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ORIGINAL ARTICLE

Open Access



Small differences matter: how regional distinctions in educational and labour market policy account for heterogeneity in NEET rates

Johann Bacher^{1*}, Christina Koblbauer¹, Heinz Leitgöb² and Dennis Tamesberger³

Abstract

Labour market and education policy makers and researchers are increasingly focusing on the NEET indicator as a supplement to the youth unemployment rate. Analyses of factors influencing NEET have concentrated primarily on individual characteristics such as gender and migration background on one hand, and on macro-level factors of nations such as economic growth and minimum wage regulations on the other. However, nations are not homogenous, especially when a country is divided into several federal states, as is the case with Austria. This article aims to analyse regional differences within Austria. In order to explain the differences, we define a multilevel model that contains four contextual factors: the importance of upper secondary education; the importance of dual education; vacant jobs; and expenditures for active labour market policy. Because the institutional level addresses different age groups, the analysis was split into two age groups: 15–19 and 20–24 years. The results have shown that, besides the social structure of the population, contextual factors like the upper secondary education, the dual education, vacant jobs, and expenditures for active labour market policy are also relevant for explaining regional differences in the NEET rates. But one main insight was that the impact of the contextual factors varies between different social groups.

1 Introduction

Policy makers and researchers in the area of labour market and education are increasingly focusing on the youth not in employment, education or training (NEET) indicator as a supplement to the youth unemployment rate (see, inter alia, Barham et al. 2009; Dietrich 2013; Eurofound 2011; EC 2011a, b; Finlay et al. 2010; OECD 2014). This indicator measures the share of young adults who are not in employment, education or training against the whole

population aged between 15 and 24.¹ As of 2014,² the NEET rate is 12.5% for the EU28 countries; Italy has the highest rate (22.1%) and the Netherlands, with 5.5%, has the lowest. With 7.7%, Austria has one of the lower NEET rates.

Analyses of factors that influence NEET (see, for example, Dietrich 2013; Eurofound 2012) have focused mainly on individual characteristics such as gender, migration background, etc., and on macro-level factors of nations, including economic growth, the education system and labour market institutions. Most of the cross-country analyses are facing the problem of cross-national comparability and a large variation in the economic, institutional and cultural context. Therefore, it might be useful

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¹ The definition of the 15–24 years age group implies an over-representation of low-educated workers in the sample. Most higher education students are still in the education system at ages 15–24 by definition and thus cannot be in risk of being unemployed or temporary workers yet. However, we will apply this established definition to make international comparability (EC 2011c) possible, though we will distinguish between two age groups.

² Eurostat (2016).

to focus on differences within a nation, especially when the country is divided into several federal states.

Austria is an example of a federal state, and comprises nine subnational provinces. These individual regions of Austria differ considerably in number of inhabitants (as of 2014, Vienna had 1.8 million people, while Burgenland had 300,000) and social structure (as of 2014, 40.7% of people in Vienna had a migration background, compared to 10.9% in Carinthia). As of 2014, the NEET rates of Austria's federal states varied from 5.6% (Salzburg) to 11.1% (Vienna).

Despite recent investigations into federalism (see, *inter alia*, Biela et al. 2013; Hueglin and Fenna 2015; Skogstad et al. 2013; Verrelli 2014), empirical policy research has largely ignored regional differences within countries in the field of social policy; or, more probably, research reports in these fields have not been published (for exceptions see, *inter alia*, Aguilar et al. 2013; Blum and Schiemer 2015; Mätzke and Oliver 2014). This diagnosis also applies to Austria. In the discussion about varieties of capitalism (Hall and Soskice 2001), Austria is identified as a coordinated market economy, which is characterised by strong industrial relations with a coordinating function in the economy and a vocational system, which provides very specific skills (Busemeyer 2013). At first view, the Austrian dual apprenticeship system fits well in this typology. However, there are significant regional differences concerning the enrolment of young people in the dual apprenticeship system. In Upper Austria, 35% of all students in upper secondary education are in dual apprenticeships, whereas the corresponding proportion in Burgenland is only about 15%. The dual apprenticeship system is a main influencing factor on the NEET rate (Eurofound 2012; Tamesberger 2015). Therefore, neglecting regional differences may result in a restricted explanation of the NEET phenomenon in Austria.

The current article aims to deepen knowledge concerning the causes of regional differences in NEET rates within Austria and to specify individual and contextual effects. Therefore, the following research question will be discussed: How can the differences in the NEET rates between the federal provinces be explained, and what influences do institutional and economic characteristics of subnational states have on this rate?

To answer this question, we start by summarising the current state of research on the NEET indicator and potential institutional determinants (Sect. 2). We then reflect on regional differences and their perceived influence on the NEET rate from a theoretical perspective and deduce hypotheses for the empirical analysis (Sect. 3). The data, variables and statistical methods of the analysis are portrayed in Sect. 4. We present the

results of our empirical study in Sect. 5 and discuss them in Sect. 6.

2 State of research

2.1 Youth unemployment and the NEET labour market indicator

As mentioned above, there is an increasing focus on the NEET indicator and a rapidly growing state of research (Barham et al. 2009; Dietrich 2013 and Dietrich et al. 2015; Dietrich and Möller 2016; Eurofound 2011; EC 2011a, b; Finlay et al. 2010; Maguire 2013, 2015; OECD 2014; O'Reilly et al. 2015). The advantage of this indicator is that, unlike the youth unemployment rate according to the ILO labour-force-concept (LFC) (Statistik Austria 2010), it also includes young people who are out of the labour force, are not actively searching for a job or who are not available for work within the next two weeks. The only precondition for being categorised as NEET is that the person is not employed, in education or in training. At the same time, the broad definition of the NEET indicator has evoked criticism (see, *inter alia*, Finlay et al. 2010; Furlong 2006, 2007; Tamesberger and Bacher 2014; Yates and Payne 2006). The NEET group is characterised by high heterogeneity because the indicator groups together young people with very different problems and needs. Young adults can belong to the NEET group if they are unemployed and without further education, as well as if they are high school graduates who take a break between school and university. Therefore, it cannot be generally assumed that all young people in the NEET group are socially excluded. Furlong (2006) criticised the NEET indicator for being too narrow because, for example, precarious jobs that can also be associated with a high risk of social exclusion are not included. A further disadvantage is that overcoming NEET status by taking up a training course does not necessarily mean a sustained end of social exclusion. Tamesberger and Bacher (2014) asked whether the NEET indicator should be adapted to exclude young mothers with care responsibilities who are not actively looking for a job, which would reduce the heterogeneity significantly. We will account for these criticisms in the data analysis.

Concerning the causes of NEET status, Eurofound (2012) has provided comprehensive empirical evidence with individual-level socio-structural factors such as health problems, migration background, low education, living in remote areas, and poorly educated parents with low income on the one hand, and a number of macro-structural characteristics of the EU member states on the other. Here, GDP growth has a negative but weak influence on the NEET rate. Further, Eurofound (2012, p. 55f) shows a strong positive correlation between the

NEET rate and the general unemployment rate, meaning that a shortage of available jobs seems to be the main cause of NEET. This result is in line with the literature concerning the influence of the general economic development on youth unemployment (see, for example, Bell and Blanchflower 2011; Dietrich 2013; Freeman and Wise 1982, p. 8; O'Higgins 1997; Scarpetta et al. 2010). Moreover, Dietrich and Möller (2016) also referred to the relevance of country-specific factors—institutions, traditions and characteristic structures—in explaining disparities between European countries.

Regarding institutional factors, significant research has been done concerning labour market regulation and its influence on youth unemployment, though still showing a heterogeneous picture. On the one hand evidence exists for the problem of an “insider–outsider” labour market caused by a strict employment protection legislation (EPL), which lowers transition probabilities from school to work and decreases the youth employment rates (Bassanini 2006; Breen 2005; Russell and O'Connell 2001); on the other hand, in the case of a recession, employment protection legislation keeps employed young people in the job (O'Higgins 2012; Wolbers 2007). Even though, Noelke (2011) criticises the discussion on EPL and youth unemployment because of the unclear causal effects, he shows in a more recent and empirical sophisticated article (2016) that deregulating temporary contracts increases youth unemployment rates and lowers youth employment rates.

