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The mediating and moderating role of neighbourhoods and regions on second-generation immigrant youths' school-to-work transitions in the Netherlands

Katarina Wessling  | Christoph Meng

Research Centre for Education and the Labour Market (ROA), Maastricht University, Maastricht, The Netherlands

Correspondence

Katarina Wessling, Research Centre for Education and the Labour Market (ROA), Maastricht University, P.O. Box 616, NL-6200 MD, Maastricht, The Netherlands.
Email: k.wessling@maastrichtuniversity.nl

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Abstract

Contexts in which people live such as neighbourhoods, cities or regions influence individuals. However, research analysing effects of different contexts simultaneously is limited. Our paper's focus is to examine the interrelation between regional and neighbourhood conditions and their influence on school-to-work transitions. We investigate the process of transitioning from vocational training to employment, with a specific focus on adolescents from non-Western immigrant origin. We link Dutch survey data on almost 15,000 graduates with spatial information from Statistics Netherlands and compare results across multilevel linear probability models. Overall, we find employment prospects to be reduced in neighbourhoods and regions that are socioeconomically unfavourable. However, neighbourhood influences diminish or even disappear once accounted for the region. Deprived conditions in urban regions are particularly detrimental for adolescents of immigrant descent. However, a high share of coethnics in the neighbourhood reduces the unemployment risk of second-generation non-Western minorities in deprived urban regions. This finding stresses the relevance of immigrants' neighbourhood networks for education and employment prospects.

KEYWORDS

neighbourhood effects, non-Western immigrant youth, regional effects, residential environment, school-to-work transition

1 | INTRODUCTION

Residential environments such as neighbourhoods, cities and regions are highly relevant in explaining individual life chances. There is an increasing sociological literature on the influence of socio-structural characteristics of the neighbourhood on social, educational, economic and health outcomes (e.g., Büchel & van Ham, 2003; Damm, 2014; Jencks & Mayer, 1990; Malmberg & Andersson, 2019; Miltenburg & van de Werfhorst, 2016; Sampson, Morenoff, & Gannon-

Rowley, 2002). Moreover, urban economists and economic geographers have shown repeatedly that the socioeconomic conditions in cities or regions as well as regional distances affect individual outcomes (e.g., Frenette, 2004; Hedberg & Tammaru, 2013; Spiess & Wrohlich, 2010).

A basic argument of early-established theoretical concepts such as the *concentric zone model* by the Chicago School scholars of sociology (Park, Burgess, & MacKenzie, 1925, p. 25) or the *social ecology* approach by Bronfenbrenner (1979) is that individuals are living and

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acting in several environments such as neighbourhoods, communities, cities and regions simultaneously. In spite of the large existing body of literature on (spatial) contextual influences, only little attention has been given to the interrelatedness of contexts. The present contribution aims at addressing this issue. In this paper, we concentrate on education and employment chances of young adults after graduating from postsecondary nontertiary vocational education and training (VET) in the Netherlands. The crucial argument of this paper is that living in a socioeconomically disadvantaged neighbourhood, which is located in a socioeconomically prosperous region, might have other consequences for education and employment prospects of VET graduates than living in a socioeconomically disadvantaged neighbourhood located in a socioeconomically disadvantaged region. The Dutch VET system is comparable with the training systems of countries such as Germany or Switzerland, which are characterised by a strong VET system aiming at providing on-the-job training for young adults on a non-academic level in order to facilitate a smooth transition between education and employment. In the Netherlands, approximately 40% of the workforce are trained in occupations below the level of tertiary education.

Selective evidence on labour market outcomes shows that it is promising to observe contexts simultaneously. Hedberg and Tammaru (2013) disentangle city and neighbourhood effects on the labour market integration of newly arrived immigrants in Stockholm and Malmö. They find neighbourhood effects on the chance of finding employment to disappear once they account for city effects. A study by Mellander, Stolarick, and Lobo (2017) shows that workplace networks are more important than neighbourhood networks. The authors find small influences of neighbourhood conditions on income for low-skilled workers. However, the effect of the workplace is considerably stronger for both low-skilled and high-skilled workers.

Related to the idea of the multiple embeddedness in contexts, recent studies approach contextual effects by focusing on determining the optimal scale or size of residential environments. The rationale behind is that 'adequate models of scale need to specify not only the distance-dependent relevance of context elements but also their distribution and an adequate combination' (cf. Hillmert, 2017, p. 1). Hartung and Hillmert (2019) explore on the basis of neighbourhood data, a distance decay in the relevance of neighbours for individual educational aspirations. North and Syrett (2008) also find decreasing effects of the spatial scale on employment. However, Wessling and Bechler (2019) find that study choices of high school graduates are mostly effected by local conditions in a commutable spatial radius, compared with observing smaller effect sizes at smaller as well as larger radii. Brattbakk (2014) shows that larger geographical levels have a stronger impact on educational attainment. These mixed findings and variations in most optimal scales can refer to differences in the observed outcome, the stage in the life course of individuals and heterogeneities between social groups (Galster & Sharkey, 2017). While comparing different scales of contexts provides informative insights on residential effects, the *moderating relation* between residential contexts such as neighbourhoods and regions remains

unconsidered. Educational research that concentrates on outcomes such as school performance, motivation or the risk of dropping out of school provides evidence for the relevance of the moderating relations of contexts. Research shows that socioeconomic influences of *neighbourhood* and *school* or *classroom* mutually reinforce each other (Brännström, 2008; Owens, 2010; Sykes & Musterd, 2011). However, potential mediating and moderating relations have been much less considered when focusing on labour-market related contexts and outcomes. Thus, we address the following research question:

- Are there mediating and moderating influences of *regional* and *neighbourhood* socioeconomic conditions on individuals' school-to-work transition processes?

We focus on the transition from training into the working world because this has serious implications for individuals' long-term success on the labour market. In our dependent variable, we observe whether VET graduates are *employed*, *unemployed* or entered *further VET* or *higher (vocational) education*. Due to data availabilities, we are not able to further differentiate measures of job quality. However, we believe that in expanding the focus towards further VET and higher education (HE) and not only focusing on graduates' unemployment risk, we can contribute to a better understanding of this crucial transition in young adults' life course.

This first transition to the labour market is known to be particularly critical for adolescents of non-Western immigrant origin (Brekke, 2007; Crul & Vermeulen, 2003). The relevance of immigrants' residential living conditions is discussed along several dimensions of the social and structural integration process (Schaake, Burgers, & Mulder, 2010). Immigrants are known to be not evenly distributed across residential areas. Factors such as economic conditions and the presence of coethnics influence the place of residence of immigrants (Beckers & Boschman, 2017; Viñuela, Gutiérrez Posada, & Rubiera Morollón, 2019; Wang & Ramsden, 2018; Zorlu & Mulder, 2011). This concentration in residential areas suggests that spatial contexts are particularly important for ethnic minorities' employment prospects. A major argument is that individuals of similar ethnic background are more likely to interact and form social ties (Giulietti, Schluter, & Wahba, 2013; Granovetter, 1973; Nieuwenhuis, Hooimeijer, & Meeus, 2015; Putnam, 2000). Thus, our second research question is as follows:

- Do influences of neighbourhood and regional socioeconomic conditions on individuals' school-to-work transition processes differ for second-generation non-Western immigrant youths compared with their native counterparts?

The concentration of immigrants in residential areas often coincides with socioeconomic deprivation (Musterd, 2005). Research suggests that negative effects of neighbourhood deprivation might be confounded with ethnic group effects (Wilson, 1996; Zuccotti & Platt, 2017). Thus, we aim at disentangling influences of the ethnic

residential structure from socioeconomic conditions. Following this, our third research questions is as follows:

- Which role does the immigrant group concentration in the residential area play in understanding the relation between socioeconomic region and neighbourhood conditions and individuals' school-to-work transition processes?

To address our three research questions, we proceed as follows. In the next section, we present theoretical arguments that outline the relevance of neighbourhoods and regions for education and employment prospects. We further discuss the specificities of the labour-market prospects of immigrant youths in western societies. Thereafter, we outline why we concentrate on the case of the Netherlands, before we present our estimation strategy. We estimate multilevel linear probability models (LPMs) and focus on interaction effects between the level of neighbourhoods and regions. The utilised data stems from the Dutch School Leaver Survey from the Research Centre for Education and the Labour Market (ROA). Due to an almost full sampling of VET graduates in the year 2013, the data comprise information on almost 15,000 training graduates. We link the individual information with information from Statistics Netherlands (CBS) on the level of local neighbourhoods (*buurten*, $n = 2,864$) and functional labour market regions (*arbeidsmarktregio's*, $n = 35$). In the subsequent section, we present our main findings. Most importantly, we find neighbourhood influences to disappear once accounted for regional conditions. Deprived conditions in urban regions are particularly detrimental for adolescents of immigrant descent. However, a high share of immigrants in the neighbourhood reduces the unemployment risk of non-Western youths in deprived urban regions. We discuss the findings against the background of previous research and policy implications in the final section.

2 | THEORETICAL ARGUMENTS

2.1 | Neighbourhood influences

There is a long-standing literature on the relevance of neighbourhood conditions on individual outcomes. Theoretical discourses present several differentiations between mechanisms and transmission channels representing *neighbourhood effects* (for an overview, see e.g., Galster, 2008; Galster & Sharkey, 2017; Nieuwenhuis & Hooimeijer, 2016). The differentiation between *endogenous*, *correlated* and *exogenous effects* (Galster, 2008; Manski, 1993) suits our research interest, because it accounts for the fact that neighbourhoods are embedded in larger areas, such as cities or regions, which leads to the assumption that contextual settings are (inter)related. *Endogenous neighbourhood effects* describe the behaviours or attitudes of the people in one neighbourhood that directly affect the behaviour or attitudes of neighbours. This argument is best described as a social externality. The mechanisms at work represent socialisation effects. *Correlated neighbourhood effects* describe effects that can be related

to larger social or structural forces in which a neighbourhood is embedded. *Exogenous (contextual) neighbourhood effects* arise if a neighbour's behaviours or attitudes depend on neighbours' exogenous characteristics. In terms of school-to-work transitions, we argue that endogenous neighbourhood effects refer to the influence of social interactions between neighbours in education and occupation matters, which impact individuals' preferences for or information on a specific occupation or qualification.

