3]—firstly, the number of applications for the vacancy and, secondly, six different characteristics of the candidates. Table 3 (see Appendix 1) shows all dimensions and levels of the vignette study.[4]

The dimension *number of applicants* simulated staffing problems. This involved analysing the effect of a small number of applications on the recruitment chance of foreigners compared to the situation in which HR professionals are able to choose from a large number of different candidates. Here, we waived the use of presenting an explicit number of candidates because each company can perceive a different number of applications as a shortage or surplus, depending on the number of applications normally received. The level average number was included in this dimension as a reference category.

To separate the influence of a foreign VET certificate from an effect based on applicants' nationality, we differentiated both. We distinguished between five different countries of *nationalities* and certificates. These were German as reference category,[5] Poland and Spain as two member states of the European Union (EU) and Egypt and Turkey as two non-member states. The selection was made due, in particular, to legal differences. Foreigners could achieve their *qualification* in their country of origin or in Germany. As there were four different foreign nationalities, there were also four foreign VET certificates. In contrast, Germans could only obtain their certificate in Germany. In addition, Turks and Poles are among the most important foreign groups in Germany. Due to increasing immigrant numbers over recent years, Egyptians have been chosen as immigrants from a third country nation with a particular interest in occupations at the VET level, in comparison to Indians, Americans or Chinese, who mainly concentrate on academic professions on the German labour market (OECD 2013). Spain has been

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[3] In order to avoid inconsistent responses, it is recommended that no more than seven dimensions (plus/minus 2) are chosen (Auspurg and Jäckle 2015).
[4] To evaluate whether the introduced dimensions are interpreted in the study as intentional, we also asked some follow-up questions for the purpose of an internal validity check.
[5] The level of German has been doubled to ensure a more realistic application situation in which recruiters could compare foreign applicants with a sufficient number of German candidates. According to Frodermann et al. (2013), we included two levels labelled with German in the dimension *nationality* and summarised this in our analysis to ensure uncorrelated and balanced levels.

selected as an EU member state which was also directly affected by the financial and economic crisis in 2008 (Roubini and Mihm 2011).

To measure the impact of *occupation-specific work experience* on the German labour market, a distinction was made between applicants working for 1 or 5 years in a job that matches their professional qualification and compared them to those who have no work experience in Germany. To study the relevance of *German language skills*, we distinguished between foreign applicants with and without fluent German skills. All German applicants speak fluent German. Depending on specific occupations and companies, English might also be common as an internal language of communication (Manchen Spörri and Hohenstein 2012). We therefore included the dimension of English language skills, varying foreigners and Germans both with and without fluent business English skills. Finally, *sex* was included as a further control dimension.

The vignette universe, the total number of all possible vignettes, results from the Cartesian product of all dimension levels and thus implies 864 different application situations (3*6*2*3*2*2*2). From this vignette universe, we were able to draw an efficient sample of 240 vignettes and divided these into 40 sets of 6 vignettes.[6] In order to avoid confounding the deck effects and participants' characteristics, all 40 sets were randomly assigned to respondents, meaning that multiple respondents rated each set. The vignette order within the sets was also varied randomly to prevent order effects (Auspurg and Jäckle 2015). Figure 1 shows a vignette example presenting a Spanish candidate with a foreign qualification.

Finally, we keep *applicants' age*, *work experience outside of Germany* and the *occupational position* constant in our experimental study. The age of the applicants is restricted to between 25 and 30 years, the major age group of immigrants in Germany (Geis 2012). Foreign applicants who have no work experience outside the German labour market are comparable to German applicants, who are also without work experience abroad. To ensure candidates' comparability, only present vacancies without management responsibilities that can be filled by both young professionals and persons with little work experience were presented.

After the factorial survey, respondents were asked additional questions, including items to test the internal validity of the vignettes, some direct questions about the expectations of HR managers in recruitment processes and about some firms' and respondents' characteristics.

Data Collection and Sample Characteristics

The study was conducted between April and June 2015. The sampling frame was limited to 2130 HR managers who agreed to participate in this factorial survey as part of the BIBB Recognition Monitoring. Four hundred eighty-five HR managers took part in the online vignette experiment and answered the additional questions during the online survey. Table 1 summarises respondents' and firms' characteristics. Respondents are predominantly male and between 45 and 54 years old (mean age is 49 years). Most

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[6] Our fractional experimental design reached a *D*-efficiency of 99.95 (out of 100, which indicates a completely orthogonal design with equal frequencies of all levels (Kuhfeld 1997)). The *D*-efficient design was generated under the assumption of interactions between VET certificate and German language skills and between work experience in Germany and German language skills.