Another institutional factor is active labour market policy. Eurofound (2012) showed that the expenditure for active labour market policy is able to reduce the NEET rates of European states. Similarly, Russell and O'Connell (2001) found—on the basis of data from the European Community Household Panel (ECHP) for nine countries—a strong positive influence of active labour market policy on young people's employment. Tamesberger (2015) pointed out that the active labour market policy helps young people in particular to move out of an out-of-labour status.

Regarding youth unemployment and transitions from school to work, one of the most influencing factors seems to be the vocational system. There is consensus in the literature that the dual apprenticeship system has a positive influence on the employment situation of young people (see, for example, Breen 2005; Biavaschi et al. 2012; Eurofound 2012; O'Higgins 2012; Quintini et al. 2007; Shavit and Müller 2000; Wolbers 2007). For instance, Wolbers (2007) showed that in countries with a strong dual apprenticeship system, the likelihood of entering a first significant job is greater than in countries without such a system. According to Steiner (2009), the dual apprenticeship system has a distinctive integration function

because it absorbs youths who are leaving school early for certain reasons. Busemeyer (2013), the Cologne Institute for Economic Research (2010), Hofäcker and Blossfeld (2011) and Steiner and Wagner (2007) have also shown that countries that place high importance on the dual apprenticeship system show lower levels of youth unemployment. The majority of previous research with this focus has not proved simultaneously macro- and micro-level factors meaning to analyse cyclical, institutional and individual factors in one model. Therefore, de Lange et al. (2014) applied a multilevel analysis on the basis of data on young people from 29 countries who participated in the European Social Survey 2002, 2004, 2006 and 2008. One of the main results was again that in countries with a more specific vocational system, young people are less frequently unemployed or in temporary work. However, an important finding through the multilevel analysis was that this “safety function” of vocational systems works only for young people with higher education, with young people with lower education facing more difficulties in finding a permanent job.

In this article, we advance the above-mentioned studies in at least three ways. First, contrary to most of the cross-country studies, the focus here is on regional differences within a country. Second, in the analysis we are controlling for motherhood and for young people waiting for university entry or for civil or military service to eliminate the limitation of the classic NEET concept. Third, a multilevel analysis will be applied, which makes it possible to identify different effects of institutional, economic and individual factors on the NEET rate.

2.2 The influence of Austrian federal states

The international findings mentioned above suggest that structural characteristics also cause differences in the NEET rates at the subnational level of the federal states. As mentioned, the Austrian political system is a federal one. All subnational states have different financial resources and possibilities to shape the educational system, the economy and the labour market policy. Mätzke and Stöger (2015) assumed that regional governments in Austria commonly have an informal influence on federal politics, so that each federal state can pursue and assert its own individual interests. Therefore, the real power of federal states is actually much larger than some might anticipate from a legal perspective. Austria's federalism is braced in the federal constitution (Pelinka 2009). Article 15 (1) of the constitution states that all matters that are not explicitly assigned to the federation fall within the competencies of the provinces. The federal constitutional law (BV-G) defines a broad range of responsibilities that are assigned to the federal government in legislation and implementation (Pelinka 2009; article 102 (2) BV-G), so

that the subnational states are, from a legal perspective, in a weaker position (Erk 2008, p. 17). However, the legislation permits that the federation voluntarily entrusts the provinces with the enforcement of certain tasks [article 102 (3) BV-G]. As mentioned, regional governments and their leaders have a strong informal influence on the federal government; for example, the election winners on the federal level ensure that members of the federal states become ministers in the new cabinet. This “unwritten law” guarantees that important federal states have a representative in the new government.

Austria’s upper secondary educational system contains four main types of schools³: academic secondary school (“Gymnasium Oberstufe”, AHS-Oberstufe); colleges for higher vocational education (“Berufsbildende Schulen”, BHS); schools for intermediate vocational education (“Berufsbildende Mittlere Schule”, BMS); and apprenticeships (dual education and vocational education). Academic secondary schools are 4 years in duration, and colleges for higher vocational education are 5 years. Both school types finish with a general qualification for university entrance. This is not the case for the other school types like apprenticeships, which are a characteristic of the Austrian, German, Danish and Swiss school systems (Ebner 2013). In the dual apprenticeship system young people are employed for practical training in a company and simultaneously attend a school. In order to meet the compulsory education of nine years, the students have to attend a pre-vocational school (“Polytechnikum”) before they can start an apprenticeship.

In Austria, the legislative and administrative responsibility for upper secondary education rests with the federal government [article 14 (1) BV-G]. However, public compulsory schools, which include vocational training schools, are assigned to the federal provinces. This means that each federal state is responsible for setting up and maintaining schools for dual vocational training. Moreover, the provinces and municipalities participate in financing upper secondary education (Statistik Austria 2015, p. 82f). The fact that each subnational state has the opportunity to pursue specific educational objectives is reflected in the varying importance of the different school types. The National Report on Education (Vogtenhuber et al. 2012, 34f) shows that the share of pupils in (general and vocational) upper secondary education and dual vocational training⁴ differs considerably between the Austrian federal provinces. In Upper Austria, 35% of all students in upper secondary education are in dual apprenticeships, whereas the corresponding proportion

in Burgenland is only about 15%. Upper Austria shows a rather low share of pupils who attend general upper secondary education, whereas Vienna has the highest proportion. One of the few regional research results for Austria was provided by Poschalko et al. (2011), who analysed the federal provinces of Austria concerning institutional determinants on the transition from school to work. The analysis focused on the proportion of young people without further education after compulsory schooling. One main finding was that, in the federal provinces in the West (Vorarlberg, Tirol, Upper Austria), young people with migration backgrounds often have no further education past compulsory schooling. The authors explained this mainly by the dominance of a dual apprenticeship system in these provinces.

A similar federal division of responsibilities can be observed in relation to the labour market policy in Austria. The Austrian government uses active labour market policy intensively to combat unemployment in general, particularly for young people. There is a wide range of instruments, from short-term work and governmental funding to increase the employment possibilities of special target groups to classical training programmes.⁵ With regard to young people, Austria introduced a so-called “youth safety net” at the end of the 1990s. At the beginning of the financial and economic crisis in 2008, the “youth safety net” was further developed to a youth guarantee scheme that should ensure that every young person who wishes to embark upon training will get a place in a company or a special workshop. There are currently four main parts of active labour market policy for young people in Austria: measures of supra-company training; measures to increase the supply of apprenticeship opportunities; measures to prepare young people for vocational training; and particular qualification and employment programmes for unemployed individuals aged 19–24 (BMASK 2012b). It has become clear that in Austria—contrary to other youth guarantee schemes, such as those in the Nordic countries—there is a stronger focus on the vocational training in the active labour market policy for young people (Tamesberger 2015).

Even though the labour market policy is basically the responsibility of the federal government—particularly the Federal Ministry of Labour, Social Affairs and Consumer Protection [§1 (1) Arbeitsmarktförderungsgesetz—AMFG]—, the federal provinces have a considerable influence. Labour-market-related services of the federal government are mainly provided by the public employment service (PES), which is an enterprise under public

³ See, for example, OEAD (2016).

⁴ For more details on the Austrian “dual vocational training system,” see Lassnigg (2011, 2015).

⁵ It would be beyond the scope of this article to describe all instruments in detail. More information about active labour market policy in Austria is provided by BMASK (2012a).

law [§1 (1) Arbeitsmarktservicegesetz—AMSG]. The Austrian PES comprises one federal organisation, nine provincial organisations (one in each federal state) and 104 local organisations (§1 (2) AMSG; Arbeitsmarktservice 2016). In Austria, the social partners are involved at all these levels, and therefore have a significant influence on labour market policy (provincial employment schemes) (Arbeitsmarktservice 2014).

The federal PES organisation is responsible for defining the obligatory labour market guidelines, which are equally valid for all federal states. These universal guidelines are supplemented by specific targets for each federal state (Bock-Schappelwein et al. 2014, p. 10). In turn, the provincial organisations develop objectives for the local organisations, which are responsible for the practical implementation of the labour market policy (Graf et al. 2010, p. 49).