A comparable argumentation can be found in Kearns and Parkinson (2001). They suggest to differentiate functions and mechanisms of different *scales of neighbourhoods*, one of these scales being the urban district or region, which fulfils the predominant function of a 'landscape of social and economic opportunities' (Kearns & Parkinson, 2001, p. 2104). Whereas smaller neighbourhood units, referred to as the 'home area', are expected to fulfil a psychosocial function of interaction and social contacts. An explicit focus on simultaneous contexts is provided by Cook (2003), who suggests that social contexts jointly affect outcomes in three ways: The effects can be *additive*, *multiplicative* or *substitutable*. He strongly advocates the idea to validate concepts that refer explicitly to interdependencies among social contexts rather than to study single contexts in order to avoid misspecifications and overestimation or underestimation of contextual influences.

We aim to bridge these arguments by studying the effects neighbourhoods and functional regions jointly. Regarding the underlying mechanisms, we suppose that neighbourhoods are less a space of job opportunities than regions are. However, neighbourhood conditions might not be irrelevant for individuals' labour market success. Social interactions with neighbours (who have specific occupations and information) can be beneficial because they can motivate or inform young adults about jobs. In contrast, prior research argued that ethnic or racial stereotypes can expand towards the level of neighbourhoods (Ellen, 2000). There is ample evidence that neighbourhood composition may be related to inhabitants' discrimination in several domains (for an extensive review see Pager & Shepherd, 2008). Thus, education or employment chances can be affected by a negative perception of the neighbourhood (e.g., 'black', 'dangerous' or 'poor'). In terms of contexts' interrelations, we argue that the transmission of information can originate from direct interactions with neighbours; the actual job on which information is provided or through which interest arose, however, is likely to be located in a larger area, such as a region.

2.2 | Regional influences

Regional economic conditions are a key structural factor in explaining individual variations in the transition to employment. Perfect spatial mobility behaviour could reduce this influence, but we know that financial as well as social (e.g., familial ties) costs restrict mobility (Andrews, Green, & Mangan, 2004). Hence, the regional context in which individuals are embedded in at the time of graduation from training is relevant to seeking first-time employment (Büchel & van

Ham, 2003). Under restricted spatial mobility conditions—which are particularly relevant for immigrant minorities (see section below)—functional labour market regions represent commutable spatial areas and, thus, an adequate spatial context—in terms of accessibility—in which individuals seek education, training or employment. Poor regional conditions increase an individual's risk of unemployment. It is theoretically assumed that young adults tend to stay in training and education to avoid unemployment in times of and regions with poor labour market conditions. This is referred to as the *discouraged worker effect* (Raffe & Willms, 1989). Not only are applicants' decisions subject to socioeconomic conditions but also are the firms' decisions requesting skilled labour. In regions with poor labour market conditions, the demand for apprentices and skilled workers is lower (Hillmert, Hartung, & Wessling, 2017). Recent graduates on which we focus are particularly affected, because they are new—and therefore *outsiders*—to the labour market (Lindbeck & Snower, 2002).

In sum, we assume that the relation between neighbourhoods and regions follows the idea of correlated (Galster, 2008; Manski, 1993) or substitutable effects (Cook, 2003). We expect regions in contrast to neighbourhoods to be the predominant spatial area in which employment or education is searched for. However, because deprived neighbourhoods are likely to be embedded in deprived regions, a correlation between them is reasonable to assume, which can only be unfolded when both contexts are jointly observed. Therefore, we hypothesise the following:

H1. The effects of socioeconomic neighbourhood conditions on the risk of unemployment are mediated through socioeconomic regional conditions. Thus, neighbourhood effects should decrease or disappear when regional socioeconomic conditions are accounted for.

Nonetheless, we expect independent neighbourhood (endogenous) effects above and beyond regional effects due to the provision of labour market relevant information or influences on preferences through mechanisms such as *social interactions* and *social role models* (Galster, 2008) in the neighbourhood. Following Cook (2003), we expect these effects to be also multiplicative. Neighbourhoods should be especially relevant when regional opportunities are scarce because more active career planning is required and could be induced through social exchanges with individuals in the residential area. Hence, we assume the following.

H2. Favourable socioeconomic neighbourhood conditions should attenuate the increased risk of unemployment in poor regional socioeconomic conditions.

2.3 | Young adults from immigrant origin on the training and labour market

Immigrant youths have been repeatedly shown to face specific labour market disadvantages. This is theoretically explained by a lack host

country-specific human capital such as language or information about the job market (Kogan, 2016). Also, discrimination towards immigrants increases their unemployment risk (Andriessen, Nievers, Dagevos, & Faulk, 2012). Both discrimination and a lack of specific human capital can become particularly relevant, given the regional situation. Jobs are more contested in disadvantaged regional labour markets and individuals with less knowledge regarding entry barriers and available opportunities are considerably worse off. Moreover, tight regional economic conditions allow employers to choose from a wider set of applicants so that taste-based discrimination can become more likely. Thus, we expect the following.

H3a. The unemployment risk of second-generation youths from non-Western immigrant origin is more strongly associated with poor regional and neighbourhood socioeconomic conditions, because they are less likely to move, less informed about the labour market and more likely to be affected by discriminatory practices.

In contrast to this hypothesis, research also presents evidence of specific immigrant-related advantages. Although immigrants face lower employment chances, they express high(er) educational or occupational goals or aspirations. This is referred to as the *immigrants' aspiration (attitude)-achievement paradox* and is observed particularly among non-Western minorities (D'hondt, Van Praag, Van Houtte, & Stevens, 2016; Salikutluk, 2016). This paradox is based on the theoretical argument that immigrants are strongly motivated to become successful in the host country because they represent a positive selection of their home country's population (Kao & Tienda, 2005). Given the Dutch VET system's specific structure (see above), where continuation in VET after a first graduation from VET is very common, we expect to observe the paradox as follows:

H3b. Compared with natives, youths from non-Western immigrant origin are more likely to enrol in further VET or HE at a university of applied sciences, regardless of regional or neighbourhood conditions.

In terms of selectivity, it is important to not only account for the spatial socioeconomic conditions because negative effects of neighbourhood deprivation might be confounded with immigrant group effects. In particular, a high concentration of coethnics in the neighbourhood can become relevant for the labour market and educational prospects of immigrant youths (Beckers & Boschman, 2017; Wang & Ramsden, 2018; Zorlu & Mulder, 2011; Zuccotti & Platt, 2017). Individuals of similar immigrant background are more likely to interact and form social ties (Giulietti et al., 2013; Granovetter, 1973; Nieuwenhuis et al., 2015; Putnam, 2000). Thus, via social interaction and role models, the exchange of labour market-relevant information and the mutual reinforcement of educational and occupational goals (Vervoort, Flap, & Dagevos, 2011; Zhou, 2009) might be reinforced. This reinforcement process could reduce labour-market disadvantages for young adults of immigrant origin in

neighbourhoods, which are characterised by a high share of neighbours from with a comparable migration background. Therefore, we hypothesise the following:

- H4.** A high share of coethnics in the neighbourhood attenuates the increased unemployment risk for youths from non-Western immigrant origin in socioeconomically poor regions and neighbourhoods.

3 | THE CASE OF THE NETHERLANDS

The Netherlands provides a valuable case to test the outlined hypotheses for three reasons: First, it is a country with a longstanding migration history and a large immigrant population. Second, residential patterns of natives and immigrants differ strongly—especially between urban and rural areas (see below). Third, the data quality and the large number of cases provide the possibility to distinguish regional from neighbourhood characteristics and relate them to microlevel information on individuals' education and labour market prospects. In the following, we provide a brief overview of the Dutch VET system as well as an overview of the situation of non-Western immigrants and their descendants in the Netherlands.

For reasons of data availability, this paper concentrates on graduates from the Dutch VET system. Approximately 40% of the Dutch workforce are trained through secondary VET (*middelbaar beroepsopleiding* [MBO]). MBO is provided at four hierarchically structured qualification levels (MBO 1 to 4) differing in content and duration. Each MBO study programme is offered in two distinct paths: the so-called vocationally educating learning path (BOL) and the vocationally guiding learning path (BBL). Study programmes in BOL are school based, whereas study programmes in BBL are on the job. Both paths are supposed to be equivalent regarding qualifications, but labour market prospects differ greatly and are more favourable for work based (BBL) apprentices. In 2013, in the Netherlands, 476,589 students followed an MBO study programme, and 378,370 (80%) followed a BOL track.¹ There are around 150,000 graduates each year. After MBO graduation, one can either continue one's vocational education or enter the workforce. Approximately half of MBO graduates entered the labour market and half continued in VET and education either within MBO or—if they graduated from the highest level (MBO 4)—in HE at a university of applied sciences.

In 2014, 21.4% of the 16.8 million Dutch residents were of immigrant descent. A little over half have a non-Western immigrant background. Non-Western minorities are mainly of Turkish, Moroccan and Surinamese origin. These three groups comprise approximately 60% of non-Western immigrants in the Netherlands and 7.5% of all Dutch residents. In terms of participation in vocational training, we find 20% of MBO students to be from non-Western immigrant descent; 6% have a Western migration background (CBS, 2014). Thus, non-Western minority students are overrepresented in MBO.

Moreover, we find non-Western immigrants to be unequally distributed across regions and neighbourhoods. They are concentrated in urban neighbourhoods of larger cities such as Amsterdam, Rotterdam and The Hague. Moreover, a strong urban–rural divide among the non-Western immigrant population is observed; the rural population is composed almost exclusively of native Dutch inhabitants (92%), with only 2% non-Western immigrants and 6% Western immigrants. In urban areas, 73% of the population is native Dutch, 17% of non-Western immigrant origin and 10% of Western immigrant origin. Although the Netherlands is among the most densely populated European countries, differences in the local population structure are rather strong. To observe the relevance of these distinct settlement patterns, our analyses account for urban and rural areas separately.