You will only receive a small number of applications for your advertised nurse position. Among these applications, there is a Spanish candidate who obtained her qualifying degree as a nurse in Spain. After that, she worked for one year in this profession in Germany. She speaks German fluently but has no fluent business English skills.

In your opinion: What chance does this applicant have of filling the vacancy?

Very low   Very high
chance   chance

☐   ☐   ☐   ☐   ☐   ☐   ☐

Fig. 1 Example of a vignette

of them work in the HR department. Our sample includes both firms in service and in production industry. The majority of firms in the sample employ 50 to 249 employees. Almost one third of firms employ persons with foreign VET certificates. As well as summarising sample characteristics, columns two and three of Table 1 compare the distribution of firms which participated and which were invited to participate. Small firms with fewer than 10 employees were less likely to accept the invitation, whereas employers with 50 to 249 employees were somewhat more likely to participate.

Each respondent was requested to evaluate six different applicants, meaning that our vignette sample includes 2883 applicant evaluations.[7] On average, each vignette was answered 12 times, so that the overall statistical power should be ensured (Auspurg and Hinz 2015). Because of our sampling procedure, vignette dimensions are almost equally distributed in terms of levels, with the exception of German nationality, German language skills and German certificates (see Table 4, Appendix 1). Except for these three correlations, the correlation table of the vignette dimensions shows no other high correlations (see Table 5, Appendix 1). This means that the experimental design allows high level of precision in the estimation of the vignette effects.

We were able to obtain additional information at the firms' level by asking questions after the vignette experiments. This is relevant for our further analysis. In 33% of firms, immigrants with foreign VET certificates are employed. Expectations vis-à-vis employees' German language skills (query according to the Common European Framework of References for Languages) are quite high. Forty-six per cent of the firms require proficient German skills, meaning that the employee is easily able to understand virtually everything heard or read. Another 42% expect independent German language skills. In this category, persons are able to understand the main points of clear standard input on familiar matters regularly encountered in work. For 12% of firms, basic German skills are sufficient. This means that the employee can understand sentences and common expressions relating to areas of most immediate relevance. In our sample, 62% of the firms expect future recruitment difficulties due to applicant shortages.

In order to gain insights into skill shortages at occupational level, we match the occupational position presented in the vignettes, measured at the three-digit-code of the German National Classification of Occupations 2010 (occupational group),[8] with the white list of the Federal Employment Agency. The white list includes shortage

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[7] Some HR managers did not answer all of the six vignettes presented.
[8] See the German National Classification of Occupations 2010, https://statistik.arbeitsagentur.de/Navigation/Statistik/Grundlagen/Klassifikation-der-Berufe/KldB2010/Arbeitshilfen/EnglischeKldB2010/KldBEnglischl-Nav.html [last downloaded 15 December 2017].

Table 1 Respondents and firms' characteristics

Respondents	Participated in the survey ($n = 485$)	Firms	Participated in the survey ($n = 485$)	Invited to participate ($n = 2130$)
	%		%	%
Sex		Sector		
Male	76.97	Production industry	26.71	23.58
Female	23.03	Service industry	73.29	76.42
Age		Firm size		
< 35	8.12	1 to 9 employees	18.97	28.08
35 to 44	19.14	10 to 49 employees	31.63	33.05
45 to 54	40.19	50 to 249 employees	32.85	25.87
> 54	32.55	> 249 employees	16.55	13.00
Working in HR department		Employees with foreign VET		
Yes	86.96	Yes	32.64	38.69
No	13.04	No	67.36	61.31

occupations at qualification level for skilled workers resulting from nationwide bottle-necks. Shortage occupations are coded as 1 and all others as 0.

Estimation Method

The several hiring chances for different applicants were estimated based on the seven vignette dimensions and other relevant firm characteristics. As each respondent evaluated a set of vignettes, there is dependence between the decisions of one respondent. This results in a hierarchical data structure with vignettes at level 1 and respondents at level 2. To account for the dependence of error terms within respondents, multilevel-models (random intercept regressions) are preferred and allow for estimating effects of respondent or firm characteristics in addition to vignette effects (Auspurg and Hinz 2015; Hox et al. 1991).