Apart from the educational system and the labour market policy, the federal state governments can also have an influence on the regional economic policy; for example, by introducing fiscal stimulus packages or by promoting investments in the regional economy, which can shape the number of available jobs. In that context, Brenke (2013) referred to a growing regional concentration of youth unemployment in Germany, which goes hand in hand with a general shortage of jobs in certain regions. In a similar vein, Boysen-Hofgreffe and Pape (2011) pointed out that a federalist country cannot be seen as a single labour market. Instead, labour market trajectories differ between the individual federal states. The authors attributed this observation partly to the specific regional business fluctuations and labour market policies in Germany. Also, wide disparities concerning the number of vacancies per 1000 unemployed people can be observed between the Austrian subnational states (Statistik Austria 2016a, b). Furthermore, Bauer et al. (2010, p. 133 ff) showed that the expenditure on promoting economic development differs considerably among the individual provinces. In 2008, Vienna spent about € 25 per capita on regional business promotion, while the corresponding figure for Carinthia and Tyrol was substantially higher, at € 120 and € 100, respectively.

3 Theoretical perspectives and hypotheses

3.1 The role of the education system

The education system plays a central role in the debate on varieties of capitalism (Hall and Soskice 2001). In liberal economies, it is assumed that the education system provides more general skills, supporting the mobility of labour and leading to more radical innovations, like biotechnology or IT. In contrast, coordinated economies provide especially firm-specific knowledge which is associated with incremental innovations, like the production of

quality products in the automobile industry. As Busemeyer (2013) pointed out, the vocational education is typical for coordinated economies and depends heavily on the industrial relations. The dual-apprenticeship system is a typical example where through a combination of school and work-based elements, firm-specific skills are learned. As mentioned in Chapter 2, the dual apprenticeship seems to ease the labour market entry of young people and contributes to a relatively low youth unemployment rate (Breen 2005; Biavaschi et al. 2012; O'Higgins 2012; Quintini et al. 2007; Shavit and Müller 2000; Wolbers 2007). This circumstance is theoretically explained mainly in four ways. First, in those countries where the (vocational) educational system provides firm-specific skills, there is a strong link between the education system and the labour market as well as with firms. This link influences the recruiting process because demanded qualifications are provided which can contribute to a positive economic development (de Grip Maarten 2006; Ryan 2000). Second, an early direct contact between young people and companies, for example in the case of the dual-apprenticeship system or in other forms like long-term internships, can work as a screening device besides (bad) school certifications (Solga and Menze 2013). Third, a certified vocational education has a “signalling effect” on the labour market (Gangl 2002; Moser and Lindinger 2014), which can ease the labour market entry after finishing the vocational education. Fourth, the combination of theoretical learning in the vocational school and practical activities in companies is an attractive alternative for young people who are “tired” of the typical school system and intend to leave school. This can contribute to reducing dropout rates (Ryan 2000). However, the strong link between the vocational system and the labour market, or rather, with companies, also has negative effects. Young persons with poor school education and migrants, in particular, have problems accessing apprenticeship places. Solga and Menze (2013, 8) claimed that due to the market mechanism in the apprenticeship, unequal chances from the general school system are continued in the vocational system. There are also indications of discriminatory recruitment practices by firms (Herzog-Punzenberger and Schnell 2012, p. 256; Poschalko et al. 2011; Solga and Menze 2013). It has been empirically shown that young people with low education do not benefit from a more specific education system like the dual apprenticeship system (de Lange et al. 2014; Wolbers 2007). In Austria, the target group of the dual apprenticeship system is primarily the age group 15–19 years. Accordingly, we assume that the dual apprenticeship system has a negative influence on the NEET rate of young people between 15 and 19 years of age (H1a).

The often-criticised selective access (Herzog-Punzenberger and Schnell 2012; Kohlrausch 2012; Solga and

Menze 2013) to apprenticeship places makes it possible to expect that the NEET risk of migrants aged between 15 and 19 years will be higher in those provinces with a strong dual apprenticeship system (H1b). In addition, we assume an effect of the provision with upper secondary education. Upper secondary education in Austria covers different kinds of schools (see above and OEAD 2016): Schools for Intermediate Vocational Education (BMS), Colleges for Higher Vocational Education (BHS) and Academic Secondary School Upper Cycle (AHS Oberstufe). The last two provide the qualification for university entrance and are attended by young people between 15 and 19 years of age. The federal states differ in the provision of these school types of upper secondary education (see below), and the engagement of teachers depends on the number of students. Therefore, we can assume that teachers try to keep students in the system to secure their position. Furthermore, in the case of general job shortage, young people may choose the alternative option of remaining longer in the educational system if there is a higher number of available places in upper secondary schools. These two effects result in a lower NEET rate of young people between 15 and 19 years in federal states with a higher provision of upper secondary school (H2a).

3.2 The role of economic performance

In investigating the youth unemployment rate and the NEET rate, it is essential to consider the general economic situation. Earlier research results (Bell and Blanchflower 2011; Dietrich 2012; Eurofound 2012) revealed that business fluctuations play an important role for the labour market integration of youths. Furthermore, there is evidence (OECD 2008; Gangl 2002; Scarpetta et al. 2010) that youth unemployment is even more sensitive to changes in economic conditions than overall unemployment.

In times of economic crisis, fewer vacancies exist for more unemployed people. Under these circumstances, youths take in the role of 'outsiders' in the labour market because they lack the knowledge and skills required for a specific job (de Lange et al. 2014; Scarpetta et al. 2010). Thus, in the case of general job shortage, employers prefer experienced workers to labour market entrants with little work experience. Additionally, Clark and Summers (1982) argued that the main reason for youth unemployment is job shortage; that is, a low number of vacancies on the local labour market. Eurofound (2012) considered that it is necessary to increase the number of available jobs to achieve a long-term reduction of the youth unemployment rate and the NEET rate.

Thus, it can be expected that the number of available jobs has a negative influence on the NEET rate: the more

jobs available in a province, the lower the NEET rate will be (H3) We assume no difference between age groups, as all young people are faced with this development.

3.3 The role of active labour market policy

There is a broad consensus in research that long duration of unemployment reduces the probability of re-employment (Calmfors 1994; Jackman and Layard 1991; Shimer 2008; Wolbers 2000). This circumstance is theoretically explained in two ways (Bean 1994; Jackman and Layard 1991; Phelps 1972; van der Velden et al. 2001). First, long-term unemployment causes a loss of human capital. Second, long-term unemployment weakens working habits. Losing one's daily routine and rejected job applications result in declined job-seeking activities and motivation to get back to work.

A promising measure to limit the loss of human capital and work moral is active labour market policy (ALMP). Calmfors (1994) sums up three basic functions of ALMP. First, it provides support in the job seeking process with the objective to maintain active job seeking activities and to match job seekers and potential vacancies in an efficient way. Second, ALMP offers training courses. Youths who are in training courses are able to maintain acquired skills respectively their human capital and additionally participation structures their daily routine. Third, it creates new jobs. This can be either achieved by creating additional jobs in public sector or by subsidizing employment of specific groups in private sector.

As already mentioned in Sect. 2 empirical investigations (Bacher et al. 2014; Eurofound 2012; Russell and O'Connell 2001) provide evidence that high expenditure on active labour market policy increases the probability of re-employment for young people. However, Heckman et al. (1999) emphasised that the success of ALMP may differ significantly between various programmes. Nevertheless we expect that the expenditure for active labour market policy has a negative influence on the NEET-rate (H4a) because higher expenditure for active labour market policy leads to more available training courses by the PES that can be used by young unemployed so that they are per definition no longer NEETs. In contrast to the educational system we expect that ALMP-measures addresses to all young people in the age between 15 and 24 years.

Earlier research results (Bacher et al. 2014; Bergemann and van den Berg 2006; Hofer and Weber 2006; Martin 1998) indicate that active labour market policy reduces the NEET-risk of women in a greater extent than the risk of men. For several years the Federal Ministry of Labour, Social Affairs and Consumer Protection calls for raising women's share in active labour market policy to 50% of total budget. To achieve this objective most federal states

provide specific measures for the promotion of women (Lutz et al. 2013, p. 5f). Therefore, we consider that an increase in expenditure for active labour market policy is primarily used to expand the supply of specific training courses for women to meet the 50% target. Concrete we hypothesise that the NEET-reducing effect through active labour market policy is only significant for females (H4b). Again we assume no difference according to age.