4 | ESTIMATION STRATEGY

To test our hypotheses, we apply Linear probability models (LPMs²), which allow to analyse the risk of unemployment after VET graduation in a linear regression framework. The outcome variable distinguishes between (a) being *unemployed* versus being *employed* and (b) being *unemployed* versus being in *further (vocational or higher) education*. We not only juxtapose employment versus unemployment but also include the opportunity to obtain further education and training to account for the institutional structure of the Dutch VET system and to gain a more comprehensive picture of VET graduates' prospects.

Since our hypotheses suggest (cross-level) interaction effects, we choose an LPM because interaction effects in nonlinear models do not allow for a straightforward interpretation. To address the LPM's shortcomings, we calculate heteroscedasticity-robust standard errors (Karaca-Mandic, Norton, & Dowd, 2012). Following Horrace and Oaxaca (2005), we check for observations that produce predicted probabilities outside the range of zero to one. The LPMs presented include only observations that produce predicted probabilities between zero and one. A total of 340 (2.2%) cases produce predicted values below zero or above one, but we observe no differences in substantive findings.

We apply a multilevel approach (e.g., Rabe-Hesketh & Skrondal, 2005). Figure 1a illustrates the structure of the dataset. At the first level are the MBO graduates, who are nested in neighbourhoods (Level 2), which are nested in labour market regions (Level 3). The data are strictly hierarchical, because each unit belongs to only one higher-level unit. Moreover, we find the data to be unbalanced. The number of neighbourhoods j in regions k varies between 28 and 227, the number of graduates i in regions k varies between 147 and 901, and between one and 34 graduates are distributed across neighbourhoods j . We observe on average 414 respondents per region and 5.5 respondents per neighbourhood.

The three-level variance component model can be written as

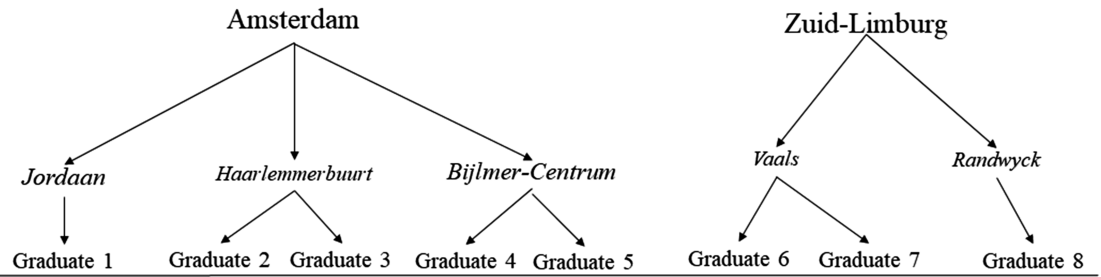
$$y_{ijk}(0|1) = \beta_0 + u_k + u_{jk} + e_{ijk}, \quad (1)$$

(a) Three-level solution

Level 3:
Regions k ,
 $n=35$; 414; (147-901)

Level 2:
Neighborhoods j ,
 $n=2,864$; 5.5; (1-34)

Level 1:
VET graduates i ,
 $n=14,486$;



(b) Two-level solution

Level 2:
Regions j ,
 $n=35$

Level 1:
VET graduates i ,
 $n=14,486$
w/ neighborhood
variables measured
on graduate-level

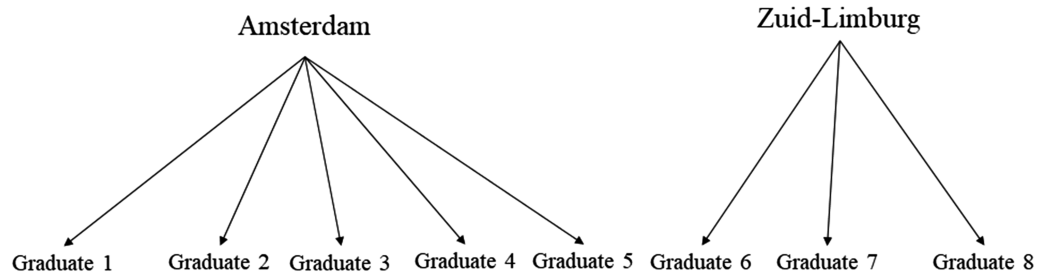


FIGURE 1 Illustrative multilevel model structure and data classification. Data: ROA School Leaver Survey (2013) and CBS (2014)

with

$$v_k \sim N(0, \sigma_v^2), u_{jk} \sim N(0, \sigma_u^2), e_{ijk} \sim N(0, \sigma_e^2),$$

where i, j and k are defined as

$$i = 1, \dots, n_{ijk}, j = 1, \dots, J_k, k = 1, \dots, K,$$

where n_{ijk} represents the number of students in the j th neighbourhood within regions k ; J_k denotes the number of neighbourhoods in region k ; K represents the number of regions; y_{ijk} is the unemployment risk for student i in neighbourhood j in region k ; the intercept β_0 denotes the weighted mean across all regions, neighbourhoods and graduates; v_k represents the regional effect; and the mean of y_{ijk} for region k is $\beta_0 + v_k$. Hence, the random regional effect v_k can be calculated as the difference between the regional and overall mean. The mean of y_{ijk} for a neighbourhood is $\beta_0 + v_k + u_{jk}$. The neighbourhood-level effect is u_{jk} , defined as the difference between the neighbourhood and regional mean. The mean of y_{ijk} for e_{ijk} represents the residual term and the observed mean of y_{ijk} for student i is $\beta_0 + v_k + u_{jk} + e_{ijk}$, so that the error term describes the difference between student i 's observed probability of unemployment and the neighbourhood mean. The components σ_v^2 , σ_u^2 and σ_e^2 indicate how the explained variance is allocated across regions, neighbourhoods and individual level. The models are calculated for urban and rural areas separately, because we discuss the considerable differences between rural and urban contexts, particularly with regard to non-Western immigrant inhabitants. The classification of urban and rural areas follows a definition provided by the Dutch statistical office (CBS). Urban areas are municipalities

with thousand or more addresses per square kilometre; Rural areas are municipalities with less than thousand addresses per square kilometre.

In a first step, we check for the accuracy of the model setup. Table A2 shows the detailed results of the test. According to the likelihood ratio (LR) test, we find the neighbourhood level to be more relevant in urban compared with rural areas; however, in both cases, the LR test suggests multilevel clustering at the regional level to be appropriate, whereas the neighbourhood level does not provide a reduced model fit compared with a single-level model. Using the Akaike information criterion (AIC) and the Bayesian information criterion (BIC), we also find a two-level model solution to be most parsimonious. In substantive terms, this testing indicates the neighbourhood level as not particularly relevant to individuals' unemployment risk. Thus, we adjust the setup and continue by estimating a two-level model including the individual and regional level, whereas neighbourhood-level variables are measured at the individual level, with clustered standard errors for neighbourhoods (Figure 1b).

5 | DATA

5.1 | Individual-level data

Individual-level data are from the 2013 ROA School Leaver Survey, a monitoring instrument for the transition from school to work. The survey observed the education or job status of MBO graduates 18 months after graduation. We excluded MBO Level 1 graduates, because this level does not provide a full-qualifying vocational degree.

We also excluded individuals with missing information in the control variables and we restricted the data to respondents, who were born in the Netherlands. Residential information was available at age 15 and at the time of the interview. We use residential information at the age of 15 and additionally control for whether individuals moved between the two time points. The general problem with residential contextual effects is that individuals are nonrandomly allocated in neighbourhoods and regions. Individuals—in our sample the parents of the respondents—(self-)select into neighbourhoods and regions based on their preferences and resources. As a result of this selection process, estimated effects can be potentially inflated because the characteristics that drive households into living in certain residential contexts are correlated with the unemployment risk. We aim at reducing the selection bias by making use of extensive control variables. Table A1 illustrates the distribution and summary statistics of individual-level control variables conditional on the dependent variable. First, by using contextual variables that are measured temporarily before the transition to employment or further training takes place, we can assume that the choice of residence is less a selectivity problem because it can be attributed to the parents rather than the graduates themselves. A similar argument is introduced by Zuccotti and Platt (2017, p. 4). Second, unobserved factors related to both the place of residence and the outcome of interest could be differences in motivation, ability and personality of individuals. By controlling for parents' education, we capture a large share of differences in motivation and ability. More importantly, we also control for the exam grades that students achieve in their VET programme and the hierarchical level of their VET degree. Also, the type of training and the training sector provide information on ability and motivation differences. Yet there is a remaining part of uncertainty in the residential bias, in particular concerning personality. A recent study observes a distinct geographical clustering of personality traits among different regions in the Netherlands. However, the authors show that economic factors in regions seem to have a much larger impact in determining

location choices, undermining the impact of personality traits (Hooijen, Bijlsma, Cörvers, & Poulissen, 2020).

5.2 | Contextual-level data

We link the ROA School Leaver Survey to contextual information at the level of neighbourhoods and labour market regions via the postal codes of the respondents' place of residence at time of interview. Local and regional data were supplied by CBS. At the neighbourhood and regional level, we capture the share of social benefit payment recipients (Figure 2a,b) to account for the socioeconomic situation in the residential environment as well as in the functional labour market region.³ To account for the likelihood of interacting with coethnics in the immediate residential area, we use information on the share of non-Western immigrants in the neighbourhood. Because non-Western immigrants are not a homogeneous group, we carry out additional analyses for Turkish immigrants—the largest group of non-Western immigrants available in the dataset—and the share of Turkish immigrants in the neighbourhood separately. The results can be found in Figure A3.