We analyse three different random intercept models, all controlled for firm size, regions (16 federal states), shortage occupation (white list), for firm's expected hiring problems in the future, and firms' experiences with employees with foreign VET certificates (presented in Table 2). Model I concentrates on effects of vignette dimensions concerning *all applicants*. Models II and III consider only *foreign applicants*, model III also includes a cross-level interaction of applicants' language skills and firms' expected language skills.

Table 2 Random intercept models predicting recruitment chance of applicants

Predictors	Model I		Model II		Model III	
Vignette dimensions						
Number of applicants (ref. average number)						
Small number	0.096	(0.055)	0.107	(0.069)	0.117	(0.068)
Large number	−0.108*	(0.055)	−0.185-**	(0.070)	−0.187-**	(0.069)
Nationality (ref. German)						
Polish	−0.036	(0.092)	–	–	–	–
Spanish	0.023	(0.092)	–	–	–	–
Egyptian	−0.199*	(0.091)	–	–	–	–
Turkish	−0.209*	(0.091)	–	–	–	–
VET certificate (ref. German)						
Poland	−0.415-***	(0.117)	−0.327-***	(0.092)	−0.328-***	(0.091)
Spain	−0.452-***	(0.116)	−0.320-***	(0.090)	−0.304-***	(0.090)
Egypt	−0.630-***	(0.117)	−0.732-***	(0.091)	−0.740-***	(0.091)
Turkey	−0.391-***	(0.116)	−0.499-***	(0.091)	−0.488-***	(0.090)
German language skills (ref. fluent)	−1.597-***	(0.055)	−1.595-***	(0.057)	−1.877-***	(0.082)
English language skills (ref. fluent)	−0.423-***	(0.045)	−0.340-***	(0.058)	−0.358-***	(0.057)
Work experience in Germany (ref. no experience)						
1 year	0.916***	(0.054)	0.822***	(0.069)	0.818***	(0.068)
5 years	1.528***	(0.055)	1.406***	(0.070)	1.401***	(0.070)
Sex female (ref. male)	−0.101*	(0.045)	−0.059	(0.059)	−0.058	(0.058)
Cross-level interaction						
Expected basic Germ. language skills (ref. proficient) ## vig: no fluent Germ. language skills (ref. fluent)	–	–	–	–	0.707***	(0.182)
Expected independent Germ. language skills (ref. proficient) ## vig: no fluent Germ. language skills (ref. fluent)	–	–	–	–	0.469***	(0.119)
Main-effects of expected German skills						
Expected basic German skills (ref. proficient)	–	–	–	–	0.167	(0.179)
Expected independent German skills (ref. proficient)	–	–	–	–	0.221	(0.116)

Table 2 (continued)

Predictors	Model I		Model II		Model III	
Further influencing variables						
Occupation is on white list	0.266**	(0.097)	0.314**	(0.111)	0.318**	(0.109)
Firm expects recruitment problems in future (ref. no)	0.266**	(0.086)	0.240**	(0.099)	0.222*	(0.097)
Firm employs foreigners with foreign VET certificate (ref. no)	0.225**	(0.092)	0.259**	(0.105)	0.160	(0.105)
Firm size (ref. < 10 employees)						
10 to 49 employees	0.066	(0.120)	0.213	(0.138)	0.235	(0.136)
50 to 249 employees	0.027	(0.122)	0.126	(0.140)	0.121	(0.137)
> 249 employees	0.137	(0.141)	0.303	(0.162)	0.314	(0.159)
Constant	4.300***	(0.150)	4.035***	(0.176)	4.008***	(0.279)
$N_{vignettes}$	2883		1921		1921	
N_{groups}	485		485		485	
Random effect parameters						
R^2 within	0.497		0.473		0.481	
R^2 between	0.138		0.189		0.230	
R^2 overall	0.397		0.363		0.384	
Rho	0.282		0.324		0.316	

Coefficients from random intercept models; robust standard errors in parentheses; models control for federal states of Germany. Dependent variable: applicants' chance of filling the vacancy, scale ranges from 1 ("very low chance") to 7 ("very high chance"). Significance: $p < 0.001$ (***); $p < 0.01$(**); $p < 0.05$ (*)

Results

Each analysis refers to the employers' evaluation of job applicants' hiring chances on the rating scale. Figure 2 (see Appendix 1) shows the distribution of the dependent variable which is slightly skewed to the left. Table 4 (see Appendix 1) summarises descriptive statistics of all vignette and firm variables used in the multivariate analysis. Table 2 reports the results of random intercept models.

