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ORIGINAL ARTICLE

Open Access



Hiring in border regions: experimental and qualitative evidence from a recruiter survey in Luxembourg

Tamara Gutfleisch^{1,2*}  and Robin Samuel²

Abstract

Firms in border regions typically deal with heterogeneous applicant pools that include both (foreign) domestic workers and cross-border commuters. However, we know little about recruiters' workforce needs and hiring practices in cross-border labour markets. Based on a survey of real recruiters in Luxembourg, this study presents experimental and qualitative findings on the role of country of residence in recruiters' hiring intentions against foreigners. Luxembourg presents a rarely studied but highly relevant case for hiring practices owing to a combination of a strong economy, strict labour market regulations, and a transnational workforce. Drawing on data from a factorial survey experiment, we found no discrimination against Portuguese and French applicants living in Luxembourg. Yet, (highly skilled) cross-border workers from France and Germany faced disadvantages regarding recruiters' hiring intentions. However, differences in effect sizes between foreigners and cross-border workers were small and not statistically significant. When further asked about the potential challenges of recruiting in Luxembourg's cross-border labour market, respondents expressed concerns about flexibility, poor social fit, and cultural differences in hiring foreign and cross-border employees. Overall, our study provides further points of reference for studies on hiring intentions in cross-border labour markets across Europe.

Keywords: Hiring intentions, Cross-border labour mobility, International workforce, Factorial survey experiment, Luxembourg

JEL Classification: M51, J71, J61, R23

1 Introduction

Cross-border labour mobility is a growing phenomenon in Europe (Parenti and Tealdi 2021), referring to the flow of individuals across national borders for work. In addition to cross-border migration, cross-border commuting, in which workers reside in one country and regularly commute to another for work, has increased significantly in the European Union (EU) in recent years (Fries-Tersch et al. 2021). Yet, in contrast to the vast literature on the determinants and consequences of international labour

migration (e.g. Borjas 2014; Massey et al. 1993), little attention has been paid to cross-border commuting.

Firms in border regions typically draw on heterogeneous applicant pools that include both (foreign) domestic workers and cross-border commuters. This makes it easier for these firms to find skilled workers, but political, linguistic, and cultural differences between regions can also pose a challenge for hiring new employees. Despite this situation, most previous studies have focused on the supply-side factors of cross-border commuting, such as the choices of workers (e.g. Decoville et al. 2013) or the impact of regional labour mobility on macro-level indicators like unemployment rates (e.g. Niebuhr and Stiller 2006; Schwab and Toepel 2006). We know little about how recruiters perceive and navigate the ethnic,

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linguistic, and sociocultural diversity that characterises applicant pools in border regions (but see e.g. Wiesböck 2016). While an extensive body of research has documented the specific disadvantages that certain (residing) immigrant groups face in hiring (e.g. Baert 2018; Zschirnt and Ruedin 2016), these studies mostly did not investigate patterns of possible discrimination against highly skilled immigrant groups and cross-border workers.

Luxembourg presents a relevant but rarely studied case for hiring practices owing to a combination of a strong economy, strict labour market regulations, and a transnational workforce. Rapid economic growth in recent decades has attracted both high- and low-skilled immigrant groups (Fetzer 2011). Today, foreigners account for almost 50% of Luxembourg's resident population, representing the highest proportion of immigrants (relative to the country's total population) in Europe (Eurostat 2020). The largest share of immigrants comes from other EU member states.

Besides Germany and Switzerland, Luxembourg also has one of the highest shares of cross-border workers in Western Europe (Fries-Tersch et al. 2021). Specifically, foreign domestic workers and cross-border commuters from neighbouring countries (France, Germany, and Belgium) account for most employees in the private sector (Amétépé and Hartmann-Hirsch 2011). This context allows us to contrast recruiters' hiring intentions towards residing and non-residing immigrant groups.

While Luxembourg's sociodemographic composition may be unique at the country level, similar labour market contexts exist elsewhere, sharing features of Luxembourg's economy, ethnic diversity, and geo-spatial characteristics. Notable examples include the Swiss-French-German border (e.g. Sohn et al. 2009), the Dutch-German-Belgian border (e.g. Broersma et al. 2020), and the Danish-German border (Buch et al. 2009). Thus, the Luxembourg case provides further points of reference for studies on recruitment in cross-border labour markets across Europe.

Ethnic discrimination in hiring has been explained in terms of aversion (or 'distaste'; Becker 1957) towards members of certain immigrant groups based on perceived social and cultural distance from the host society (Hagendoorn 1995). Alternatively, because of uncertainty and lack of information, recruiters may rely on negative stereotypes about immigrants' productivity (Aigner and Cain 1977; Phelps 1972). Due to the geographic proximity, cultural differences from the domestic native workforce may be smaller for cross-border workers than for certain residing immigrant groups. However, differences in educational qualifications, linguistic barriers, and commuting-related factors (e.g. distances) may impede the recruitment of cross-border workers. Focusing

on the role of country of residence in hiring decisions against foreigners in border regions contributes to a better understanding of regional patterns of labour market inequality.