In Figure 2, the minimum and maximum, mean and standard deviation for the important dependent variables on the contextual level are given. We find the average share of social benefit recipients in areas in which unemployed respondents reside to be higher relative to the places of residence of respondents who are employed or in training. Unemployed respondents live in regions with an average share of benefit recipients of 2.1%, whereas employed respondents reside in regions with only 1.7% benefit recipients. Moreover, we observe that unemployed respondents live in neighbourhoods with an average share of 11.2% non-Western inhabitants, whereas the employed live in neighbourhoods with a share of only 9.1% non-Western inhabitants. Without further analyse, these findings are, of course, insufficient for drawing conclusions on effects of neighbourhoods and regions on individual outcomes.⁴

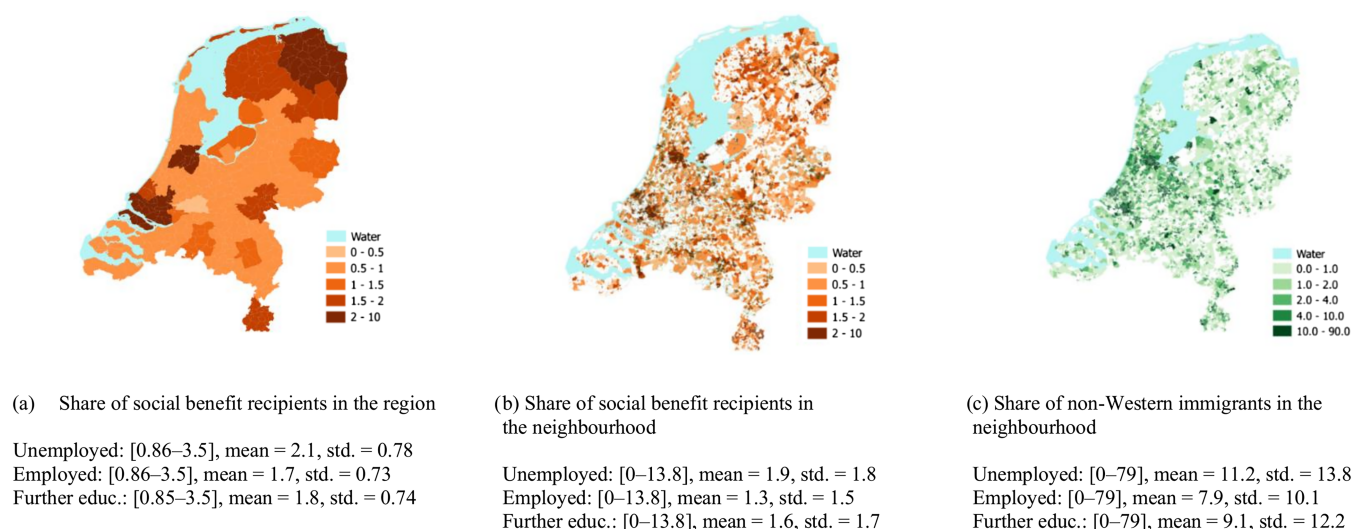


FIGURE 2 Variables at the neighbourhood and regional level (for all available cases at the individual level, $N = 14,486$). Data: ROA School Leaver Survey (2013) and CBS (2014)

6 | RESULTS

6.1 | (Inter)relations between neighbourhoods and regions

To illustrate the results of our models, we display the predicted probabilities derived from the LPMs on a map of the Netherlands in Figure 3. While the visual patterns of neighbourhood differences between Panels c and d are rather unclear, we observe clear differences in the regional concentration of predicted unemployment risk between Panels a and b. We find the predicted probability pattern to be very similar to that of the regional socioeconomic situation (Figure 2). An individual's unemployment risk compared with the chance of being employed (Panel a of Figure 3) is particularly high in the northern regions of Groningen and Flevoland, in the southern

region of Limburg and even higher around Amsterdam and in South Holland. When comparing unemployment with further VET or HE at a university of applied sciences (Panel b), we find similar patterns; however, the unemployment risk is considerably lower around the urbanised area of Amsterdam, which could indicate that larger cities provide more educational alternatives to avoid unemployment after VET.

Table 1 presents detailed empirical results of the models for rural (columns a1 to b2) and urban (columns c1 to d2) areas separately. Because we focus on the risk of unemployment after graduation from VET, negative statistical effects indicate a lower individual risk of ending up unemployed and therefore a higher chance of being employed (columns a1, b1, c1, d1) or in further VET or HE (columns a2, b2, c2, d2). The first model includes neighbourhood indicators in addition to control variables at the individual level. In the second model, we add

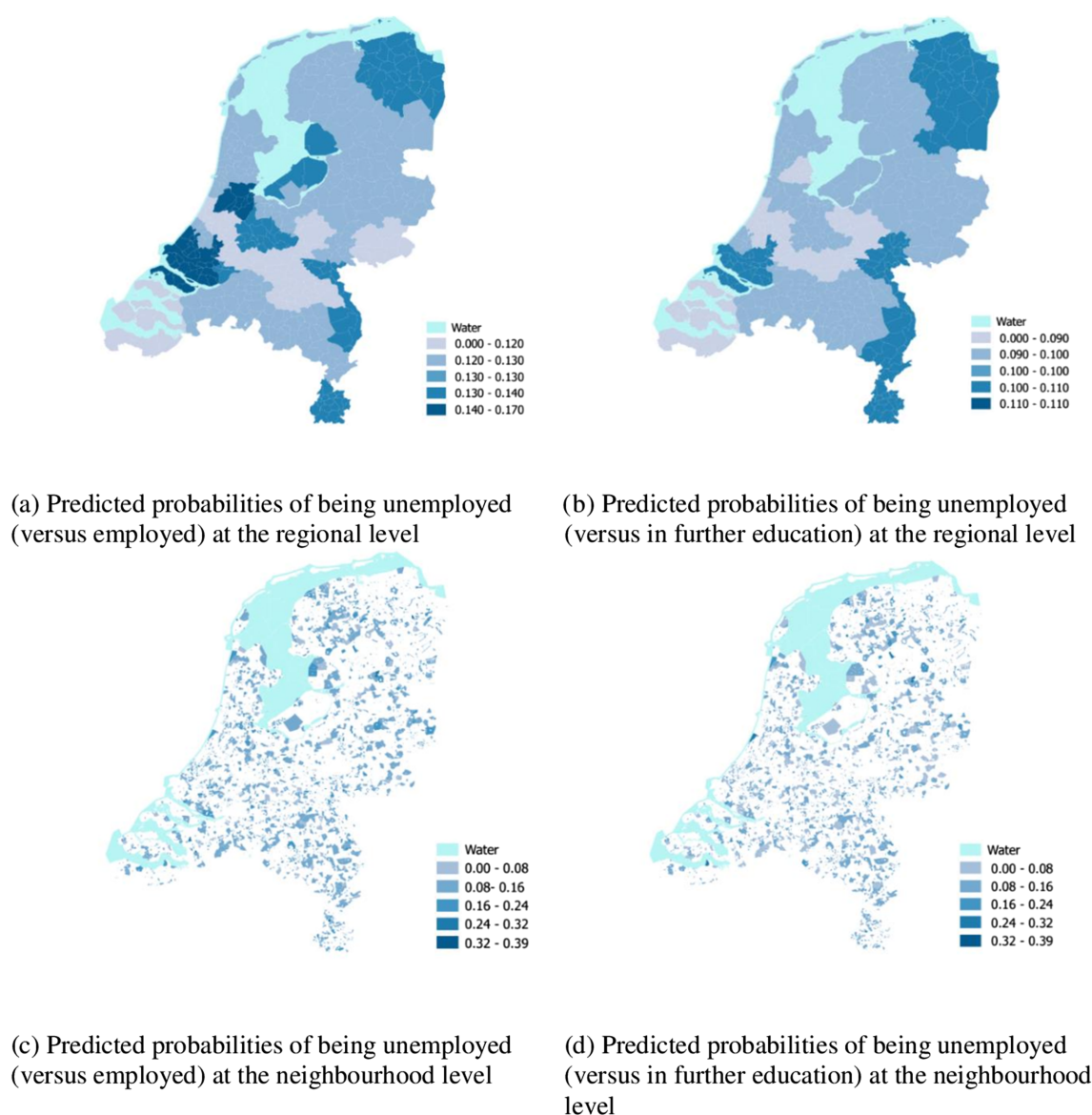


FIGURE 3 Predicted probabilities from linear probability models (LPMs) of being unemployed for neighbourhoods and regions. Data: ROA School Leaver Survey (2013) and CBS (2014)

TABLE 1 Multilevel models (LPMs) of the chances of unemployment after VET versus employment and versus further training/higher education