Against this background, Fig. 1 shows the general explanatory model used in this article to explain differences in the NEET-rates between the Austrian subnational states. We expect that, in addition to socio-structural characteristics, the provision of upper secondary education, the provision of dual vocational training, the number of vacancies (as an indicator for economic performance) and the expenditure for active labour market policy will all have an impact on the NEET-rate and are therefore partly responsible for differences between the federal states.

4 Data, measurement and analytical strategy

4.1 Data

The Austrian Labour Force Survey (micro-census) (Kytir and Stadler 2004) serves as database on individual-level, conducted quarterly for the period from 2006 to 2012. The micro-census uses a household sample stratified by regions (Haslinger and Kytir 2006). In a first step, an approximately equal number of households is selected within each federal province of Austria. Within these selected households, all people aged 15 or older are included in the survey. According to the rotating panel design, each household remains in the survey for five consecutive quarters. In line with the international research literature (European Commission 2011a, b), we analysed young people aged between 15 and 24 years. To avoid problems with autocorrelations, we considered each of these young persons only once, focusing on the

first observation when entering the panel. The final data set comprises data of $n = 32,728$ youths, whereof $n = 16,942$ belong to the 15–19 age group and $n = 15,728$ to the 20–24 age group. As theory suggests different mechanisms to be at work in how the context-level variables of interest influence the individual NEET risk between these two age groups (see Sect. 3), we decided to split the sample and conduct separate analyses. Unequal selection probabilities are compensated by applying sampling weights.

The individual-level data from the Labour Force Survey is merged with contextual data on the level of the nine Austrian federal states. This data contains institutional information on educational and economic characteristics (such as the provision of upper secondary education and dual vocational education) and originates from several data sources (see Table 1 for details). Because the institutional data is still available only for the period from 2006 to 2012, we have to limit the analysis to this time span. In total, we have 63 state-year observations (nine Austrian federal states over seven years).

4.2 Operationalisation

4.2.1 NEET risk

The dependent variable under investigation is the NEET rate, defined as the share of youths who are currently not in employment, education or training out of the whole population aged between 15 and 24 years. For the period from 2006 to 2012, the overall NEET rate is 8.0% (se = .86; cluster robust standard error to account for nesting within federal states). Figure 2 reveals considerable variation in NEET rates between federal states and age groups. Older youths (aged between 20 and 24 years) are consistently confronted with a higher NEET risk than the 15- to 19-year-olds. A plausible explanation might be the comparatively stronger integration of the younger age group in the formal educational system, while the older youths are more or less inevitably exposed to labour market regularities without that strong institutional protection in terms of inclusive functioning (see arguments above).

The heterogeneity in NEET rates between federal states is partially caused by divergences in the socio-structural composition of the target population with regard to gender, size of municipality, country of birth (Austria or other) and citizenship (Austrian or other). As can be learned from the two bar graphs in Fig. 2, controlling for these compositional differences results in a marked tendency of NEET rates to converge.⁶ In detail, 69.0% of the

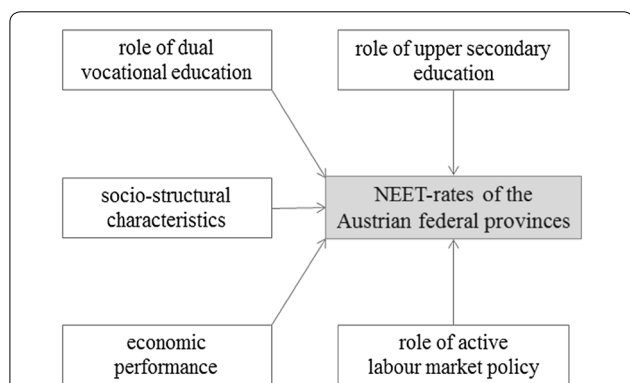
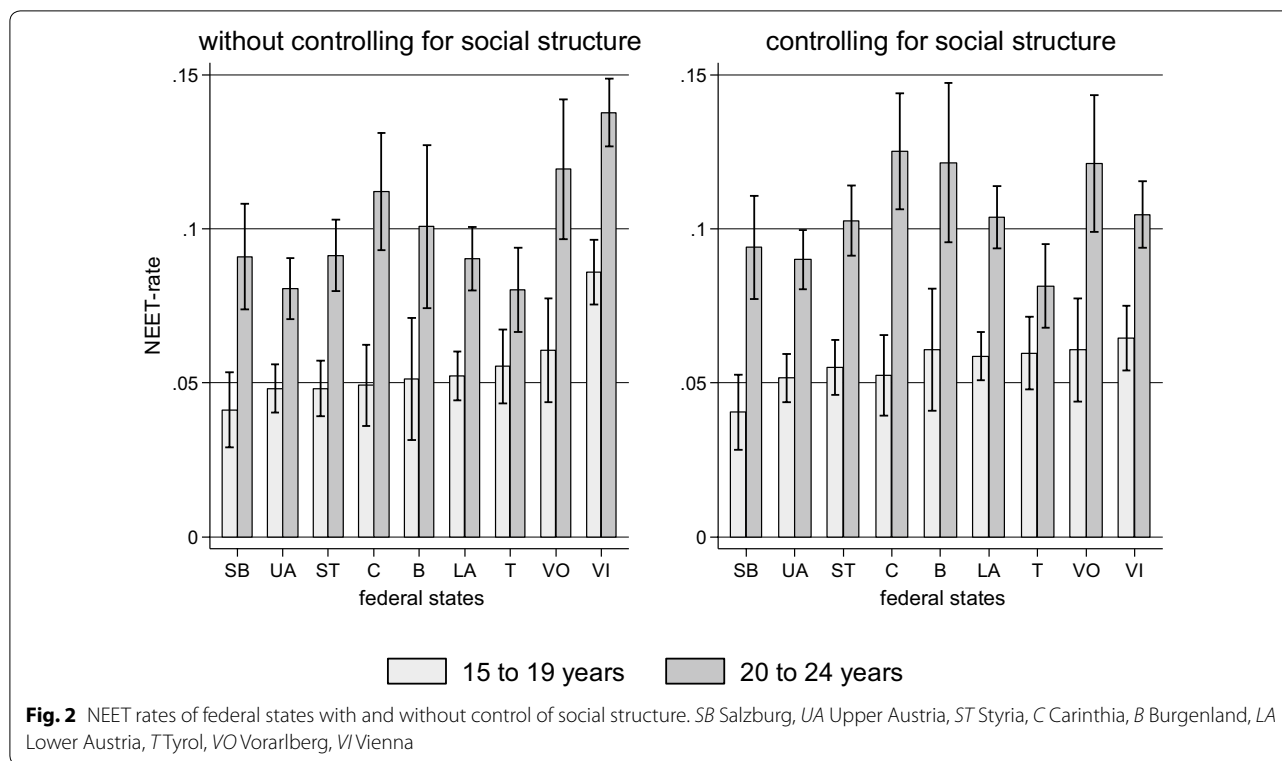


Fig. 1 Empirical model for the explanation of differences in the NEET rates between the Austrian federal states

⁶ Adjusting NEET rates at the federal state level for compositional effects is based on the method of “fair comparisons” described in Additional file 1: Appendix A.