In this study, we report experimental and qualitative findings from a recent recruiter survey conducted in Luxembourg's youth labour market in 2018/2019. Despite the country's impressive economic growth and relatively low overall unemployment rate, unemployment has become a specific risk among the younger generations in Luxembourg, with socially disadvantaged individuals being particularly affected (Willems 2015). The youth unemployment rate fluctuated sharply at around 20% in the years preceding our data but remained high compared with the EU, with an average of 15% in 2019.¹ Since disadvantages in access to employment at the beginning of one's career may accumulate over one's lifetime (DiPrete and Eirich 2006), young people are an important group to focus on when interested in recruiters' workforce needs and hiring practices.

Against this backdrop, we set out to address the following questions: How do recruiters in Luxembourg evaluate foreign workers during the hiring process? What is the role of country of residence in recruiters' hiring intentions against foreigners in Luxembourg's cross-border labour market? The analyses were based on a factorial survey experiment (FSE) in which respondents were asked to evaluate experimentally manipulated fictitious descriptions of applicants. A vast majority of prior FSEs regarding hiring has focused on descriptions of hypothetical vacancies that may or may not correspond to real-life hiring situations (Gutfleisch et al. 2021). Conversely, our recruiter survey was partly based on samples of real-world vacancies and included recruiters responsible for filling these, and this likely increased the external validity of the results. To better understand recruiters' workforce needs in heterogeneous regional labour markets, we further asked: What are respondents' perspectives on the main challenges of recruitment in Luxembourg's cross-border labour market? To answer this question, we use qualitative evidence from an open-ended question in the recruiter survey.

In the following sections, we provide background information on Luxembourg's institutional context, discuss theoretical expectations, describe the design of our recruiter survey, analyse our data from the FSE and open-ended questions, and discuss our results.

¹ Authors' calculations based on data retrieved 12 May 2021 from the Eurostat database (Unemployment by sex and age – yearly data [une_rt_a]). Youth unemployment is defined as the percentage of unemployed individuals in relation to the number of active labour market participants within the age group of 15 to 24 years.

2 Background

The transnationality of Luxembourg's workforce gradually increased over the twentieth century. In the first half of the twentieth century, the mining and steel industry was the driving force behind Luxembourg's economy. Immigrants from Germany and Italy met the demand for both low- and high-skilled labour (Fetzer 2011). The 1960s and following decades experienced an influx of Portuguese immigrants ('guest workers') and their families who primarily filled low-skilled jobs in the construction, industrial, and catering sectors (Berger 2008). After the steel crisis in the 1970s, Luxembourg's service sector expanded rapidly, resulting not only in strong economic growth but also in an increased demand for highly skilled labour that largely exceeded the supply of domestic workers (Fetzer 2011). These developments led to the recruitment of high-skilled workers mainly from the neighbouring countries (Belgium, France, and Germany) (Amétépé and Hartmann-Hirsch 2011).

Today, Luxembourg has the highest proportion of residing immigrants in Europe (Eurostat 2020). Portuguese immigrants comprise the largest foreign group, representing 16% of the total resident population, followed by French, Italian, German, and Belgian immigrants.² However, almost half of all employees in Luxembourg are cross-border commuters (STATEC 2022). French workers account for 50% of cross-border commuters, followed by German and Belgian workers (roughly 25%, respectively).³ They mostly come from the regions of Saarland and Rhineland-Palatinate (Germany), the Lorraine region (France), and Wallonia (Belgium) (Sohn et al. 2009). Most cross-border workers reside close to the Luxembourg border, such as in the cities of Arlon (Belgium), Trier (Germany), Thionville (France) and Metz (France) (Conseil Economique et Social [CES] 2020). The majority are employed in the capital of Luxembourg and in the area surrounding Esch-sur-Alzette—Luxembourg's second-largest city—in the south of the country (CES 2020, p 18). Based on a survey on the mobility of cross-border workers in 2012, the average commuting time among cross-border workers is about one hour one way (Schmitz 2012). The average commuting distance varied between 40 km from France, 46 km from Germany, and 49 km from Belgium. While there are

no considerable differences in wage levels between the sending regions of the three countries, wages—and housing prices—are, on average, higher in Luxembourg compared with these regions (CES 2020).

Cross-border commuters and residing foreigners primarily work in the private sector, where Luxembourgers comprise the minority in many occupational fields (Amétépé and Hartmann-Hirsch 2011). Although cross-border workers comprise at least a quarter of employees across all labour market sectors, they are primarily employed in the fields of finance and insurance, information and communication, construction, commerce, and manufacturing, where they account for at least 50% of the workforce (CES 2020). Cross-border workers are, on average, higher educated than residents. Belgian cross-border workers have the highest share of tertiary-educated workers, with only small differences between German and French cross-border workers and Luxembourgers (CES 2020).

Consequently, recruiters must make their recruitment decisions against the background of specific circumstances which apply in cross-border labour markets. To compare foreign residents and cross-border workers, we focus on Portuguese, French, and German immigrants—three of the largest foreign groups in Luxembourg. Portuguese immigrants, particularly the first generation, share characteristics with groups of traditional labour migrants ('guest workers') in other European countries, such as a lower socioeconomic status compared with natives and other immigrant groups (e.g. Hildebrand et al. 2017). Residential segregation between the Portuguese and resident immigrants from Luxembourg's neighbouring countries further hinders the social and cultural integration of Portuguese immigrants and their offspring (Willems and Milmeister 2008). French and German immigrants and cross-border workers typically work in highly skilled labour market segments, such as the financial and technology sectors (Amétépé and Hartmann-Hirsch 2011). Although immigration from France is relatively recent, both countries share a long tradition of political and cultural ties with Luxembourg due to their geographical proximity (Kankaraš and Moors 2012).