	Rural				Urban			
	(a1) unemp. vs. emp.	(a2) unemp. vs. edu.	(b1) unemp. vs. emp.	(b2) unemp. vs. edu.	(c1) unemp. vs. emp.	(c2) unemp. vs. edu.	(d1) unemp. vs. emp.	(d2) unemp. vs. edu.
Individual-level variables								
Non-Western immigrant origin (ref. native)	.091*** (.022)	-.014 (.033)	.091*** (.022)	-.014 (.033)	.069** (.023)	-.038** (.012)	.074** (.020)	-.033** (.011)
Male (ref. female)	-.035* (.012)	-.038*** (.007)	-.035* (.012)	-.038*** (.007)	-.019* (.008)	-.032*** (.007)	-.018* (.008)	-.032*** (.007)
Age at end of training	.015*** (.003)	.04141*** (.003)	.015*** (.003)	.04141*** (.003)	.014*** (.003)	.039*** (.003)	.014*** (.003)	.039*** (.003)
Overall grade	-.020*** (.006)	-.014*** (.003)	-.020*** (.006)	-.014*** (.003)	-.017*** (.004)	-.012*** (.003)	-.016*** (.004)	-.013*** (.005)
Sector (ref. technical sector)								
Agriculture	.014 (.040)	.040 (.028)	.014 (.040)	.040 (.028)	.120* (.038)	.092** (.020)	.118* (.038)	.091** (.020)
Economic	.058** (.020)	.036** (.014)	.058** (.020)	.036** (.014)	.030*** (.015)	.021** (.008)	.031*** (.014)	.021** (.008)
Health & care	-.019 (.014)	.023 (.015)	-.019 (.014)	.023 (.015)	-.037** (.012)	-.013 (.011)	-.037** (.013)	-.013 (.011)
Education & social	.051** (.018)	.028 (.011)	.051** (.018)	.028 (.011)	.051** (.017)	.014 (.013)	.051** (.017)	.014 (.013)
Type of training (ref. on the job [BBL])								
School based (BOL)	.080*** (.016)	.010 (.011)	.080*** (.016)	.010 (.011)	.125*** (.012)	.026* (.011)	.119*** (.013)	.026* (.011)
Vocational degree (ref. MBO Level 2)								
MBO Level 3	-.034* (.014)	-.003 (.010)	-.034* (.014)	-.003 (.010)	-.096*** (.018)	-.032* (.013)	-.096*** (.018)	-.031* (.014)
MBO Level 4	-.082*** (.022)	-.068*** (.018)	-.082*** (.022)	-.068*** (.018)	-.149*** (.012)	-.091*** (.012)	-.146*** (.014)	-.091*** (.010)
Parents' education (ref. low)								
Intermediate education	-.016 (.010)	-.020 (.009)	-.016 (.010)	-.020 (.009)	-.020 (.011)	-.019 (.011)	-.019 (.011)	-.019 (.011)
Higher education	-.010 (.011)	-.037*** (.013)	-.010 (.011)	-.037*** (.013)	-.012 (.012)	-.040*** (.011)	-.012 (.012)	-.038*** (.014)
Staying in home region (ref. leaving)	-.024 (.017)	-.041*** (.008)	-.026 (.017)	-.041*** (.008)	-.0191 (.019)	-.0201 (.013)	-.021 (.019)	-.0201 (.013)
Contextual-level variables								
Neighbourhood (non-Western)	.038 (.048)	.010 (.005)	.035 (.041)	.010 (.005)	.011 (.011)	.010 (.006)	.014 (.011)	.006 (.007)
Neighbourhood (deprivation)	.006 (.004)	.001 (.005)	.006 (.004)	.001 (.005)	.005* (.002)	-.003 (.005)	-.001 (.009)	-.001 (.004)
Region (non-Western)			-.009 (.014)	.004 (.014)			-.001 (.001)	.007 (.002)
Region (deprivation)			.018** (.008)	.014 (.008)			.010** (.004)	.004 (.006)
Region (15- to 24-year-olds)			-.002 (.007)	-.002 (.007)			.003 (.008)	.001 (.004)
Constant	-.122 (.078)	-.645*** (.112)	-.087 (.080)	-.645*** (.112)	-.074 (.069)	-.584*** (.066)	-.088 (.055)	-.605*** (.056)

(Continues)

TABLE 1 (Continued)

	Rural				Urban			
	(a1) unemp. vs. emp.	(a2) unemp. vs. edu.	(b1) unemp. vs. emp.	(b2) unemp. vs. edu.	(c1) unemp. vs. emp.	(c2) unemp. vs. edu.	(d1) unemp. vs. emp.	(d2) unemp. vs. edu.
Variance components								
Regional variance σ_v^2			.004*** (.002)	.002*** (.001)			.003*** (.002)	.001*** (.001)
Residual variance σ_e^2	.087*** (.002)	.059*** (.001)	.087*** (.002)	.059*** (.001)	.096*** (.003)	.071*** (.002)	.096*** (.002)	.075*** (.001)
N	4,578				9,908			

Note: Data: ROA School Leaver Survey (2013) and CBS (2014). Clustered standard errors in parentheses.

Abbreviations: LPM, linear probability model; MBO, middelbaar beroepsonderwijs; VET, vocational education and training.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

regional-level variables. All region and neighbourhood indicators are standardised.

We find neighbourhood deprivation significantly increases the unemployment risk compared with being employed in urban areas (column c1 of Table 1). However, this effect is not stable once we account for regional-level deprivation (column c2 of Table 1). Regional deprivation is the only stable and significant socio-spatial context influence in both urban and rural areas. We find an increase of one standard deviation in regional deprivation raises the likelihood of

TABLE 2 Mediation analysis based on linear probability model (LPM)

Rural	
(1) unemp vs. emp.	
ACME (average causal mediation effect)	0.005***
Direct effect	0.004
Total effect	0.009***
% of Tot eff mediated	0.371***
Sensitivity check	
Rho at which ACME = 0	0.016***
(2) unemp. vs. edu.	
ACME (Average causal mediation effect)	-0.001
Direct effect	0.001
Total effect	0.001
% of Tot eff mediated	-0.081
Sensitivity check	
Rho at which ACME = 0	-0.005
N	4,578
Urban	
(1) unemp vs. emp.	
ACME (average causal mediation effect)	0.023***
Direct effect	0.017***
Total effect	0.040***
% of Tot eff mediated	0.566***
Sensitivity check	
Rho at which ACME = 0	0.014***
(2) unemp. vs. edu.	
ACME (average causal mediation effect)	0.014
Direct effect	0.005
Total effect	0.030
% of Tot eff mediated	0.640
Sensitivity check	
Rho at which ACME = 0	0.005
N	9,908

Note: Mediator: regional socioeconomic composition; treatment: neighbourhood socioeconomic condition; outcomes: (a) the risk of being unemployed (vs. being employed) and (b) the risk of being unemployed (vs. being in further or higher education). Data: ROA School Leaver Survey (2013). Standard errors are clustered on the neighbourhood and the regional level.

*** $p < 0.05$.

unemployment compared with being employed by 1%. This effect seems small but, considering realistic differences between regions, this result indicates an individual's likelihood of unemployment (compared with being employed) is 7% higher in the most deprived urban area compared with the most prosperous. In rural areas, the unemployment risk between the most and least deprived areas differs by 14%. We observe a negative association between regional deprivation and individual employment prospects. We also find pre-existing neighbourhood effects in urban areas disappear once the region is included in the model. We can indirectly infer from this that the neighbourhood effects on VET graduates' (un)employment risks are mediated by regional conditions.

In addition to the estimated models, we run a mediation analysis (Imai, Keele, & Yamamoto, 2010) to directly test the mediating relation between neighbourhood and regional socioeconomic conditions. In doing so, we use the user-written Stata commands *medeff* and *medsens* (Hicks & Tingley, 2011). Results are depicted in Table 2. Again, we calculated LPMs separately for rural and urban areas. The standard errors are clustered for the neighbourhood and the regional level. Presented are average marginal effects. The average effect of the treatment variable (social deprivation in the neighbourhood) on the risk of being unemployed that operates through the mediator (social deprivation in the region) is indicated by the average causal mediated effect (ACME). We find a mediating relationship between

neighbourhood and region to only be significant for the outcome variable unemployed vs. employed in urban areas. Here the ACME is 0.023. The indirect effect represents 57% of the total effect, that is, we find that the effect of neighbourhood socioeconomic condition on the risk of being unemployed is to a large share mediated through socioeconomic condition in the region. For rural areas, we find the share of the mediated effect on the unemployed risk (versus being employed) to be 37%. However, we find that initially the neighbourhood effect is not significant. Thus, we cannot confirm a direct mediation here. Moreover, we do not find any significant mediation effect on the risk of being unemployed versus being in further VET or HE. Hence, the results only partly support our first hypotheses and previous research (Hedberg & Tammaru, 2013; Mellander et al., 2017).

Nevertheless, the separate consideration of urban and rural areas reveals a more complex relevance of contextual conditions on different levels for employment and education prospects of individuals. Our findings indicate that previous research has overestimated neighbourhood influences on employment due to not considering actual opportunities in a spatial range representing the accessible labour market region.

Beyond the mediating relation between socioeconomic conditions in regions and neighbourhoods, we also expected an interacting relation. Figure 4 shows the interaction between regional and

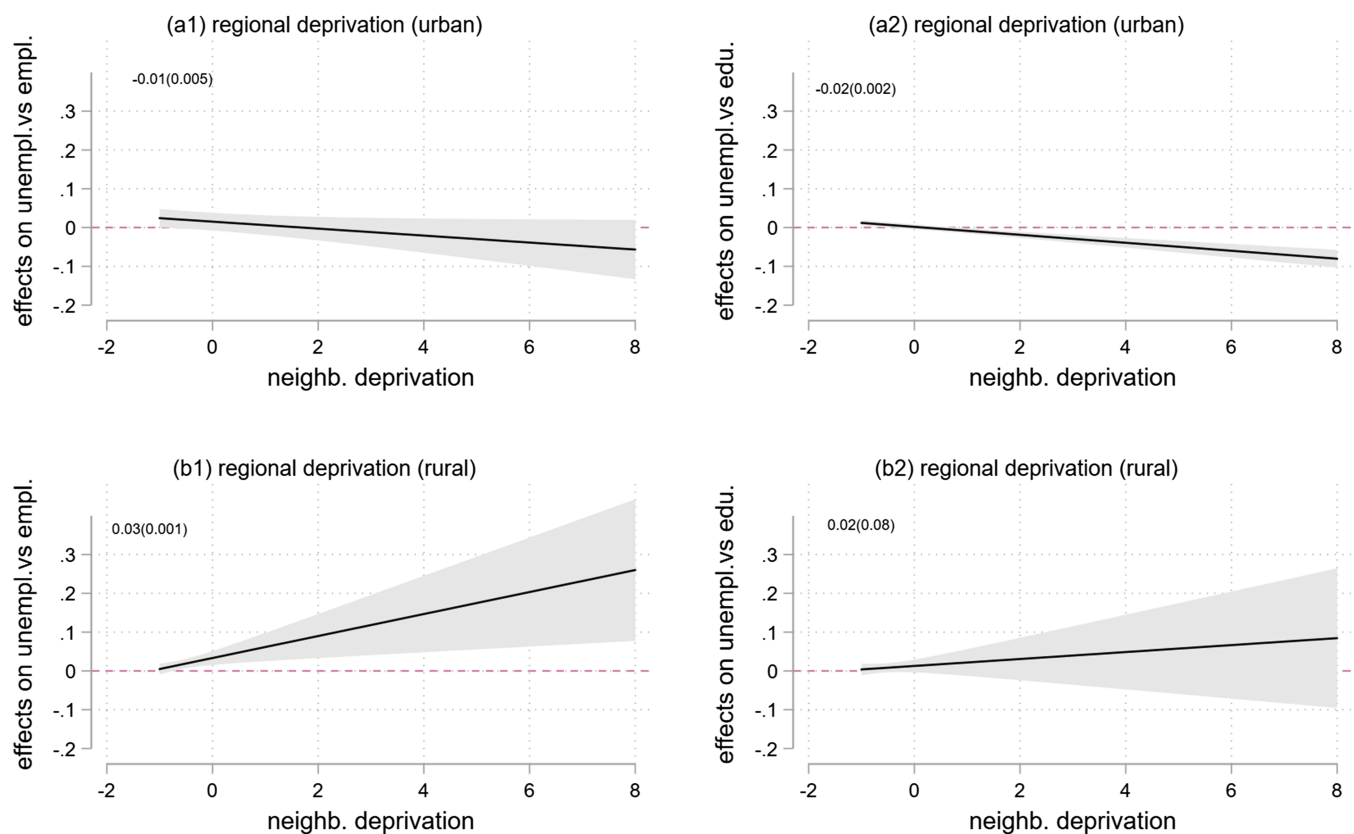


FIGURE 4 Interaction effects (neighbourhoods and regions). Average marginal effects of regional socioeconomic condition in rural (upper panels) and urban areas (lower panels) for neighbourhood socioeconomic condition on the unemployment risk compared with employment (right panels) or further training (left panels); grey surface: 95% CI. Data: ROA School Leaver Survey (2013) and CBS (2014)