Table 1 Independent variables

Variable	Operationalisation	Source	Mean SD	Min Max
<i>Context-level variables (i = 63 federal state-years)</i>				
Provision of upper secondary education (SECED)	Number of teachers in upper secondary schools per 1000 youths aged between 15 and 20 years	Number of teachers: "Zahlenspiegel" provided by the Federal Ministry of Education and Women's Affairs Number of youths aged between 15 and 19 years: Labour Force Survey	49.9 28.5	42.6 67.9
Provision of dual vocational education (VOCEED)	Proportion of apprentices of all students in upper secondary education (%)	(1) Number of apprentices: "Lehrlingsstatistik" provided by the Austrian Economic Chambers (2) Number of students in upper secondary education: "Zahlenspiegel" provided by the Federal Ministry of Education and Women's Affairs	28.6% 6.2%	17.0% 41.4%
Economic performance (JOBS)	Vacancies per 1000 people in the Working-age population	(1) Vacancies: Statistics Austria (2) Number of people in the working-age population (15–64 years): Labour Force Survey	7.7 2.4	3.6 14.4
Role of active labour market policy at the federal level (LMPOL)	Expenditures for active labour market policy of the federal government per each unemployed youth aged between 15 and 24 years	(1) Expenditure for active labour market policy of the federal government: provided by the Federal Ministry of Labour, Social Affairs and Consumer Protection (2) Number of unemployed youths: Labour Force Survey	7125.2 1474.0	4764.3 12,753.5
Variable	Operationalisation	Source	Mean	
<i>Individual-level control variables [n (15–19) = 16,942; n (20–24) = 15,786]</i>				
Age (AGE)	1 = 20–24 years 0 = 15–19 years	Labour Force Survey	.523	20–24 years
Gender (FEMALE)	1 = female 0 = male	Labour Force Survey	.498	
Size of municipality	1 = up to 5000 residents (INH5000) 2 = 5001 to 30,000 residents (INH30000) 3 = 30,001 and more residents (INH+)	Labour Force Survey	.418 .217 .365 (proportions)	
Country of birth (BORN_AUT)	1 = Austria 0 = other	Labour Force Survey	.827	
Citizenship (CITIZ_AUT)	1 = Austrian citizenship 0 = other	Labour Force Survey	.867	
First interview in third quarter (QUARTER3)	1 = yes 0 = no	Labour Force Survey	.245-	
Motherhood (MOTHER)	1 = yes 0 = no	Labour Force Survey	.047	



variation in NEET rates in the 15–19 age group and 37.6% in the 20–24 age group can be accounted for by socio-structural heterogeneity between federal states. Particularly Vienna, as Austria’s largest city and capital, is profiting from adjusting for compositional differences. Its exceptionally high unconditional NEET rates can to a large extent be explained by the increased share of young immigrants without Austrian citizenship living in Vienna (Statistik Austria and Kommission für Migrations- & Integrationsforschung der Österreichischen Akademie der Wissenschaften 2016, 80ff). Under the assumption of having an equivalent social structure in all federal states, Vienna’s NEET rates decrease considerably in both age groups, leading them to converge with the other federal states’ rates.

4.2.2 Independent variables

Table 1 describes the independent variables that are considered to have an impact on the federal states’ NEET rates. The ratio of teachers in upper secondary schools to young people between 15 and 20 years of age was used as an indicator for the provision of upper secondary education. Teachers in academic secondary schools, colleges for higher vocational education and schools for intermediate vocational education are included in the variable. On average, the ratio of teachers in secondary schools to young people aged between 15 and 20 is 51.3

(see Table 1). Remarkable differences exist between the federal states; the ratios range from 42.6 to 67.9.

Apprenticeship (namely dual education and vocational education) was used as an own variable. The variable “provision of dual vocational education” is defined as the ratio of students in the dual system to students in upper secondary education. Only apprenticeships provided by companies are counted. In the last years, apprenticeships outside companies have become more important, and the practical training takes place in schools. Students in this kind of apprenticeship are not included because these apprenticeships are financed by resources of active labour market policy. If they were included, they would be double-counted. On average, the ratio is 29.6, which means that out of 100 students in upper secondary schools, 29.6 are in vocational training. Again, there are considerable differences among the federal states: the lowest value is 17.0, and the highest 41.4.

The purpose underlying the consideration of the variable “economic performance” is to cover the whole situation and is not limited to young people. The variable reflects the fact that youth unemployment depends on overall unemployment (see, inter alia, Bell and Blanchflower 2011; Gangl 2002; Tamesberger 2015). As previously mentioned, Eurofound (2012) indicated a weak correlation between GDP growth and the NEET rate, but a stronger correlation between the adult unemployment

rate and the NEET rate. Eurofound (2012) concluded that the NEET rate is mainly influenced by labour demand, or rather, by labour market tightness, which is better captured by adult unemployment. Against this background, we operationalise labour demand by the number of vacant jobs, which seems to be a more direct indicator for labour market tightness than the adult unemployment rate. On average, 7.6 vacant jobs are available for 1000 persons in the active labour force population (aged between 15 and 64 years). Again, there are clear differences among the federal states; the values range from 3.6 to 14.4.

In contrast to the economic performance, the variable “role of active labour market policy” refers to young people exclusively. On average, active labour market policy spends € 7145 for each unemployed young person per year. Young people in measures of ALMP are classified as being in training and therefore they are not in a NEET status.

In addition, gender, age, place of residence, country of birth, citizenship, motherhood and an indicator for being interviewed in the third quarter of the year included dichotomous explanatory variables at the individual level. The last two variables (motherhood and third-quarter interview) serve as controls for two problems related with the NEET indicator’s definition described in Sect. 2.1: the dummy for third-quarter interviewing should account for NEET status just as a consequence of being in a waiting position (for the start of, for example, university, military or civil service) after having finished school. As these activities usually start in the autumn (October), the probability of being in such a waiting position is highest in the third quarter of the year. Including the motherhood indicator is a reaction to the discussion of whether young mothers should be considered in the course of the NEET definition.

4.3 Analytical strategy

In order to test the derived hypotheses, multilevel models were specified (see, *inter alia*, de Leeuw and Meijer 2010; Hox 2010; Raudenbush and Bryk 2002; Snijders and Bosker 2012). This class of models takes into account a nested data structure and allows the appropriate inclusion of independent variables at each analytical level to avoid individualistic or ecological fallacies (Subramanian et al. 2009). This makes it possible to explore a broad range of relationships between individual- as well as context-level characteristics and the dependent variable of interest, generally located at the lowest or most disaggregated (in most cases individual) level. Here, an example is the relationship between the federal state characteristic provision of upper secondary education and the NEET status as individual-level outcome measure. Besides the fixed effects element, the multilevel model provides

extensive options to account for statistical uncertainty via the specification of random effects. These are included in the model equations by error terms.

For our analytical purposes, we specified two-level linear probability models. At the context-level 2, the Austrian federal states with $k = 1, \dots, K = 9$ and the years of observation with $t = 1, \dots, T = 7$ were combined to 63 state-years with $j = 1, \dots, J$ as units. Level 1 contains $i = 1, \dots, n$ individuals nested within these state-years.⁷

Further, we applied a hierarchical analysis strategy (Cohen et al. 2003) by estimating several nested models for each of the two age groups separately. In a first step, an intercept-only model without covariates was estimated to disentangle the level-specific variance components (model 1).⁸ Based on these results we calculated the intraclass correlation (ICC) ρ , defined as the share of variance in the outcome variable at the context levels relative to the total variance. The ICC gives an initial indication concerning the relevance of the contextual level in influencing the individual level outcome. Further, random-intercept (RI) models were estimated. Model 2 contains the defined set of covariates at the contextual level of state-years. Model 3 additionally considers the individual-level covariates. Finally, random-intercept random-slope (RIS) models including cross-level interactions were specified. These models assume that contextual factors moderate the effects of individual-level covariates. Technically, the specification of cross-level interactions allows for the explanation of an individual-level variable’s slope variance by relevant characteristics of the context-level units. For example, it can be tested whether the number of vacant jobs in state-years has a stronger negative impact on NEET risk for males than for females. While model 4 contains gender-based interactions, model 5 aims at studying the moderating effects of the set of contextual factors on the relationship between Austrian citizenship and NEET status.

Before entering the models, all context-level covariates were z-standardised and are therefore centred on their

⁷ From a methodological point, a three-level model with federal states and years cross-classified at the highest level (level 3), state-years on level 2 and individuals on the lowest level would have been preferable in order to decisively separate time from federal state effects and to get unbiased standard error estimates (Schmidt-Catran and Fairbrother 2016, Model F). However, the number of level 3 units and the associated variance are too small to let the optimisation algorithm converge given a reasonable number of iterations or to achieve stable parameter estimates. Switching from the three-level to a two-level model with individuals nested within state-years will result in biased standard error estimates if there is random variation between years and federal states (Schmidt-Catran and Fairbrother 2016). To account at least partially for this problem, we will conduct robustness tests by including year as well as federal state dummies at the state-year level into the final models 4 and 5 (see below and Additional file 1: Appendix B) and check the stability of standard error estimates.

⁸ All models are formalised in Additional file 1: Appendix B.

grand means with a common standard deviation of 1.0. Standardised context variables enable the direct comparison of their semi-standardised coefficients, which can be interpreted as the NEET probability's percentage point change associated with a covariate increase by one standard deviation. Because all individual-level covariates are dichotomous and 0/1-coded, there is no need to consider any kind of centring.