While recruiters likely have reservations for hiring foreigners, their reservations for hiring French and German residing foreigners and border crossers compared with Portuguese immigrants might be lower, either due to higher productivity expectations among these groups or personal taste due to cultural similarity. However, differences in hiring intentions might be relatively low given the cultural similarities between the three immigrant groups. For the same reason, mechanisms of taste-based discrimination (Becker 1957) might be less relevant in the context of hiring cross-border workers. In contrast, recruiters might have concerns about the productivity of

² Based on the authors' calculations. The data are from Luxembourg's statistical office (retrieved from: https://statistiques.public.lu/stat/TableViewer/tableView.aspx?ReportId=12859&IF_Language=eng&MainTheme=2&FldrName=1, January 4, 2020).

³ Based on the authors' calculations. The data are from Luxembourg's statistical office (retrieved from: https://statistiques.public.lu/stat/TableViewer/tableView.aspx?ReportId=12859&IF_Language=eng&MainTheme=2&FldrName=1, January 4, 2020).

foreign cross-border workers in line with statistical discrimination theory (Arrow 1972; Phelps 1972). For example, owing to longer commuting distances and times, recruiters might expect these workers to be less flexible and mobile and thus less productive than residing foreigners. In addition, there are potential cultural barriers that recruiters might suspect, particularly among cross-border workers, as they are less likely to participate in Luxembourg's social and cultural life than residing foreigners. Conversely, cross-border workers tend to have lower reservation wages than the residing job candidates in Luxembourg (Brosius 2005), likely making them more attractive for recruiters. Nevertheless, taste-based and statistical discrimination mechanisms are generally difficult to disentangle (Neumark 2018), and applicants' nationality and place of residence might interactively shape recruiters' hiring preferences. Our experimental design allows to disentangle nationality and place of residence for French applicants.

Although we cannot directly test the role of such factors, our study provides a first account of hiring intentions towards foreign residing and cross-border workers in Luxembourg's cross-border labour market. Since contextual factors such as occupation and recruiter characteristics can influence hiring decisions (Bills et al. 2017; Deros and Ryan 2018), we consider potential effects of such factors on our results in sensitivity analyses.

3 Data and methods

We draw on data from an online recruiter survey conducted in Luxembourg between 22 November 2018 and 25 January 2019 (Gutfleisch and Samuel 2021a). The survey encompassed various occupational fields to ensure a heterogeneous sample of jobs in terms of skill level, the proportion of female and male workers, and innovation dependency. The occupational fields were chosen based on four-digit codes from the International Standard Classification of Occupations 2008 (ISCO-08), including industrial mechanics, financial brokers, insurance representatives, waiters/waitresses, nursing professionals, personal care workers, and information technology (IT) specialists (e.g. system administrators) (see Additional file 1: Table A1). The target population constituted real recruiters with relevant experience in these fields. Recruiters were individuals involved in recruiting new employees at their respective companies, regardless of whether they had received professional training in human resources. Gutfleisch and Samuel (2021b) provide more information on the dataset.

3.1 Sampling process

Data were collected in two steps. Initially, real-world vacancies for entry-level jobs in each occupational field

were sampled based on predefined criteria. Only jobs situated in Luxembourg that required at most a bachelor's degree and five years of labour-market experience were included. The vacancies were collected manually as well as through a web-scraping tool that utilised online job portals and company websites (see Additional file 1: Table A2). The contact information of the person responsible for filling the position, as indicated in the job advertisement, was extracted along with the vacancies. When no contact information was provided, we approached the relevant company and requested the name and email address of the person responsible for filling the vacancy. In the second step, recruiters were sampled based on publicly available lists of companies using different sources to achieve a higher sample size. The contact information of the person most likely to be involved or experienced in hiring in the respective occupational field (e.g. business owners) was retained. If no such information was available, the relevant companies were asked to provide the contact information of a person actively involved in recruitment decisions. Between July and November 2018, the email addresses of 1342 recruiters were recorded across five occupational fields (i.e. mechanics: 183; nursing: 151; IT: 447; finance: 185; catering: 376). Additional file 1 provides further details on the sampling process.

3.2 Online survey and factorial survey experiment

The recruiter survey consisted of three parts.⁴ Additional information regarding the given vacancies and job types was obtained during the first part of the online survey. The second part comprised an FSE in which respondents rated several hypothetical curricula vitae (CVs). Finally, recruiters were questioned regarding their personal information, including their opinions on the possible challenges of recruiting in Luxembourg's labour market. At the beginning of the survey, the respondents in the no-vacancy sample (i.e. those who were sampled via public registries) were asked whether they typically hired workers for the required job type; those who responded that they did not were excluded from the survey to ensure that all respondents had relevant recruitment experiences. The questionnaire for the no-vacancy sample, including the FSE, was based on the selected job types, whereas the questionnaire for the vacancy sample (i.e. the respondents who were sampled based on real vacancies) was formulated according to the advertised positions.

⁴ The design of the survey was based on a recruiter survey and FSE conducted in four European countries (Hyggen et al. 2016; NEGOTIATE 2020).