neighbourhood deprivation. The average interaction effect and respective standard errors in brackets are displayed in the figure. Panels a1 and a2 present the results for urban areas and Panels b1 and b2 those for rural areas. Again, strong differences are apparent. In urban areas, the findings indicate the more deprived the neighbourhood, the stronger the effect of regional deprivation on the chances of further or HE instead of unemployment (Panel a2). In rural areas, the effect of deprived regional conditions on an individual's likelihood of unemployment is observed to be reinforced by neighbourhood deprivation (Panel b1).

Our second hypothesis cannot directly be confirmed, because we do not find that a favourable neighbourhood can compensate for an economically poor region. However, we find clear interactions between neighbourhood and regional socioeconomic deprivation. These interactions suggest differences between the social mechanisms at work in urban versus rural contexts. While the effect of living in multiple deprived settings simultaneously can be cushioned through an increased supply of educational alternatives in urban areas, these educational alternatives do not seem to be available in rural areas. In rural areas, the effect of poor socioeconomic regional conditions on unemployment risk is reinforced by poor socioeconomic neighbourhood conditions.

6.2 | Neighbourhood and regional effects on second-generation youths from non-Western immigrant origin

Drawing on the specific situation of young adults from non-Western immigrant descent (see Table 1), we find they have higher chances of experiencing unemployment compared with natives. However, as suggested in the literature on the *immigrants' aspiration (attitude)-achievement paradox* (D'hondt, Van Praag, Van Houtte, & Stevens, 2016; Salikutluk, 2016), they also have higher chances of participating in further training or HE or training. This finding is in line with our third hypothesis. Overall, the specific associations for second-generation non-Western immigrants can be related to the immigrant-specific mechanisms discussed above. Deficits in country-specific human capital such as language and information (Kogan, 2016), but also discriminatory practices in the labour market (Andriessen et al., 2012) could play a role in immigrants' increased unemployment risk. However, based on the data at hand, we cannot disentangle which of these theoretically relevant mechanisms is at work here.

By directly comparing urban and rural areas, we can show that differences between second-generation immigrant youths compared with their native counterparts appear to be a primarily urban affair, which is due to typical settlement patterns. As indicated above, only 2% of the rural population is of non-Western immigrant origin and of the non-Western immigrant respondents in our survey, 95% live in urban areas. Because of this spatial concentration, we focus on urban settings in the following step of our analysis. The results for rural areas are shown in Figure A2.

The upper panels in Figure 5 illustrate how natives' and second-generation non-Western immigrants' risk of unemployment differs between socioeconomic conditions in neighbourhoods (a1 and a2) and regions (a3 and a4). The lower panels present three-way interaction effects between individuals' migration background, the neighbourhood share of non-western immigrants (high versus low) and the socioeconomic conditions in the neighbourhood (b1 and b2) and region (b4 and b3).

Panels a2 and a4 show that the unemployment risk compared with being in further training is lower for second-generation non-Western immigrants the more deprived the neighbourhood and region. Thus, we find second-generation non-Western immigrants to be particularly likely to access further qualifications in unfavourable local and regional settings. On the other hand, the negative effect of regional deprivation on employment prospects is relevant only to natives (Panel a3). Thus, in contrast with our third hypothesis, it is not immigrants but, rather, native youths who are more likely to be unemployed compared with being employed in deprived regional contexts.

Although this result means a lower unemployment risk for second-generation immigrants compared with their native counterparts in deprived regional contexts, it does not necessarily indicate they are less vulnerable on the labour market. There are several potential explanations for this finding. First, second-generation immigrant youths could be particularly disadvantaged but more strongly supported through educational and vocational programmes, which are specifically designed to keep young adults most likely to be at risk—such as non-Western immigrant youths in urban areas—from being unemployed. In that sense, participation in these training programmes could be considered less voluntary on the part of the graduates and even a negative signal on the labour market. Second, second-generation immigrant youths could be anticipating their competitive disadvantages on the labour market, particularly in more contested regional contexts, where employment is scarce. Hence, they do not even try to apply for work but remain in education to prevent becoming unemployed. This impression of anticipated labour market disadvantages could even be reinforced by a greater likelihood of interacting with other immigrants in the neighbourhood with similar experiences. Third, second-generation immigrant youths could just as well be more motivated and therefore more likely to obtain further training or HE, as stated in the literature (D'hondt et al., 2016; Salikutluk, 2016). If so, a high share of immigrants in the neighbourhood could reinforce not only the anticipation of poor labour market prospects but also high aspirations. In the lower panel in Figure 5, we find supportive evidence of the relevance of neighbourhoods of comparable immigrant background.

In Panel b3 of Figure 5, the effect of regional deprivation on the chances of unemployment versus employment is displayed for a high share of non-Western immigrants in the neighbourhood (grey X) versus a low share (blue triangle). Second-generation non-Western immigrants are more likely to be unemployed compared with natives when regional conditions are deprived, but only when the share of non-Western immigrants in the neighbourhood is low (blue triangle). In

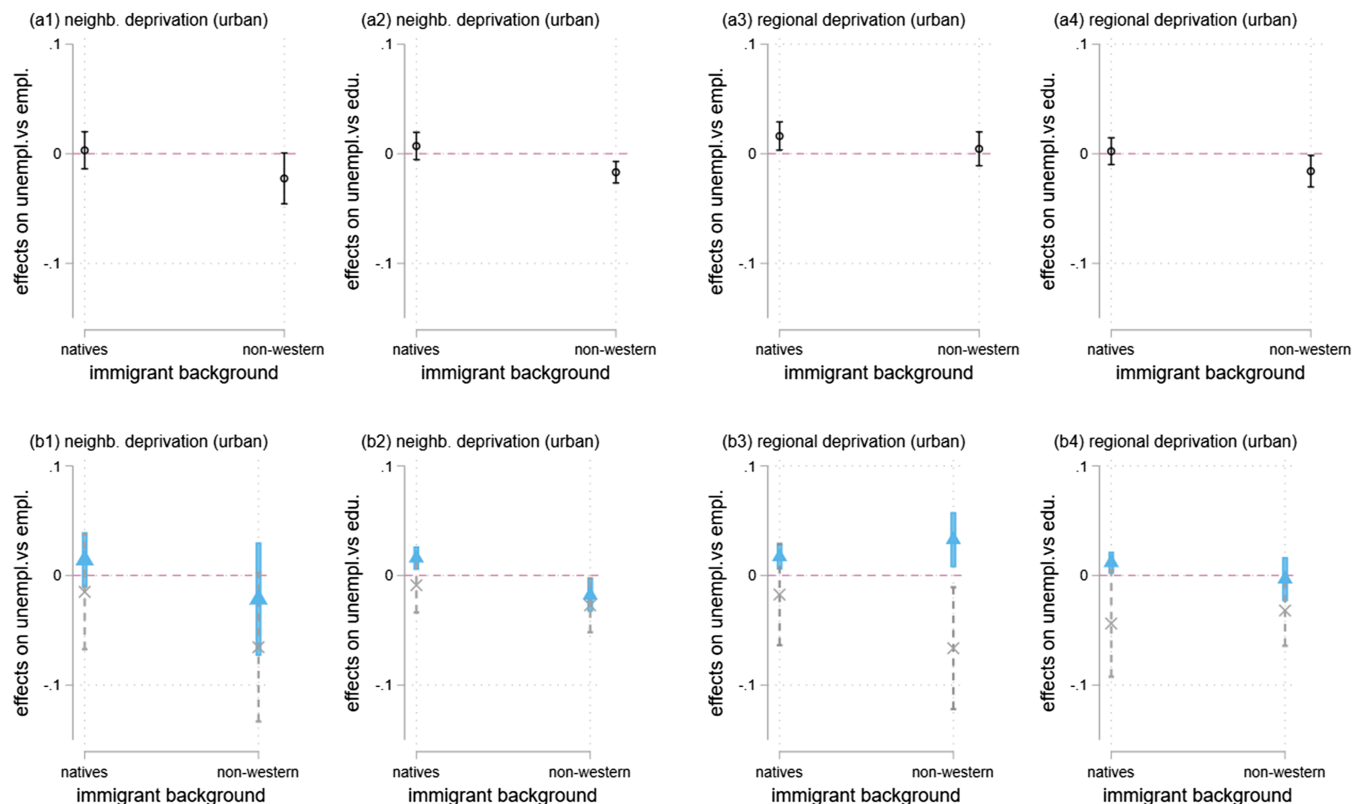


FIGURE 5 Interaction effects (URBAN). Average marginal effects of regional and neighbourhood deprivation on unemployment risk for second-generation immigrants and natives (upper panel) and for immigrants and natives with share of non-Western immigrants in neighbourhood (lower panel). Blue triangles indicate low shares of non-Western immigrants and the grey X's indicate high shares, grey surface: 95% CI. Data: ROA School Leaver Survey (2013) and CBS (2014)

turn, a high share of non-Western immigrants in the neighbourhood attenuates non-Western immigrants' unemployment risk (grey X). In Figure A3, results for the largest immigrant group—Turkish immigrants ($n = 456$) and the share of Turkish immigrants in the neighbourhood compared with natives—are calculated separately. We concentrate on urban areas only, because the share of Turkish inhabitants in rural neighbourhoods is too small. We find the results to be even stronger compared with the findings in Figure 5. However, we also find the confidence intervals to be very large due to the smaller number of cases. We find no significant influence of the share of non-Western immigrants in the neighbourhood on native VET graduates. Thus, second-generation non-Western immigrants' risk of entering unemployment after VET graduation is higher compared with natives in socioeconomically deprived regions with a low share of non-Western immigrants in the neighbourhood. We find that a high share of non-Western immigrants in the neighbourhood changes this relation, where non-Western youths in deprived regions are better off than their Dutch counterparts.