In accordance with the logic of hypothesis testing, we draw attention to the significance level when interpreting parameter estimates. Due to the small number of contextual units, effects with an associated p value equal or lower than .1 will be accepted as significant. Additionally, we introduced some relevance criteria. Since Austria already has a comparatively low NEET rate, we define a reduction (or increase) by .5% points as relevant. As a consequence, significant effect estimates of context variables with an absolute value equal or larger than .005 will receive substantive interpretation.

All models were estimated by maximum likelihood via the EM algorithm with Stata 14 by applying the *mixed*⁹ command (for details, see Rabe-Hesketh and Skrondal 2012) and robust standard errors based on the Huber-White sandwich estimator (see, for example, Hayes and Cai 2007) to compensate for heteroscedasticity as a consequence of the LPM-specification.

5 Results

Tables 2 and 3 summarise the multilevel modelling results for the two age groups. The intercept-only model 1 carves out rather small but significant intraclass correlations with $\rho = .0030$ (15- to 19-year-olds) and $\rho = .0055$ (20- to 24-year-olds), referring to only minor differences in the unconditional probability of being in NEET status between state-years and thus federal states. However, this small variation between contextual units must be seen against the background of analysing a dichotomous variable with large variance at the individual level, because individuals either hold value 0 or value 1 while the averages on the state-year level vary only within the range .04 and .14. Despite the low intraclass correlations, we are able to identify significant context variable effects when continuing data analysis. Our results confirm conclusions from previous studies that point out the fruitfulness of analysing data characterised by small ρ (Nelzek 2008).

On the individual level, stable significant influences are identified for all covariates in both age groups. The only exception is in line with our expectations: the third-quarter interview indicator has no significant impact in

the older age group.¹⁰ Being in a waiting position for university entry, civil or military service is becoming very unlikely for the 20–24 age group, and there is no rationale suggesting the existence of systematic differences between quarters. In both age groups, the strongest impact on the probability of being in NEET status can be identified for the two migration indicators (country of birth and citizenship), in each case in Austrian youths' favour. Further, females—when controlling for motherhood—are persistently confronted with a lower NEET probability than males, with a slight tendency for the gender effect to rise with increasing age. Systematic differences in young peoples' NEET probability with regard to size of municipality occur only between urban areas with more than 30,000 inhabitants and small villages with up to 5000 inhabitants. This result is in line with the NEET research in Great Britain. Bynner and Parsons (2002) pointed out that growing up in an inner-city housing estate residence negatively influences the life chances of young men in particular. Finally, the motherhood indicator—considering the fact that young females are in NEET status just because of maternity leave—has a positive impact on the NEET probability. As expected, its effect is considerably stronger in the older age group.

The remaining discussion of the results is organised in line with the structure of Sect. 3, and will therefore start with the provision of dual apprenticeships (vocational education). The graphical presentation of cross-level interactions in the form of simple slope plots (Figs. 3, 4) aims at facilitating the understanding of differential effect structures for gender and citizenship.

5.1 Dual apprenticeship

Based on hypothesis H1a, we expect a universal negative impact of the level of provision of dual apprenticeship on NEET rates in the age group of 15- to 19-year-olds. Table 2 reveals significant effects in the expected negative direction for all models. The effect becomes insignificant after controlling for individual characteristics in model 3. This is a hint that compositional differences like degree of urbanisation, share of migrants, share of mothers between the regions are responsible for the significant effect between dual system and NEET in model 2.

With referring to the results of model 3 the hypothesis H1a must be rejected. However, according to the results of model 4 and 5 we propose to modify H1a that dual apprenticeship has no general effects but specific effects on certain groups.

⁹ The mixed command is the successor of the *xtmixed* command. The syntax is almost identical.

¹⁰ To check for further seasonal effects we re-estimated the models extended by dummies for the other quarters (reference category: first quarter). Neither significant seasonal effects for quarters two and four nor relevant changes of the effect size of any other covariate could be identified.

Table 2 Linear multilevel modelling results for the NEET probability of youth aged from 15–19 years ($J = 63$; $n = 16,942$)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Fixed effects (unstandardised)					
Constant	.0558***	.0543***	.1604***	.1589***	.1568***
Context level (federal state-years)					
Upper secondary education		-.0022	-.0021	-.0036	-.0345***
Dual apprenticeship		-.0110***	-.0042	-.0103*	-.0147+
Vacant jobs		.0006	-.0024	-.0022	-.0160*
Active labour market policy		-.0058**	-.0037+	-.0023	.0053
Individual level					
Gender (1 = female)			-.0080*	-.0048	-.0081*
More than 30,000 inhabitants			Reference group	Reference group	Reference group
5001 to 30,000 inhabitants			-.0014	-.0014	-.0012
Up to 5000 inhabitants			-.0126*	-.0124*	-.0123*
Country of birth (1 = Austria)			-.0270**	-.0268**	-.0259**
Citizenship (1 = Austria)			-.0852***	-.0856***	-.0822***
Third quarter (1 = yes)			.0140**	.0141**	.0144**
Motherhood (1 = yes)			.1820***	.1825***	.1806***
Cross-level interactions					
Gender * upper secondary education				.0029	
Gender * dual apprenticeship				.0123*	
Gender * vacant jobs				-.0004	
Gender * active labour market policy				-.0028	
Citizenship * upper secondary education					.0352***
Citizenship * dual apprenticeship					.0114
Citizenship * vacant jobs					.0147*
Citizenship * active labour market policy					-.0100
Random effects (variance components)					
Federal states-year intercept (τ_{00}^2)	.0001597	.0000465	<.0000001	<.0000001	<.0000001
Federal states-year slopes					
Gender (τ_{01}^2)					
Citizenship (τ_{06}^2)				<.0000001	<.0000001
Residuals (σ_{ε}^2)	.0531975	.0532090	.0515478	.0515183	.0514585
ρ (intraclass correlation)	.0029924**				

+ $p < .1$ * $p < .05$ ** $p < .01$ *** $p < .001$

Model 4 uncovers that an increase of the proportion of apprentices by one standard deviation (=6.2% points; see Table 2) is expected to significantly reduce the NEET rate of young males by approximately 1.0% points, whereas no effect is expected for young females (see Table 2; Fig. 3a). Further, the estimation results from model 5 provide some evidence that non-Austrian citizens may significantly profit from dual vocational education supply, while this is not the case for Austrians (see Table 2; Fig. 3c). However, the respective cross-level interaction effect, indicating slope differences between the citizenship groups, fails the preassigned

10% significance level (see Table 2). The same holds true for a likelihood-ratio test between models with and without cross-level interaction term. Further, since being employed is (1) a necessary condition for participating in dual vocational education and (2) highly selective with regard to migration status (Bacher 2010), dual apprenticeship policy appears to be a highly challenging task to effectively reduce the NEET probability of young non-Austrian citizens. In any case, hypothesis H1b—assuming that a higher provision of dual apprenticeships reduces the NEET rate of young migrants to a lesser extent than those of young Austrians has to be rejected

Table 3 Linear multilevel modelling results for the NEET probability of youth aged from 20 to 24 years ($J = 63$; $n_i = 15,786$)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Fixed effects (unstandardised)					
Constant	.1000***	.0993***	.2063***	.2074***	.2113***
Context level (federal state-years)					
Upper secondary education		.0041	.0059	.0119*	-.0029
Dual apprenticeship		-.0087 ⁺	.0018	.0051	.0095
Vacant jobs		-.0039	-.0078*	-.0169***	.0055
Active labour market policy		-.0105**	-.0066*	-.0080*	-.0182**
Individual level					
Gender (1 = female)			-.0140**	-.0161**	-.0141**
More than 30,000 inhabitants			Reference group	Reference group	Reference group
5001 to 30,000 inhabitants			-.0064	-.0057	-.0059
Up to 5000 inhabitants			-.0190**	-.0182**	-.0183**
Country of birth (1 = Austria)			-.0669***	-.0663***	-.0658***
Citizenship (1 = Austria)			-.0574***	-.0585***	-.0646***
Third quarter (1 = yes)			-.0013	-.0011	-.0012
Motherhood (1 = yes)			.3825***	.3825***	.3828***
Cross-level interactions					
Gender * upper secondary education				-.0117	
Gender * dual apprenticeship				-.0064	
Gender * vacant jobs				.0179**	
Gender * active labour market policy				.0027	
Citizenship * upper secondary education					.0089
Citizenship * dual apprenticeship					-.0105
Citizenship * vacant jobs					-.0138 ⁺
Citizenship * active labour market policy					.0126 ⁺
Random effects (variance components)					
Federal states-year intercept ($\tau_{U_0}^2$)	.0004989	.0002132	.0001315	.0001330	.0000808
Federal states-year slopes					
Gender ($\tau_{U_1}^2$)				.0001723	
Citizenship ($\tau_{U_6}^2$)					.0000824
Residuals (σ_ε^2)	.0906468	.0906854	.0816046	.0814484	.0815019
ρ (intraclass correlation)	.0054736***				