Fig. 1 Example vignette

FSEs have become an established method for studying how recruiters shortlist applicants for a given job (McDonald 2019). The method employs fictitious descriptions of situations, persons, or objects, which are evaluated sequentially by respondents. These descriptions (called ‘vignettes’) comprise multiple dimensions and levels that are experimentally manipulated

by the researcher. By merging experimental and survey research, factorial surveys distinguish the influence of single vignette dimensions on respondents’ ratings while controlling for potential confounding factors (Auspurg and Hinz 2015) and reducing the risk of social desirability owing to the multidimensional design (Auspurg et al. 2015).

Table 1 Vignette dimensions and their levels

| Dimensions | Levels | |
|--------------------------------------|--------|---|
| Gender | 1 | Male |
| | 2 | Female |
| Unemployment | 1 | No unemployment |
| | 2 | One year of unemployment after graduation |
| | 3 | One year of unemployment at the time of application |
| Nationality and country of residence | 1 | Luxembourgish nationality and living in Luxembourg |
| | 2 | Portuguese nationality and living in Luxembourg |
| | 3 | Luxembourgish–Portuguese nationality and living in Luxembourg |
| | 4 | French nationality and living in France |
| | 5 | French nationality and living in Luxembourg |
| | 6 | German nationality and living in Germany |

The vignettes in the present FSE signify hypothetical CVs of potential job candidates (see Fig. 1). The vignettes varied across the levels of three applicant characteristics (see Table 1): gender, unemployment timing, and migrant background (indicated by nationality and country of residence). In addition to Luxembourgish applicants without a migrant background, we distinguished between five foreign groups. The domestic and cross-border workers with foreign nationalities were selected based on the demographic composition of Luxembourg's population and workforce (see [Background](#) section). As listed in Table 1, we distinguished between French and German border crossers and French and Portuguese residents. For French foreigners, the design allows comparing cross-border and resident workers while controlling for nationality.

Figure 1 illustrates an example vignette of a male applicant of Portuguese nationality who applied for a catering job. Each vignette specifies 48 months of work experience in a company based in Luxembourg and a maximum of five years of labour market participation with coloured elements indicating the duration of the working and non-working phases.⁵

Our experimental design comprised 36 different vignettes (i.e. possible combinations of applicant characteristics). Across the 36 vignettes, all vignette variables and their interactions were independent of each other. A set of six vignettes was randomly assigned to each respondent, and each set was optimised for orthogonality (no correlation between vignette characteristics) and level balance (equal frequency of vignette levels) (e.g. Atzmüller and Steiner 2010). The recruiters saw each vignette separately, and the order of vignettes within each

set was randomised across recruiters. For each vignette, respondents were asked about their willingness to consider the applicant for the relevant position. The exact wording of the question was: *What are the chances of a candidate with the above shown CV to be considered for the advertised job/the job as [selected profession]?* For respondents from the no-vacancy sample, the question referred to a typical position in the same field as the advertised job in the vacancy sample. The answer scale ranged from 0 (practically zero) to 10 (excellent).⁶ We operationalize this question as 'hiring intentions' throughout the article.

Respondents were instructed to assume that the minimum educational and language requirements had been fulfilled before the rating task. Given the multilingualism of Luxembourg's labour market (Fehlen and Heinz 2016), including language proficiency as an experimental variable or constant would have resulted in unnecessarily complex and potentially implausible vignettes in some occupational contexts. For instance, the relevance of certain languages differs between occupational fields, and applicants are usually expected to be multilingual. Similarly, given Luxembourg's partially cross-border vocational education and training system (Graf and Gardin 2018) and the high proportion of foreigners who have obtained their education abroad, including educational degrees as an experimental variable, would have resulted in unrealistic scenarios. Moreover, a more complex experimental design necessitates a larger sample size, which would have been difficult to achieve in Luxembourg's small labour market. Finally, all respondents were

⁵ The visual representation of the CV was based on the design developed by Hyggen et al. (2016).

⁶ Respondents were asked four additional questions concerning recruiters' judgment of the competence and commitment of each applicant. We emphasised recruiters' hiring intentions (i.e. the results regarding the first question).

given the opportunity to highlight relevant applicant characteristics for the respective positions missing from the vignettes after the rating task.

3.3 Data collection and sample

Respondents were invited via email to participate in an online survey regarding their experiences with recruitment and personnel selection.⁷ The survey was offered in three languages: English, French, and German. Respondents provided informed consent. Among 1342 recruiters invited across five occupational fields, 227 started the survey, and 140 completed it (valid response rate of 10%). Response rates vary greatly between recruiter surveys (Bills 1992) and are generally lower than those of population surveys (Anseel et al. 2010). However, the response rate is within the range of similar recruiter surveys, including FSEs (e.g. Damelang and Abraham 2016). The five occupational fields presented different response rates (IT: 9%; nursing: 10%; catering: 13%; mechanics: 14%; finance: 7%). We do not consider these response rates problematic since each vignette was rated by multiple respondents and because the vignette variables were not significantly associated with respondent characteristics (see Additional file 1: Table S1). Furthermore, a representative sample of respondents is not essential to achieve high internal validity with experimental data.

To investigate the experimental data, we excluded respondents who dropped out before ($n=51$) or during the FSE ($n=26$) but included respondents who dropped out after the experiment was concluded ($n=10$). After excluding missing observations on our dependent variable (i.e. the vignette ratings), our sample comprised 894 vignette evaluations from 150 recruiters across five occupational fields. All bivariate correlations between the experimental conditions were close to zero and not statistically significant, ensuring efficient estimation (see Additional file 1: Table S1). To evaluate answers to the open-ended question, we utilised all the available data points for the relevant questionnaire item. The number of observations for the relevant survey item was 134 respondents.