Coefficients of the random intercept models must be interpreted as deviations from the constant by changing a particular attribute level. In model I, the constant refers to the average hiring chance for a non-shortage occupation of a German male applicant, who obtained his qualifying degree in Germany and speaks both German and business English fluently, and has no work experience in Germany, in a small firm in the federal state of Bavaria. In this case, the firm expects no future recruitment problems and employs no workers with foreign VET certificates. The recruitment chance is 4.3, slightly above the expected average of 3.5.

Regarding the influence of VET certificates, foreign qualifications from all the chosen countries have a highly significant negative effect on the recruitment chance in all models compared to German qualifications. This difference is particularly pronounced among Egyptian certificates. VET qualifications from Poland, Spain and Turkey are similarly valued, which supports the first hypothesis.

Alongside the vocational qualification, employers rely on work experience in Germany. The hiring chance of applicants who work for 1 year in the German labour market increases by 0.9 points on the rating scale for German and foreign applicants (see model I) and by 0.8 points if only foreigners are considered (see model II). Even 5 years' work experience has an effect of 1.5 respectively 1.4 for foreigners only. This is true for all applicants, Germans and foreigners and supports hypothesis 2.

We find that German language skills have the strongest effect on recruitment chances. If the foreign applicant does not speak German fluently, his recruitment chance decreases significantly. This confirms that, as expected, a lack of German language skills reduces the recruitment chances of foreigners (hypothesis 3a). However, applicants' English skills are also important for HR managers during hiring decision processes for jobs at a VET level.

To test hypothesis 3b, we estimate interaction effects of applicants' German skills and firms' expected German skills (see model III). These interactions show statistically significant positive effects. This means that if proficient German language skills are expected, the recruitment chance for foreign applicants without fluent German skills reduces by -1.8 points. If independent German skills are expected in firms, the chance reduces by -1.4 (calculated as product of main effect and interaction with $-1.877 + 0.449$). If only basic skills are necessary in the firm, the effect for non-fluent speaking applicants is only -1.1 $(= -1.877 + 0.707)$. Hypothesis 3b finds support here.

In hypothesis 4, we predicted that foreign nationality has a negative effect on hiring chances, whereby the chances for non-EU nationals are lower than for EU nationals. Our results only partially support the hypothesis, as there is no significant difference regarding recruitment chances between the German and the European nationalities, Spain and Poland. There is, however, a significant nationality effect for the non-EU countries Egypt and Turkey. Turkish and Egyptian applicants' chances of getting the job are significantly less, independent of other characteristics.

Moving on to the last hypothesis, we predicted that the hiring chances of foreign workers rise for vacancies with less labour supply. We operationalised staffing problems using simulated applicant shortages in the vignette situation, the applicant shortages expected by the firm in future and the information that the occupation for the post to fill provided on the white list. Contrary to expectations, a simulated applicant shortage does not significantly influence the hiring chances, neither for foreigners nor for Germans. Nevertheless, it is striking that a statistically significant negative effect occurs if HR managers need to select a candidate from a large number of incoming applications. This means that decision-makers tend to be rather selective. Such an effect becomes stronger if respondents have to select a foreign candidate from a large total number of applicants. In terms of individually expected recruiting problems, we found a significant positive impact when considering foreigners' chances of being hired. This means that HR managers tend to hire immigrants if they expect hiring difficulties in the future.

Regarding shortage occupations, the effects for the white list show that foreign applicants have higher recruitment chances if labour supply for specific

occupations is scarce and labour market access for (non-European) foreigners is facilitated.[9] Our results, therefore, support hypothesis 5 in so far as foreign workers indeed have higher recruitment chances in officially registered shortage occupations (white list). However, simulated vacancies with less labour supply also show higher yet no significant effects.