⁺ $p < .1$

* $p < .05$

** $p < .01$

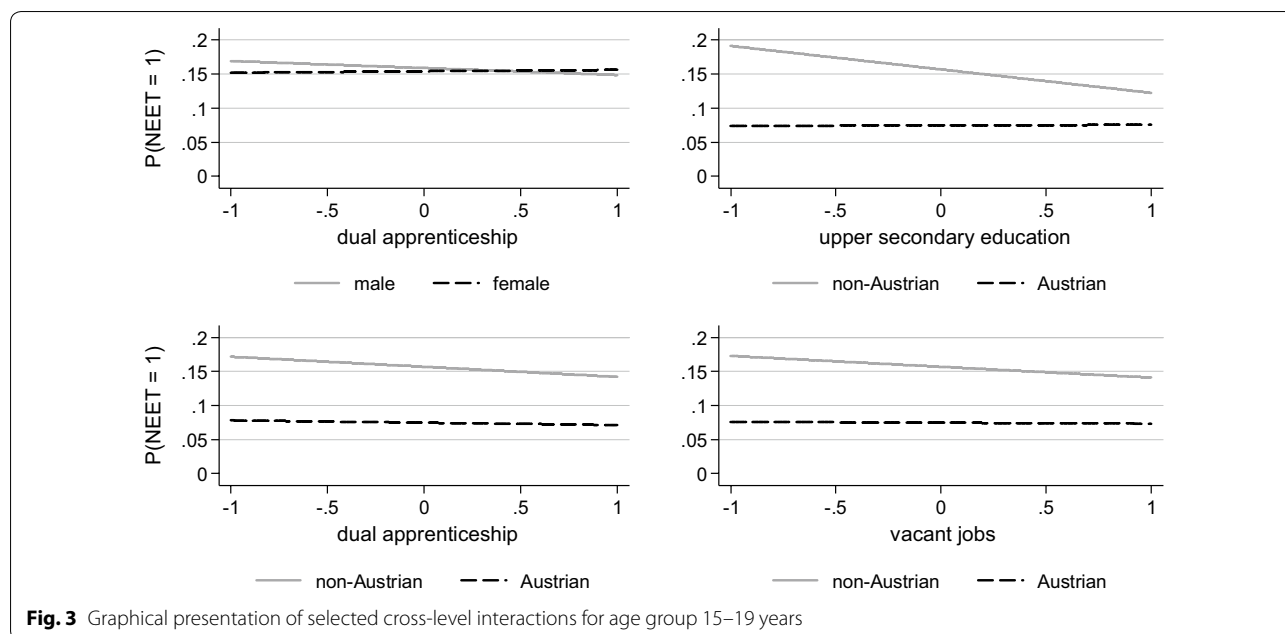
*** $p < .001$

and we cannot confirm previous findings (see Sect. 3.1). As expected, no significant effects can be identified for the older age group (20–24 years).

5.2 Upper secondary school

Hypothesis H2a assumes that a higher provision of upper secondary education reduces the NEET rate in the age group of 15- to 19-year-olds. The hypothesis has to be rejected on a general level, because only model 5, specifying a cross-level interaction with the individual-level characteristic citizenship, reveals a significant and

relevant negative impact for non-Austrians (see Table 2; Fig. 3b). In detail, an increase in the number of teachers in upper secondary schools per 1000 youths by one standard deviation (=29 teachers; see Table 1) is expected to shrink the NEET probability for the group of young people with foreign citizenship by about 3.5% points. In contrast, Austrian youths are not profiting from the measure. At first sight, this finding indicates the potential of upper secondary education to serve as an important inclusionary factor, with the power to substantially reduce migration-based social inequalities concerning integration into the



educational system and/or the labour market. However, particularly young migrants who failed to find employment to conduct dual vocational education or who do not have the sufficient grades for participating in “Gymnasium” are attending a three- or four-year vocational secondary school. Even though this kind of upper secondary school offers opportunities for disadvantaged youths, it is also seen as a “school of leftovers”, a fact that may impede labour market entry after graduation.

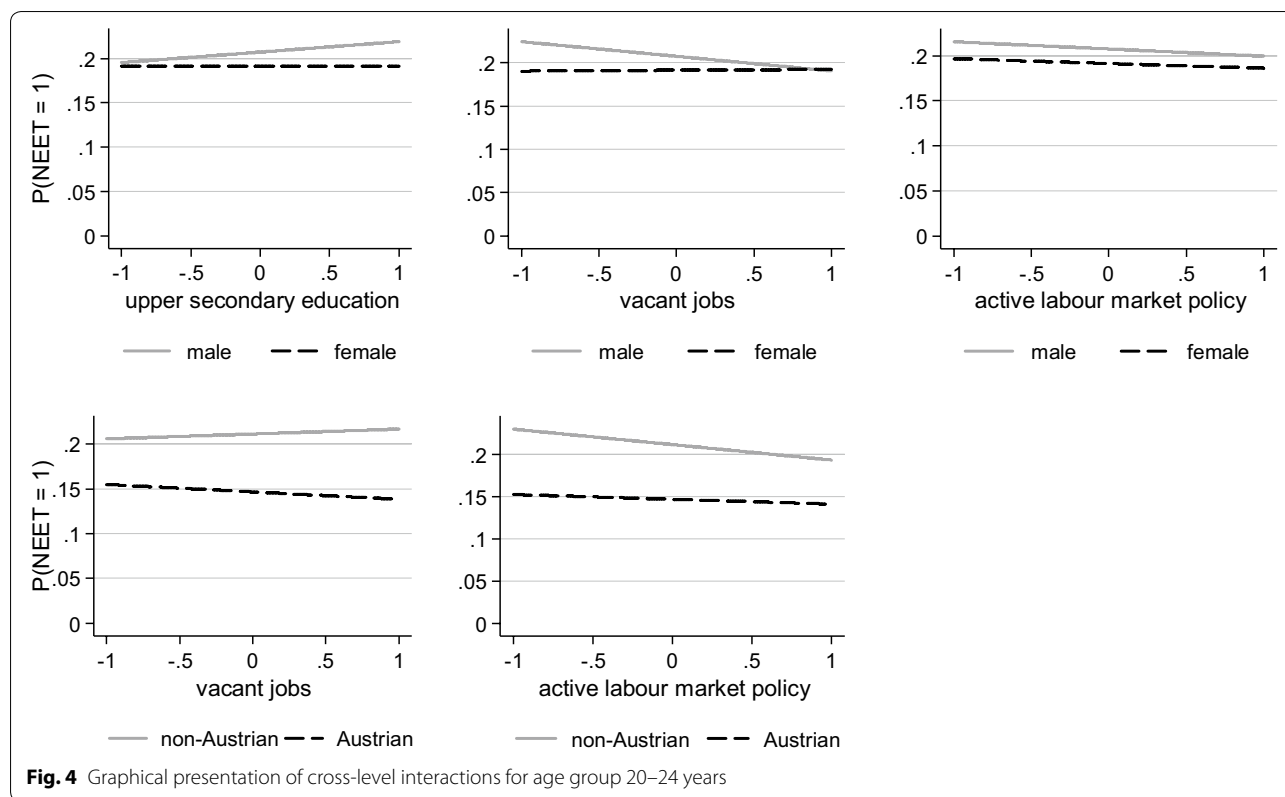
For the older age group (20–24 years), one unexpected effect occurred. Based on the estimation results of model 4, the provision of upper secondary education has an enhancing impact on the NEET probability for males (see Table 3; Fig. 4a), but not for females. The causal mechanisms responsible for generating this effect are quite unclear and require further research for illumination. One possible explanation could be that a larger supply of upper secondary education is induced by a lack of dual apprenticeship places, which would have been the first choice for young males. Because of the lack of dual apprenticeship places, young men in particular attend upper secondary education involuntary and with less motivation, which leads to less success and perhaps to not having a high school diploma. As a consequence, the labour market integration of young men aged 20–24 years can be hampered due to their experiences in upper secondary school.