The average age of respondents who indicated their year of birth ($n=142$) was 45 years, ranging from 22 to 77 years. Among 141 respondents who indicated their gender, citizenship, and country of residence, 45% were female respondents, 36% had Luxembourgish citizenship, and 62% mainly resided in Luxembourg. Yet almost all

recruiters who reside in another country are foreigners (98%). Most of the companies in our sample are located in the surroundings of the capital of Luxembourg (65%). Of the 143 respondents who indicated their highest educational level, 56% had a university degree (bachelor's or higher).

3.4 Analytical strategy

The vignette ratings were not independent of each other and may correlate with unobserved respondent characteristics because each recruiter rated six vignettes. We used multilevel regression models to account for this clustering (Hox 2010). We analysed the full sample, pooling across five occupational fields. With our first model, we tested the composite effect of being foreign (independent of the place of residence) on recruiters' hiring intentions. Therefore, we combined the individual categories of migrant backgrounds (see Table 1) into a dummy variable. In the second step, we included the full range of levels of our variable, indicating applicants' nationality and country of residence in our model. Since our experimental design confounds nationality and country of residence for German applicants, we can test the true effect of country of residence only for French foreigners. Applicant gender and unemployment were used as control variables. We combined the two levels differentiating between the timing of unemployment to create one dummy variable indicating unemployment (see Table 1). We also controlled for the occupational field, sample type, and vignette position in all our models. To test the sensitivity of our results, we performed additional analyses by occupational field and by recruiters' country of residence. The syntax used for analysis is provided at <https://osf.io/b7sdz/>.

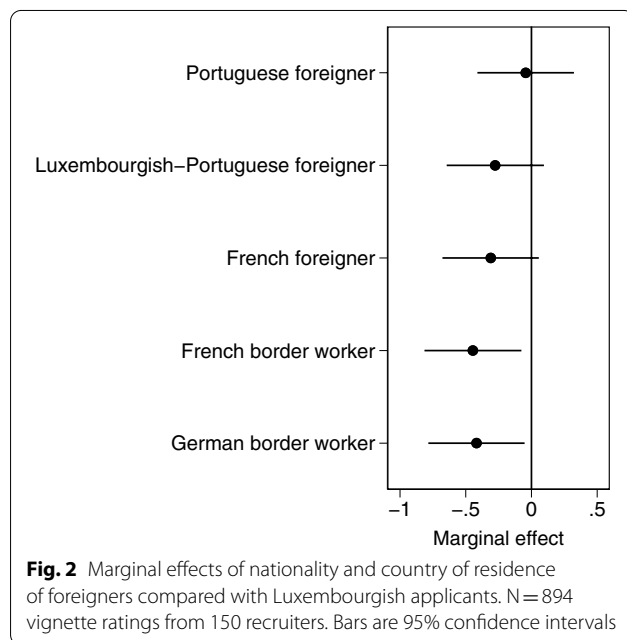
Regarding the qualitative analysis, we classified all answers to the relevant open-ended question into different categories. Respondents were asked through an open-ended question whether they saw any challenges impeding their work or recruitment in Luxembourg's multicultural and multilingual labour market and what these might be. An initial codebook was created based on one-third of the qualitative answers, which was used to code the remaining observations. The codebook was later updated based on the full set of answers. New codes were generated for categories with at least four observations. For two answers in the same category per respondent, the corresponding code was given only once. The responses were coded by the first author. The coding was reviewed by an independent researcher, and an agreement was reached after some adjustments to the codebooks. More details and the final codebook are provided in Additional file 1. The results are reported in frequencies of single categories in our sample.

⁷ The invitation asked the recipient to forward the email to the person responsible for recruitment when the contacted person was not involved in their company's recruitment process or was not responsible for filling the given vacancy. As the survey was self-administered, it was not possible to confirm that the questionnaire was completed by the addressee.

Table 2 Results of multilevel regressions predicting hiring intentions (model 1)

| | Coefficient | Standard error |
|--|-------------|----------------|
| Foreign Background (ref.: Luxembourgish) | −0.341* | (0.141) |
| Female (ref.: male) | 0.094 | (0.106) |
| Unemployment (ref.: no unemployment) | −0.753*** | (0.113) |
| Controls | YES | |
| Constant | 7.058*** | (0.514) |
| Variance: Recruiter | 3.104*** | (0.203) |
| Variance: Vignette | 2.439*** | (0.063) |

N = 894 vignette ratings from 150 recruiters. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$



4 Results

4.1 Experimental evidence of recruiters' hiring intentions

The results of the multilevel regression analyses predicting recruiters' hiring intentions are presented in Table 2 and Fig. 2. Table 2 presents the overall effect of being foreign (independent of place of residence) and the effects of the experimental control variables (see Additional file 1: Table S2 for the full model). We found that being foreign (compared to being Luxembourgish) decreased recruiters' hiring intentions by 0.3 scale points ($p < 0.05$), regardless of the place of residence. A significant negative effect of applicant unemployment was also found on recruiters' hiring intentions ($p < 0.001$). The effect of being female was relatively small and not statistically significant.