Most of the other results concerning the vignette dimensions are robust for all three models, except *sex*. While female candidates have lower recruitment chances than men in general, the applicants' sex is not significantly taken into account when evaluating a foreign skilled worker in the decision-making process.

By controlling for firm size and region in all three models, we account for some structural factors, which could influence recruitment decisions in general. Particularly for the recruitment of foreigners, we are able to prove the effect of firms' experiences with foreign skilled workers. If the firm employs foreigners with VET certificates from abroad, the chance of being hired for foreign workers rises by 0.2. This effect disappears when accounting for the interaction effect of firms' expected German language skills and applicants' German language skills in model III. This is due to a correlation between expected German skills and the employment of foreign skilled workers, such that in firms where only basic German skills are expected, the proportion of foreign skilled workers is higher (see Table 6, Appendix 2).

Finally, we prove the robustness of the vignette effects in the full model with all control variables by additionally controlling for respondents' difficulties in evaluating the fictive candidates, as well as by controlling for the importance of different applicant characteristics given by respondents. The vignette effects remained almost constant (see Table 7, Appendix 2). Furthermore, occupational positions were included as dummy-variables instead of the white list indicator. The vignette and firm level effects also remained robust under this occupation-fixed regression.

Conclusions

The prosperity of the German economy and economic and political crises in other countries stimulated migration to Germany. At the same time, recent political reforms aim to facilitate the labour market access of foreigners to the German labour market, especially in the VET system. Since most vacancies are currently posted in the VET sector, this sector holds the most potential for the integration of foreign workers. As employment participation is a key factor for integration, we examined the key criteria that improve foreigners' chances of being hired and focus on skill shortage situations.

This study analyses recruitment decisions of HR professionals, who rely on productivity signals, experience and alternative applicants. Whereas earlier studies predominantly concentrated on the employees' perspectives and labour market inequalities regarding wages or the occupational status of foreigners compared to Germans, this study is able to detect employers' preferences during the recruitment process focussing on different occupations at the VET level.

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[9] Estimating model 1 separately for occupations on the white list and not on the white list, we only find a significant penalty for non-European nationalities in non-white list occupations. However, there is no significant negative effect for foreign nationalities if only white-list occupations are considered.

Most of our derived hypotheses could be confirmed based on our data of 2883 vignettes completed by 485 companies. The results support expected barriers for foreign applicants with certificates from abroad, who experience lower chances of being hired than German candidates. Egyptian credentials in particular receive a negative evaluation. This could, firstly, be explained by larger barriers to entry to the German labour market compared to EU member states and secondly, compared to Turkish persons with completed VET, a lack of experience of Egyptian immigrants. Immigration of skilled workers from Turkey, for example, has a long tradition and is a familiar aspect. As regulations have recently changed to facilitate the labour market access of foreigners in Germany, this foreign certificate penalty could essentially be interpreted as a lack of information on the part of German employers.

Practical experiences in the German labour market are valued as positive by HR managers. We interpret this as an additional proof for the recruiter, independent of the formal training, that the applicant is able to fulfil the required tasks of the occupation. The most important factor affecting the hiring chances of foreigners is fluent German language skills. Nevertheless, this effect is reduced the fewer German skills are needed for the job. The findings suggest that language courses will increase their recruitment chances of foreigners and thereby improve their integration into German society.

There is, however, a significant nationality effect for the selected non-Western countries in this study. Turkish and Egyptian applicants' chances of being offered the job are significantly lower, independent of other characteristics. This indicates that employers ascribe certain attributes to persons from Turkey and Egypt, unobserved in our experiment, but which diminish their recruitment chances. This can be interpreted, therefore, as an ethnic penalty for the selected non-European countries. However, while both ethnic groups are predominantly Muslim, we cannot exactly estimate how far a religion-effect occurs and influences the decision. Additional research would be required to disentangle the effects of ethnicity and religion.

Additionally, our study shows that immigrants' recruitment chances increase if posts in shortage occupations have to be filled or if employers expect shortages in future hiring. Interestingly, a simulated applicant shortage in the vignette design does not significantly influence the hiring chances. Rather, our vignette study indicates that the hiring chances—for foreigners more so than for natives—become lower if HR managers need to select a candidate from a large number of incoming applications. If employers have the chance to be selective, they will be selective and then, according to the theory of monopsonistic discrimination, ethnic penalties are more likely to occur in personnel decision processes.