This finding supports the assumption that non-Western immigrants are more informed and supported and/or more motivated in neighbourhoods with a high share of non-Western immigrants. Our dataset makes it difficult to disentangle whether this finding relates more to motivation or information but, either way, it stresses the importance of weak ties (Granovetter, 1973) in employment

prospects. In particular, it demonstrates the supportive relevance of individuals with similar socio-structural characteristics, such as immigrant background (Nieuwenhuis et al., 2015; Putnam, 2000). Although this finding is partly in line with the fifth hypothesis, a limitation of the paper is that the quality of employment is not observed. Although a high share of non-Western immigrants leads to a greater likelihood of employment after training, this does not necessarily mean the jobs are suited to the level or sector of qualification of non-Western VET graduates. This would be in line with previous research suggesting that immigrants are often self-employed and, if they offer employment, it is more likely to be in low-qualified occupations.

7 | DISCUSSION AND CONCLUSION

Socio-spatial contexts in which people live have an impact on their live chances. Often unconsidered is the fact that people live in several contexts at the same time. This paper bridges research on neighbourhood and regional as well as research on immigrant youths in western societies. We analysed the mediating and interacting effects of regional and neighbourhood contexts on a crucial threshold in individuals' life courses: the transition from training to the working world. We differentiated the likelihood of entering either unemployment, employment or further training and HE after

completing vocational training (MBO) in the Netherlands. We investigated this transition for second-generation non-Western immigrants and natives because we know that immigrants are not evenly distributed across residential areas, and the concentration in specific areas suggests that spatial contexts are particularly valid for immigrant minorities.

Summing up our empirical findings, we are able to draw three central conclusions:

1. We analysed the mediating relation between neighbourhoods and regions, arguing that functional regions are the more relevant unit for representing employment opportunities, compared with neighbourhoods. Thus, we assumed the effects of socioeconomic conditions in a neighbourhood would reduce or even disappear when integrating regional information. We can confirm this hypothesis. Economically, poor neighbourhood and regional conditions increase individuals' unemployment risk. However, the effects of a neighbourhood's socioeconomic deprivation disappear once regional effects are accounted for. Previous research finds similar results for neighbourhoods and cities in Sweden (Hedberg & Tammaru, 2013; Mellander et al., 2017). Theoretically, this mediating effect is in line with correlated neighbourhood effects (Galster, 2008; Manski, 1993) and corresponds with the idea of substitutable effects (Cook, 2003). Our findings further support the argument that analytical results are sensitive to the definition of spatial units and, even when the same indicators are used, the level of aggregation or spatial measurement to which the indicator refers matters greatly (Kearns & Parkinson, 2001). In methodological terms, this is referred to as the Modifiable Areal Unit Problem (MAUP, e.g., Fotheringham & Wong, 1991).
2. We argued that living in a deprived neighbourhood within an economically prosperous region could have different implications for employment prospects than living in a deprived neighbourhood situated in a deprived region. We supplemented previous research by analysing not only the mediating but also the interacting effects of regions and neighbourhoods on individuals' school-to-work transition. Thus, we argued in favour of an endogenous neighbourhood effect (Galster, 2008; Manski, 1993). Here, we found prevalent differences between rural and urban areas. Only in urban areas, we find the double disadvantage of living in a deprived region and a deprived neighbourhood cushioned by increased opportunities for further training or HE. Urban spaces offer young adults alternatives in terms of education that do not seem available in rural areas. Here, we find a double disadvantage: A deprived neighbourhood additionally increases the unemployment risk in deprived regions.
3. We focused on the specific situation of second-generation immigrant youths of non-Western descent. We expected them not only to be more likely to enrol in further training or education but also to be additionally disadvantaged in terms of employment when living in unfavourable neighbourhood and region conditions. Moreover, we hypothesised the disadvantages are mitigated by a high share of non-Western immigrants in the neighbourhood, due to

the greater chance of social interaction and the exchange of information among individuals from similar migration background. Overall, we find second-generation immigrants to be more likely to engage in further vocational education or HE than natives are, especially in unfavourable neighbourhoods and regions. Also, second-generation immigrants are more likely to be unemployed than natives in deprived regions, but only when the share of non-Western immigrants in the neighbourhood is low. In turn, a high share of immigrant neighbours compensates for regional economic disadvantages. This could be due to the exchange of information on jobs and the fact that migrant employers might directly offer jobs to other individuals from similar migration background in need of a job. However, we have to limit our interpretation with regard to the positive implications of a high share of non-Western immigrants, because from our data, we cannot infer on the quality of employment. Further research on the match between qualification and employment is needed in order to answer the questions whether coethnic networks are simply helpful when the regional conditions are tense in finding any kind of employment or helpful in finding most suitable employment.

Overall, we could show that jointly modelling socio-spatial contexts and their interactions yields promising results. The findings demonstrate that it is important to focus on central theoretical arguments when considering the influence of spatial contexts as well as the spatial range or scale in which theoretically assumed mechanisms are most likely to be found. Our analyses underpin the early-established theoretical argument underlying the *concentric zone model* by the Chicago School scholars of sociology (Park et al., 1925, p. 25) or the *social ecology* approach by Bronfenbrenner (1979) that individuals are living in several environments such as neighbourhoods, communities, cities and regions simultaneously. Following this, future research should incorporate more strongly this simultaneous embeddedness of individuals in socially relevant contexts. This is of relevance both in terms of theory and empirical analyses. Following the terminology of Cook (2003) on context effects, we find neighbourhood effects are not just correlated, but the presence of distinct interactions between neighbourhoods and regions and individual characteristics such as the immigrant background provides evidence that neighbourhood matters. However, neighbourhoods are much less superficial than regions when focusing on employment prospects. In order to further promote a deeper understanding of spatial context effects, we suggest that their interrelations are worth considering in research beyond the presented application.

Policy makers aiming to create conditions for a smooth transition from education to employment—particularly emphasised in countries with a strong VET system such as the Netherlands, Germany or Switzerland—should pay attention to the simultaneity of residential settings, as well as the residential embeddedness of specific social groups, such as non-Western immigrants. Specific residential living circumstances should lead to careful assessments of labour market-relevant choices and chances and to a tailor-made supply with information on education and

employment prospects for young adults at the threshold between education and work.

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CONFLICT OF INTEREST

We declare that there is no conflict of interest. This manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

NOTES

- ¹ The percentage of students within the BOL track increased sharply during the economic downturn between 2009 and 2015 because employers were less willing to provide apprenticeships.
- ² As an alternative model specification, we calculated a multilevel multinomial logistic model. The results do not differ substantially and are available upon request.
- ³ Socioeconomic conditions in the region are typically illustrated by the unemployment rate. At the neighbourhood level, only social benefits recipients are available; hence, we integrate the same variable at both spatial levels. This does not seem to be problematic, because the share of benefit recipients in the region has a correlation of 0.91 with the regional unemployment rate.
- ⁴ A major concern of contextual variables are the correlations between them. A high share of non-Western immigrants in a neighbourhood is often associated with a rather weak socioeconomic structure. To quantify this relation, we provide an overview of correlations between all contextual variables in Figure A1.

ORCID

Katarina Wessling  <https://orcid.org/0000-0003-2800-4073>

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APPENDIX

TABLE A1 Frequencies of independent variables at the individual level, by dependent variable

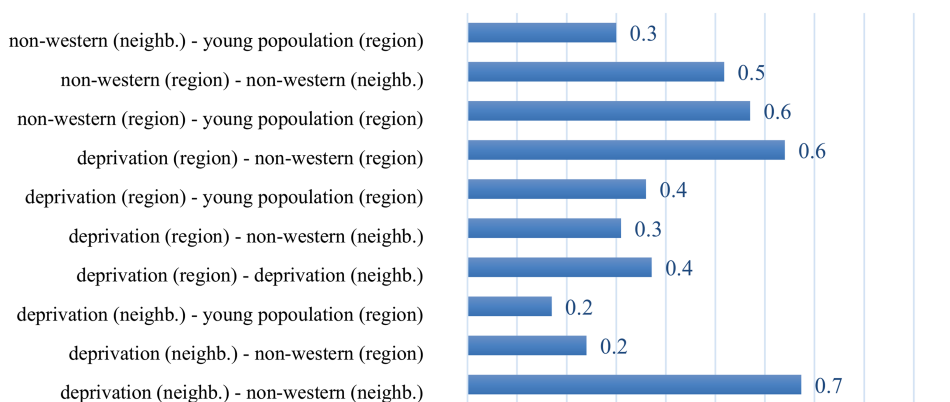
		Unemployed	Employed	Further education
Migration background	Non-Western immigrant (ref. natives)	15.1	6.1	13.1
Parents education	Low	30.7	24	22
	Intermediate	43.3	48.4	43.3
	High	26	27.6	34.7
Sex	Female	63.1	57.8	55.1
Level of vocational training	MBO Level 2	27.1	18	23.2
	MBO Level 3	30	29.8	20.5
	MBO Level 4	42.9	52.1	56.3
Type of vocational training	BOL (ref. BBL)	84.8	66.7	12.7
Training sector	Agriculture	6.5	4.2	3.6
	Technology	19.9	27.6	24.3
	Economics	36.8	27.5	35.3
	Health professions	20.2	29.6	20.3
	Social work	16.6	11.1	16.5
Urban (ref. rural)	Yes	72.1	63.5	65.8
Living at same place as at age 15	Yes	91.1	86.4	88.2
Exam grade		(1/6), Mean = 3.5, Std. = 1.08	(1/6), Mean = 3.7, Std. = 1.05	(1/6), Mean = 3.7, Std. = 1.06
Age (end of VET)		(17/25), Mean = 20.8, Std. = 1.8	(17/25), Mean = 20.7, Std. = 1.7	(16/25), Mean = 19.9, Std. = 1.4
Total		N = 739 (5.1)	N = 8,138 (56.2)	N = 5,609 (38.7)

Note: Data: ROA School Leaver Survey (2013).