Figure 2 depicts the impact of the single categories of applicant nationality and country of residence

on recruiters' hiring intentions (model 2; see the full model in Additional file 1: Table S3). Negative effects on recruiters' hiring intentions were observed in each migrant background category. However, for residing Portuguese foreigners, the effect on hiring intentions was close to zero and not statistically significant. The effect on hiring intentions was slightly more negative for Portuguese applicants with dual citizenship and French foreigners, but again none of the effects was statistically significant at the 5% level. In fact, these effects were somewhat larger (i.e. more negative) and significant only for French and German cross-border workers. Recruiters' hiring intentions were reduced by about 0.4 scale points each ($p < 0.05$) for French and German border workers. Regarding French foreigners, the effect of being a cross-border worker was slightly more negative than being a residing foreigner. However, confidence intervals largely overlapped, and the difference was not statistically significant.

4.2 Sensitivity analysis

We performed further analyses to test the sensitivity of our results. First, according to the matching hierarchy model (Auer et al. 2019), recruiters reconcile immigrants' perceived position in the ethnic hierarchy with the social status of occupations. This model explains why groups of traditional labour migrants who are culturally more distant from natives might have lower chances to get high-status jobs but might have an advantage in lower status jobs. In addition, uncertainty about worker productivity may depend on occupational context, such as whether the immigrant group is culturally or historically connected to that context (see e.g. Altonji and Pierret 2001; Pager and Karafin 2009). Thus, we tested whether certain occupational fields in our sample drive our results. The outcomes of the additional subgroup analyses by occupational field are provided in Additional file 1: Tables S4 and S5. However, the sample size in some occupational fields, particularly in finance and nursing, was rather small. Therefore, these analyses should be interpreted with caution.

Our results might have been driven by the catering field. The overall effect of being foreign compared to Luxembourgish was statistically significant only in the catering field ($p < 0.001$), where it reduced recruiters' hiring intentions by 0.8 scale points (Additional file 1: Table S4). We also observed a relatively large negative effect of being foreign in the field of finance, but the effect was close to zero in the remaining three occupational fields. Regarding border crossers, we found a relatively large negative effect on hiring intentions for German ($p < 0.001$) and French cross-border workers ($p < 0.01$) in the catering field (Additional file 1: Table S5). Recruiters'

hiring intentions were reduced by 1.2 scale points for the former applicant group and by 0.9 for the latter. Regarding French foreigners residing in Luxembourg, the effect was also negative but only slightly smaller. Recruiters' hiring intentions were reduced by 0.8 scale points for French foreigners compared to Luxembourgish. However, as in the whole sample, the difference in effects for French foreigners and cross-border workers was not statistically significant. A similar pattern was also observed in the fields of IT, finance, and nursing but none of the effects was statistically significant. Overall, the effect sizes for foreigners and border crossers were smaller and, in some cases, close to zero in these fields than in catering. In contrast, a more negative effect was observed for French foreigners than border crossers in mechanics, but again none of the effects was statistically significant. Unobserved differences between occupational fields (e.g. the tightness of the labour market), about which we can only speculate, could explain these results.

Second, studies have shown that the perceived or actual similarity between recruiters and applicants might matter for hiring decisions (e.g. Edo et al. 2019). Recruiters who do not reside in Luxembourg might have fewer concerns about the productivity of cross-border commuters than recruiters who reside in Luxembourg. Since about one-third of the recruiters in our sample were themselves cross-border commuters, we tested whether our results differ when the recruiters' place of residence is considered. Unfortunately, our sample size did not allow for a detailed differentiation by nationality and the residence of recruiters and applicants. Instead, we estimated an interaction effect between the applicants' place of residence and the recruiters' place of residence. We distinguished between resident foreigners and cross-border applicants (compared to Luxembourgish applicants), and between resident and cross-border recruiters, collapsing nationality for the latter.

The group of Luxembourg-based recruiters appear to evaluate cross-border workers slightly more negatively than cross-border recruiters (see Table S6 in Additional file 1).⁸ However, the difference was not statistically significant. We also found that recruiters based in one of the neighbouring countries—who are predominantly foreign nationals—seem to negatively evaluate both residing foreigners and border crossers. The results for the latter

group were slightly more negative than for the former, although the effects were not statistically significant for either type of applicant. Thus, overall, our results do not seem to be restricted to Luxembourg-based recruiters.

4.3 Perceived challenges of recruiting in Luxembourg's cross-border labour market

Respondents were asked through an open-ended question whether they saw any challenges impeding their work or recruitment in Luxembourg's multicultural and multilingual labour market and what these might be. Altogether, 134 respondents answered this question.

Multilingualism was a common concern in Luxembourg, as 42% of respondents mentioned the difficulty of finding candidates who spoke the required language. Respondents also outlined problems regarding the integration of employees into the company (13%) or into the country as a whole (11%). Some comments were related to the different language backgrounds of potential employees. For instance, one respondent mentioned that it was difficult to find 'a common language among employees to ensure cohesion and good communication'.⁹ According to the recruiters, such problems arise not only owing to different language backgrounds but also because of different mentalities between workers in different countries. Numerous other comments highlighted the challenge of maintaining mobility and flexibility among foreigners and cross-border employees due to rental costs in Luxembourg and commuting distances (12%). A respondent affirmed that they 'need workers who are mobile and accept the travel time'. Recruiters also reported that multiculturalism made it more difficult to find job candidates whose education meets Luxembourgish requirements as the content of vocational training varies greatly across countries (5%). At the same time, they reported it is also difficult to find qualified domestic personnel (4%). A few respondents cited difficulties in hiring foreigners because of bureaucratic processes concerning the recognition of diplomas and obtaining work permits (3%). Respondents also perceived competition and its effects (e.g. local unemployment rates) in the local labour market as a general challenge in Luxembourg (3%). Finally, 11% of respondents who answered the relevant question considered Luxembourg's multiculturalism and multilingualism an 'advantage'.