Finally, the design of our study comes with an important caveat. Although factorial surveys are highly recommended in measuring (recruitment) decision-making processes, only some factors of interest can be controlled for in vignette scenarios. We are aware that work experience in the country of origin, a personal impression of the applicants during a job interview or a work trial are not indicated in our factorial survey, with full knowledge that these factors certainly will have a further impact on the decision-making process.

Appendix 1

Table 3   Overview of vignettes' dimensions and levels

Dimensions	Levels
Number of applicants	Small – average – large
Nationality	German (2×) – Polish – Spanish – Egyptian – Turkish
VET certificate	Germany – home country
Work experience in Germany	No – 1 year – 5 years
German language skills	Fluent – not fluent
English language skills	Business fluent – not business fluent
Sex	Male – female
Additional variable within vignettes	
Occupations	Intermediate level of vocational qualification

There is no variation in the dimension 'German language skills' and 'VET certificate' for German applicants

Table 4   Descriptive statistics of all vignette and firm variables used in the multivariate analysis

	Number	Percent
Vignette dimensions		
Nationality		
German	2883	33.3
Polish	2883	16.6
Spanish	2883	16.7
Egyptian	2883	16.6
Turkish	2883	16.7
VET certificate		
German	2883	67.0
Polish	2883	08.1
Spanish	2883	8.4
Egypt	2883	8.1
Turkish	2883	8.4
German language skills (1 = fluent)	2883	66.6
English language skills (1 = business fluent)	2883	50.2
Work experience in Germany		
no experience	2883	33.4

Table 4 (continued)

|	Number	Percent
1 year	2883	33.3
5 years	2883	33.3
Sex (1 = female)	2883	50.0
Number of applicants		
Small number	2883	33.7
Average number	2883	33.2
Large number	2883	33.1
Firm variables		
Expected German language skills		
Basic	485	12.0
Independent	485	41.7
Proficient	485	46.3
Firm employs foreigners with foreign VET certificate	485	32.6
Firm expects recruitment problems in future	485	62.1
Occupation is on white list	485	24.4
Firm size		
< 10 employees	485	19.0
10 to 49 employees	485	31.6
50 to 249 employees	485	32.8
> 249 employees	485	16.5
Region		
Baden-Württemberg	485	12.9
Bavaria	485	16.5
Berlin	485	3.3
Brandenburg	485	2.4
Bremen	485	1.2
Hamburg	485	3.3
Hesse	485	7.6
Mecklenburg-West Pomerania	485	2.3
Lower Saxony	485	8.9
North Rhine-Westphalia	485	20.5
Rhineland Palatinate	485	4.2
Saarland	485	0.6
Saxony	485	4.8
Saxony-Anhalt	485	3.5
Schleswig Holstein	485	3.9
Thuringia	485	4.0
Occupational position (1-digit-level)		
Agriculture, forestry, farming and gardening	485	3.3
Production of raw materials and goods and manufacturing	485	29.2
Construction, architecture, surveying and technical building services	485	4.7
Natural sciences, geography and informatics	485	2.5

Table 4 (continued)

	Number	Percent
Traffic, logistics, safety and security	485	13.2
Commercial services, trading, sales, the hotel business and tourism	485	9.5
Business organisation, accounting, law and administration	485	17.0
Health care, the social sector, teaching and education	485	19.6
Philology, literature, humanities, social sciences, economics, media, art, culture and design	485	1.0

Table 5 Correlation table of vignette dimensions of the analysis sample ($n = 2883$ vignettes)

	Nationality	VET certificate	German skills	English skills	Work experience	Sex	No. of applicant
Nationality	1.000						
VET certificate	0.658	1.000					
German skills	0.498	0.268	1.000				
English skills	0.016	0.094	− 0.022	1.000			
Work experience	0.027	0.089	0.030	0.012	1.000		
Sex	0.020	0.081	− 0.003	0.012	0.003	1.000	
No. of applicant	0.039	0.062	0.039	0.023	0.035	0.012	1.000