TABLE A2 Random effects parameters and model statistics for the risk of being unemployed after VET graduation versus being employed and versus being in further VET or HE

	Neighbourhood		Region		Neighb. & region	
	Unemp. vs. emp.	Unemp. vs. educ.	Unemp. vs. emp.	Unemp. vs. emp.	Unemp. vs. educ.	Unemp. vs. emp.
Rural (N = 4,578)						
Constant	.092***	.069***	.093***	.069***	.091***	.068***
Neighb. (variance) σ_u^2	.002***	.001***			.002***	.000***
Region (variance) σ_v^2			.001***	.002***	.001***	.000***
Residual (variance) σ_e^2	.080***	.063***	.082***	.064***	.080***	.063***
χ^2	1.87	1.05	9.58	5.95	10.71	6.29
Prob > χ^2	0.08	0.15	0.00	0.01	0.00	0.03
ICC (neighb./[within region])	.025	.015			.034	.015
ICC (region)			.011	.006	.011	.006
AIC	792.9	276.4	785.2	271.5	786.0	273.1
BIC	810.0	294.4	802.3	289.5	808.9	297.2
Urban (N = 9,908)						
Constant	.131	.090***	.126***	.088***	.127***	.089***
Neighb. (variance) σ_u^2	.004***	.002***			.002***	.000***
Region (variance) σ_v^2			.002***	.002***	.001***	.001***
Residual (variance) σ_e^2	.109***	.081***	.112***	.082***	.110***	.081***
χ^2	5.76	3.30	13.51	10.78	15.61	11.69
Prob > χ^2	0.01	0.05	0.00	0.00	0.00	0.00
ICC (Neighb./[within region])	.032	.019			.029	.014
ICC (Region)			.011	.006	.009	.006
AIC	2,700.4	2,012.2	2,680.6	2,002.7	2,690.5	2,004.9
BIC	2,719.4	2,032.3	2,710.6	2,023.8	2,717.8	2,031.5

Note: Data: ROA School Leaver Survey (2013) and CBS (2014).

**FIGURE A1** Correlations between all context variables at the neighbourhood and regional level, Data: CBS (2014)

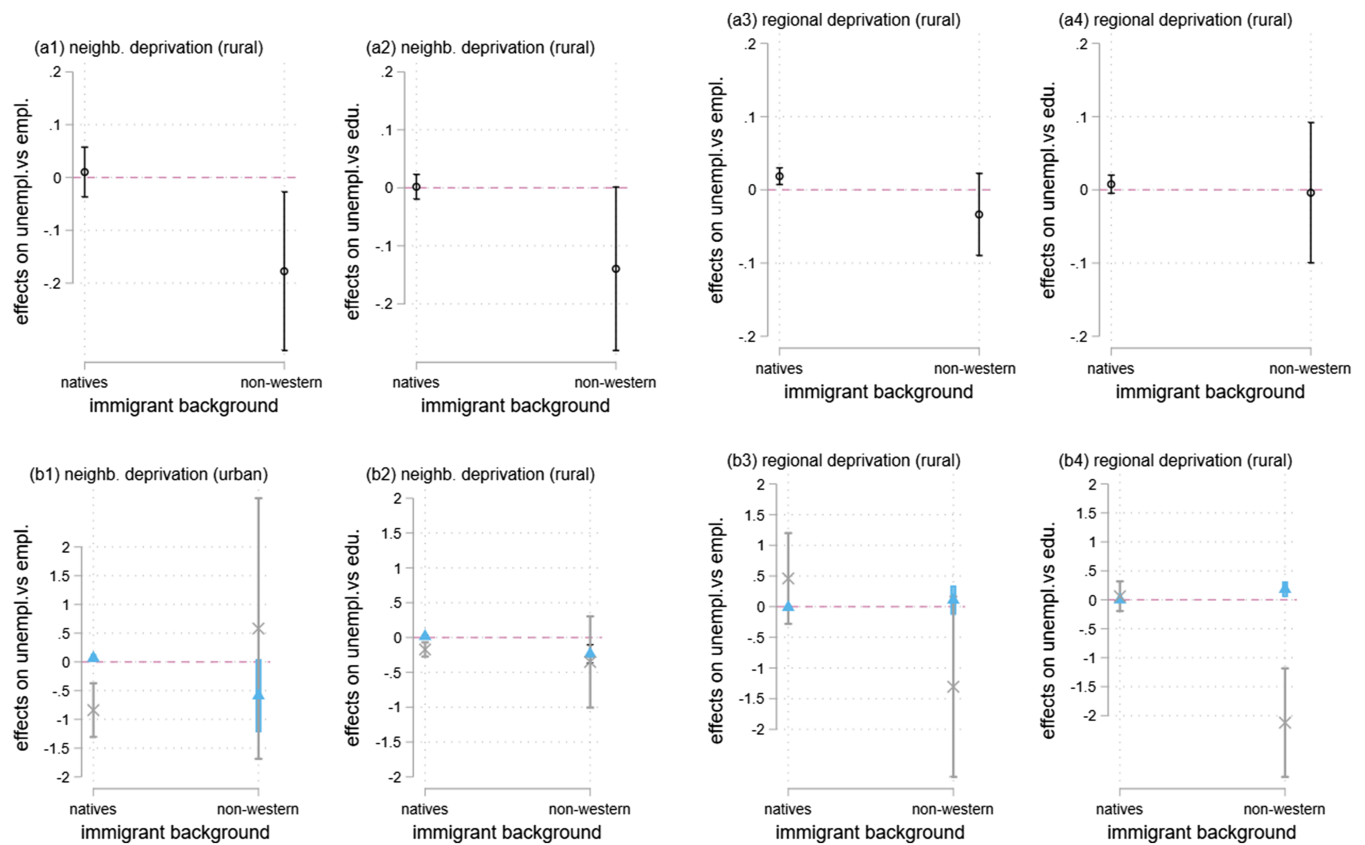


FIGURE A2 Interaction effects (rural). Average marginal effects of regional and neighbourhood deprivation on unemployment risk for immigrants and natives (upper panel) and for immigrants and natives with share of non-Western immigrants in neighbourhood (lower panel). The blue triangles indicate low shares of non-Western immigrants and the grey X's indicate high shares, grey surface: 95% CI. Data: ROA School Leaver Survey (2013) and CBS (2014)

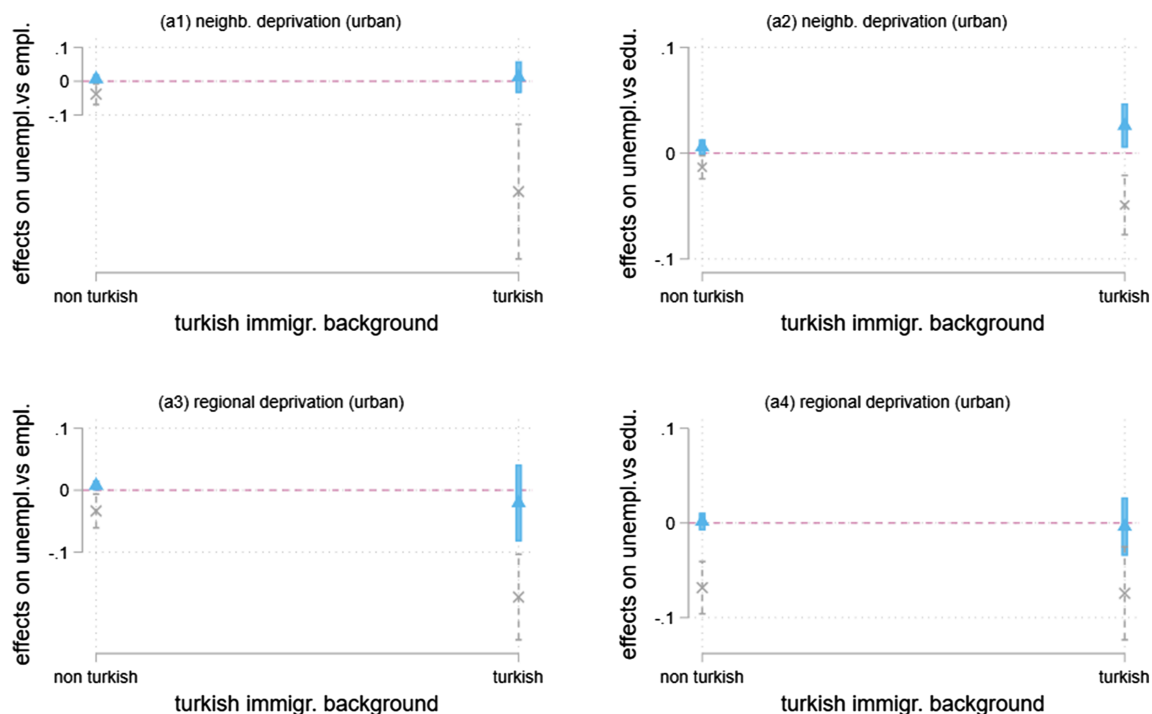


FIGURE A3 Interaction effects (urban). Average marginal effects of regional and neighbour hood deprivation on unemployment risk for Turkish and natives with share Turkish immigrants in neighbour hood. The blue triangles indicate low shares of non-Western immigrants and the grey X's indicate high shares, grey surface: 95% CI. Data: ROA School Leaver Survey (2013) and CBS (2014)