⁸ Focusing solely on nationality, Gutfleisch (2021) found, using the same data, that although both foreign and Luxembourgish recruiters evaluated foreign applicants negatively, foreign recruiters seemed to discriminate less often than Luxembourgish recruiters. Thus, the results also suggested that similarity between recruiters and applicants might matter. However, the difference was not statistically significant either and the study did not take the place of residence of applicants into account.

⁹ The language of these comments varies since the survey was offered in French, German, and English. All comments cited in the text were translated into English if the original language was French or German.

5 Discussion

Based on results from a recruiter survey, we provided both experimental and qualitative evidence on the demand side of hiring young people in Luxembourg's cross-border labour market. We focused on the impact of applicants' nationality and country of residence on recruiters' hiring intentions based on data from a factorial survey experiment (FSE). In addition, we highlighted recruiters' perspectives on potential challenges concerning hiring procedures in Luxembourg's multicultural and multilingual cross-border labour market.

We found a significant and negative effect of being foreign on hiring intentions. Generally, this outcome is consistent with experimental evidence from other countries, suggesting the disadvantage of being an immigrant in hiring decisions (e.g. Zschirnt and Ruedin 2016). Differentiated analyses suggested that these results might be driven by recruiters' reservation to hire cross-border workers. Both French and German cross-border workers were slightly disadvantaged in hiring intentions compared with Luxembourgish applicants across the five occupational fields. Regarding residing foreigners, no significant differences in recruiters' hiring intentions were noticeable between Luxembourgish, French, and Portuguese applicants. Thus, the results suggest a disadvantage of cross-border workers in hiring, but not residing foreigners. However, the effect for French cross-border workers was only slightly larger (i.e. more negative) than for French foreigners, and the difference in effect sizes was not statistically significant. In contrast, qualitative results by Wiesböck (2016) suggest a preference for cross-border commuters over domestic workers among recruiters in Central Europe. However, their study focuses on hiring practices of low-skilled workers while most immigrants considered in our study are highly skilled workers. This contrast limits the comparability of the two studies.

The results regarding Portuguese foreigners contrast with previous studies that suggest more discrimination against groups of traditional labour migrants than against highly skilled immigrant groups (e.g. Booth et al. 2012; Zschirnt 2020). Although French immigrants might be more similar to Luxembourgers than Portuguese immigrants in terms of cultural values (Kankaraš and Moors 2012), both groups come from EU member states with Roman Catholic or other Christian denomination traditions. Differences in the (perceived) cultural distance from Luxembourgers might therefore be relatively small for both residing French and Portuguese foreigners. This might explain why no discrimination was found against both Portuguese and French foreigners. Against this background, a general antipathy against French foreigners, as predicted by taste-based discrimination theory (Becker 1957), is less likely to explain the negative effect

for French cross-border workers. Models of taste-based discrimination might be generally less applicable in such a hiring context. Instead, in line with statistical discrimination theory (Phelps 1972), the results might be driven by concerns about the productivity of cross-border workers, for example, regarding flexibility and mobility. Again, however, the difference in effects between French foreigners and cross-border workers was small and not significant. Moreover, mechanisms of taste-based and statistical discrimination are difficult to disentangle (Neumark 2018). Our experimental design does not differentiate between German cross-border workers and foreign workers living in Luxembourg; hence, we cannot exclude the possibility that nationality rather than the country of residence at least partly drives the negative effects on hiring intentions for German workers.

Sensitivity analyses suggested that the disadvantage of French and German cross-border workers—as well as French residing foreigners—compared to Portuguese immigrants were most pronounced in catering. On the one hand, these results are in line with a matching hierarchy argument, which predicts less disadvantage for groups of traditional labour migrants at the bottom of the occupational hierarchy (Auer et al. 2019). Highly skilled immigrant groups, who have less socio-cultural distance from the majority society, are more likely to be disadvantaged in these occupations. In contrast, in line with statistical discrimination, recruiters might prefer immigrant groups with the lowest expected variation in productivity (Heckman 1998; Neumark 2018). In the case of low-skilled catering jobs, this might be the Portuguese, as these immigrants have historically been employed in lower status positions (see [Background](#) section). However, the reader should bear in mind that the sample sizes varied by occupational field and were generally rather small. Similar patterns, although not statistically significant, were also found in other occupational fields. Our results did not differ by whether the recruiters were themselves border crossers or residing in Luxembourg.

In addition to our experimental evidence of hiring discrimination against foreigners and cross-border workers in Luxembourg, we analysed an open-ended question regarding the perceived challenges of recruiting in an ethnically and linguistically diverse context. Several respondents stated that it was difficult to find suitable candidates proficient in the required languages. Moreover, recruiters expressed concerns regarding team fit and cohesion among employees owing to cultural differences and language skills. Given Luxembourg's high share of cross-border workers, the recruiters raised concerns regarding the flexibility and mobility of employees, particularly for jobs that require high flexibility concerning working hours, as well as regarding the recognition

of foreign qualifications. Some of these results, such as the preference for social cohesion among workers, are in line with previous qualitative studies on the labour market integration of (residing) immigrant workers in, for example, Switzerland (e.g. Imdorf 2017). Other factors, however, appear to be particularly influential on recruiters' workforce needs and preferences and thereby the employment prospects of residing and non-residing foreigners in cross-border labour markets (see also Wiesböck 2016).