Cramér's V is reported, as all variables are categorical
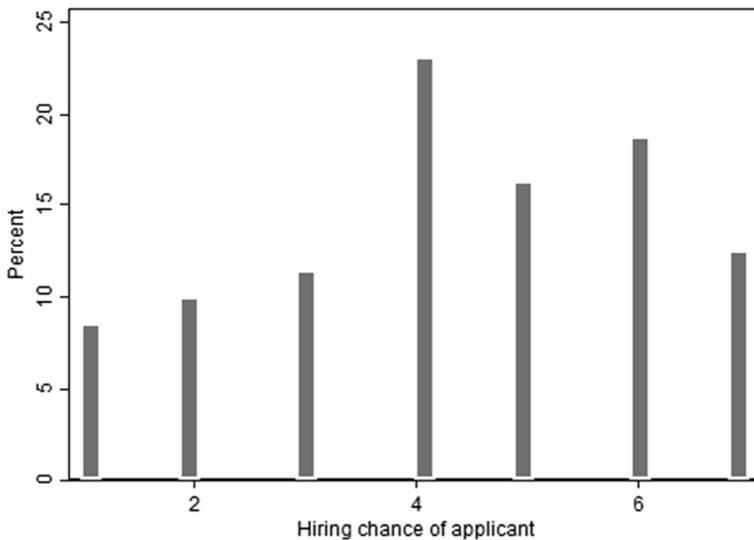
Fig. 2 Distribution of dependent variable "hiring chance of applicant"

Appendix 2

Table 6 Correlation between expected German skills and employment of foreign skilled workers

Firm employs foreigners with foreign VET certificate	Expected German language skills			
	Basic	Independent	Proficient	Total
Yes	48.41%	39.02%	22.83%	32.64%
No	51.59%	60.98%	77.17%	67.36%
Total	345	1202	1336	2883
Pearson chi2(2) = 119.7310				
Cramér's V = 0.2038***				

Significance: $p < 0.001$ (***); $p < 0.01$(**); $p < 0.05$ (*)

Table 7 Random intercept model predicting recruitment chance of applicants, controlling for respondents' difficulties in evaluating the fictive candidates and importance of different applicant characteristics

Predictors		
Vignette dimensions		
Number of applicants (ref. average number)		
Small number	0.101	(0.056)
Large number	− 0.097	(0.056)
Nationality (ref. German)		
Polish	0.007	(0.093)
Spanish	0.041	(0.093)
Egyptian	− 0.173	(0.094)
Turkish	− 0.234*	(0.094)
VET certificate (ref. German)		
Poland	− 0.441***	(0.119)
Spain	− 0.426***	(0.118)
Egypt	− 0.666***	(0.119)
Turkey	− 0.367**	(0.118)
German language skills (ref. fluent)	− 1.606***	(0.057)
English language skills (ref. fluent)	− 0.432***	(0.046)
Work experience in Germany (ref. no experience)		
1 year	0.938***	(0.056)
5 years	1.543***	(0.056)
Sex female (ref. male)	− 0.095*	(0.046)
Control variables		
Firm employs foreigners with foreign VET certificate (ref. no)	0.188*	(0.089)
Firm expects recruitment problems in future (ref. no)	0.374***	(0.083)
Occupation is on white list	0.244**	(0.094)

Table 7 (continued)

Predictors		
Firm size (ref. < 10 employees)		
10 to 49 employees	0.047	(0.118)
50 to 249 employees	0.021	(0.119)
> 249 employees	0.111	(0.139)
Additional control variables		
Difficulties in evaluating the vignettes (ref. no)	−0.132	(0.101)
Importance of applicants' nationality (ref. no)	−0.289	(0.179)
Importance of applicants' sex (ref. no)	−0.700***	(0.160)
Importance of applicants' vocational qualification (ref. no)	−0.320**	(0.118)
Importance of applicants' occupation-specific work experience (ref. no)	−0.247*	(0.111)
Constant	4.833***	(0.185)
$N_{vignettes}$	2746	
N_{groups}	462	
Random effect parameters		
R^2 within	0.500	
R^2 between	0.218	
R^2 overall	0.424	
Rho	0.244	

Coefficients from random intercept model; robust standard errors in parentheses; model controls for federal states of Germany. Dependent variable: applicants' chance of filling the vacancy, scale ranges from 1 ('very low chance') to 7 ('very high chance'). Significance: $p < 0.001$ (***); $p < 0.01$(**); $p < 0.05$ (*)

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