Some limitations of this study must be acknowledged. First, the coloured elements in the vignettes may have drawn recruiters' attention to the (un)employment history of applicants and away from their gender and migrant backgrounds. Thus, the effects of nationality and country of residence might have been underestimated. Nevertheless, our results coincide with prior research on the influence of being a foreigner on hiring intentions, at least concerning the direction of effects. Second, the sample size was rather small. Low statistical power may explain some of our null findings, and the results of the additional subgroup analyses by occupational field, in particular, should therefore be interpreted with caution. Third, we gauged recruiters' hiring intentions instead of behaviour and we cannot exclude the possibility that social desirability may have influenced some of the recruiters' vignette ratings. Overall, FSEs have been criticised for presenting respondents with hypothetical situations that may not depict real hiring situations. Indeed, past studies were based on student samples or samples of recruiters who may or may not have been familiar with recruiting for relevant job types (Gutfleisch et al. 2021). The present survey was based partly on samples of real vacancies and the recruiters responsible for filling these vacancies. In our sample, all respondents were actual recruiters with relevant recruitment experience in the occupations being studied. Hence, our approach may have increased the internal and external validity of the results. Although vignettes are simplified versions of real applicant profiles, the information provided in our vignettes (e.g. regarding job titles) was real. Lastly, our qualitative evidence was based on single survey items rather than comprehensive interviews, and social desirability might have affected some of the answers. Even so, this additional evidence provides relevant insights into the impact of cultural and linguistic diversity on hiring in border regions.

6 Conclusion

Despite the high share of foreigners living and working in Luxembourg, our results portray a considerable degree of reservation among recruiters to hire foreign job seekers, particularly cross-border workers. Overall, however,

the difference in recruiters' hiring intentions between residing and non-residing foreigners was relatively small and not statistically significant. Although Luxembourg's sociodemographic composition might be unique, labour markets in other intra-European border regions have a multicultural and multilingual workforce and potentially face similar demand-side problems affecting the local employment structure (e.g. the Swiss or Belgian border regions). Owing to their geographic position, some of these destination countries share a similar composition of cross-border workers and foreigners with Luxembourg (e.g. Sohn et al. 2009).

Comparative analyses to better decipher the impact of ethnic, linguistic, and sociocultural diversity in cross-border labour markets on hiring decisions and labour market inequality appear to be a promising way forward. In addition to a detailed comparison of general hiring patterns in European border regions, a promising extension of the present study could be to analyse the role of commuting time and thus the importance of statistical discrimination. The differences in hiring chances between resident foreigners and cross-border workers could potentially become smaller if commuting times converge (e.g. for companies closer to the border). This could be tested, for example, by adding the applicants' address (e.g. the city) to the vignettes and estimating a measure for commuting time based on information on the company's location. In addition, future research could more explicitly consider the characteristics of recruiters (Deros and Ryan 2018), as the similarity of characteristics and circumstances between recruiters and applicants could have a strong influence on hiring intentions (e.g. Erlandsson 2019; Gutfleisch 2021). Overall, as our results show, studies on demand-side processes of international labour mobility should not ignore the potentially distinct patterns of labour market integration in border regions (Wiesböck 2016). For example, a recent study on the Swiss apprenticeship market suggests that companies substitute skilled cross-border workers and training positions, affecting the employment prospects of the local youth (Aepli and Kuhn 2021). To better understand the mechanisms underlying recruiters' hiring preferences for domestic and cross-border workers, more research accounting for the socioeconomic and sociocultural heterogeneity of applicant pools in border regions is needed.

Freedom of movement ought to be a central component of European integration and cohesion. It is therefore of great interest to investigate whether potentially discriminatory employment practices exist in cross-border labour markets and how they manifest themselves. This type of research promises not only to identify and address matching problems and local inefficiencies but also to identify factors in the production and reproduction of

social inequality. By combining experimental and qualitative evidence on the role of nationality and country of residence in recruiters' hiring intentions and workforce needs in Luxembourg, we hope our study contributes to the growing literature on the demand side of labour market integration in Europe's border regions.

Abbreviations

EU: European Union; IT: Information technology; FSE: Factorial survey experiment.

Supplementary Information

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Additional file 1. Sampling process. Qualitative analysis and codebooks. Additional analyses.

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Author contributions

TG and RS jointly developed the design of the experiment and the survey. Data preparation and analysis were conducted by TG. Both authors were involved in the interpretation of the results. TG has written the original draft. RS has reviewed and edited all parts of the paper. All authors read and approved the final manuscript.

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Availability of data and materials

The data used for analysis are available as scientific use file at <https://doi.org/10.17605/OSF.IO/ZTB6Y>. The data documentation and information on how the data can be used are available at <https://doi.org/10.17605/OSF.IO/7BP5E>. Replication files can be found at <https://osf.io/b7sdz/>.

Declarations

Ethics approval and consent to participate

The study received ethics approval from the Ethics Review Panel of the University of Luxembourg [ERP 18-009].

Consent for publication

The study participants provided informed consent in written form. The study participants provided informed consent for the data to be published for scientific purposes.

Competing interests

There are no conflicts of interest to declare.

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