5.3 Vacant jobs

For the age group of 15- to 19-year-olds, labour market supply has no universal negative influence on the probability of being in NEET status; thus, hypothesis H3 cannot be unconditionally confirmed. According to the

estimation results of model 5, only non-Austrian citizens are benefitting from an increase in the number of available jobs (see Table 2; Fig. 3d). An increase by one standard deviation (=2.4 vacant jobs per 1000 people in the working-age population, see Table 1) is expected to significantly reduce the NEET probability by 1.6% points for the population of migrant youths. This finding is a hint that barriers for outsiders are weaker in regions with a greater labour demand.

When comparing both age groups, one can see that the number of vacant jobs has a higher negative impact on the NEET probability for the 20- to 24-year-olds. This group’s higher sensitivity to (the extent of) labour demand appears plausible, as their primary objective is participating in the labour market and not attending school. In accordance with the younger age group, no universal effect can be identified, resulting also in only partial acceptance of hypothesis H3. As can be learned from the estimation results of models 4 and 5, only males and Austrians profit significantly from an increase of vacant jobs (see Table 3 as well as Fig. 4b, d). An increase in the number of vacant jobs by one standard deviation (=2.4 vacant jobs per 1000 people in the working-age population, see Table 1) is expected to decrease the NEET probability of 20- to 24-year-old males by approximately 1.7% points and of same-aged Austrians by about .8% points. This finding can be explained by the fact that young men are working more often in sectors which are highly sensitive to changes in labour demand (see, inter alia, Dietrich 2012; Altenecker and Frick 2013; Verick 2009).



5.4 Active labour market policy

Surprisingly, hypothesis H4a cannot be confirmed for the younger age group. According to the estimations results displayed in Table 2, higher spending in ALMP has no significant impact on the NEET status probability for 15- to 19-year-olds. The reasons are theoretically unclear. However, the simple slopes for gender and citizenship categories provide some evidence that females and Austrians are expected to profit slightly from increasing labour market spending, a fact that weakly supports hypothesis H4b. Nonetheless, the results of the various hypothesis tests are rather inconclusive, barring substantial interpretation. This result opposes the findings in the national and international literature (Sect. 3.3). Even though we have tried to separate apprenticeships provided by companies from those financed by resources of active labour market policy, it is still possible that there are distortions. On the one hand there is significant funding for firms to secure the supply of apprenticeship opportunities or to promote equal opportunities for young women or for disadvantaged people which are financed by active labour market policy; on the other hand, the aim of the supra-company training is also preparation for placement in a company-based apprenticeship, revealing a connection between active labour market policy and the dual apprenticeship system (BMASK 2012a, b). Thus, further

investigation with more and better data is recommended in order to produce estimates affected by less uncertainty.

For the age group of 20- to 24-year-olds, investments in ALMP appear to significantly reduce the NEET rate in general (see Table 3); thus, hypothesis H4a can be confirmed. The estimation results of the cross-level interaction models 4 and 5 (see simple slopes in Additional file 1: Table A2) reveal that males and females as well as Austrian and non-Austrian youths are all profiting from labour market measures, although to differing degrees. From an increase in ALMP by one standard deviation (=€ 1474.0 per unemployed youth aged between 15 and 24, see Table 1), the NEET probability of males is expected to decrease by .8% points, while the reduction for females is with .53% points smaller (see Fig. 4c). The difference is not statistically significant (see the respective cross-level interaction effect in Table 3). However, hypothesis H4b suggests that ALMP is more successful in combating NEET for females than for males (see Sect. 3.2), though the hypothesis is predominantly based on studies focusing on the individual level. On the level of federal states it appears that—at least in Austria—the opposite is the case, and males are benefitting more than females. Thus, H4b has to be rejected. In contrast, relevant differences in the effectiveness of ALMP exist between youths with and without Austrian citizenship.

While the associated decrease in NEET probability with a rise of investments in ALMP by one standard deviation is .57 for Austrians, the expected decline for non-Austrians is about 1.8% points (see Additional file 1: Table A2; Fig. 4e). This finding indicates that ALMP is able to reduce migration-based social inequalities.

5.5 Robustness tests

The estimation results of Models 4 and 5 do not change substantially when introducing year dummies as fixed effects to test the robustness of the models (see footnote 7). Only some effects located close to $p = .1$ either pass the defined threshold and become significant or marginally fail it, in any case without relevant changes in effect sizes. A second robustness test was performed by re-estimating Models 4 and 5 including federal state dummies. Given this specification, three noticeable changes occurred: (1) There is a weak tendency of the impact of the provision of dual apprenticeship to decrease in the age group of 15–19 year-olds; (2) The effect structure of active labour market policy in the younger age group can be further illuminated: it is not gender that evokes a differing impact of investments in labour market integration on the youth's NEET probability, but citizenship. When fixing the time-invariant heterogeneity between federal states, a weak but significant negative effect around the relevance threshold of $|.005|$ can be identified for Austrians but not for migrants; (3) The unexpected positive effect of upper secondary education for males aged between 20 and 24 years is disappearing. In a third and last robustness test we account for the possibility that the federal state-specific measures financed by ALMP expenditures may not affect the individual NEET probability immediately (in the same year) but with a 1 year delay by regressing $Y_{ift} (=P_{ift}(NEET = 1))$ on $LMPOL_{ft-1}$ instead of Y_{ij} on $LMPO_j (=LMPO_{ft})$ with f as federal state, j as state-year and t as year indicators.¹¹ This is obviously not the case because $LMPOL_{ft-1}$ had no significant effect in all relevant models (2–5) for both age groups. Thus, ALMP funds appear to have a more or less instantaneous influence on the NEET-probability of youths and can therefore be seen as a policy instrument effective for short-term interventions.

6 Discussion and concluding remarks

The aim of this paper was to analyse and explain regional differences in NEET rates for Austria. Even though federalism in Austria is low on a legal level, the federal states have a very strong informal influence on politics. Therefore, we expected that the differences between the

provinces could be explained by contextual variables that reflect policy measures, such as active labour market or the building of schools.

According to the literature, institutional and economic variables were operationalised as contextual variables on the regional level, and hypotheses of their effects on the NEET rate were specified. Because the institutional level addresses different age groups, the analysis was split into two age groups (15–19 and 20–24 years). Criticisms of NEET indicator were taken into account by including control variables. The hypotheses were tested using several multilevel models.

The results have shown that, besides the social structure of the population, contextual factors like the upper secondary education, the dual education, vacant jobs, and expenditures for active labour market policy are also relevant for explaining regional differences in the NEET rates. But one main insight was that the impact of the contextual factors varies between different social groups. This illustrates that multilevel models and analyses of interactions effects are fruitful tasks.

The results reveal that the dual apprenticeship system is able to reduce the NEET rate of young males in the age group of 15–19 years. This is not the case for young females, which indicates a selective access to the dual apprenticeship system. Contrary to this, we have found that a higher provision of upper secondary education shrinks the NEET probabilities for young migrants aged 15–19 years, meaning that upper secondary school reduces migration-based social inequalities. Against the background that these two educational systems are 'communicating vessels', we can conclude that a region with a strong dual apprenticeship system may have a lower general NEET rate, but there are less equal opportunities for females and migrants in comparison to a region with a larger provision of upper secondary schools.

Concerning the effects of the extent of labour demand, we have found some group-specific effects. Accordingly, young migrants aged 15–19 years and young males without migration background in the age group 20–24 years would benefit from more vacant jobs. Contrary to these group-specific effects, we were able to prove a significant reducing effect of active labour market policy on the NEET rate of the 20–24 years age group.

From a policy point of view, we can conclude that there is no 'one-size-fits-all' solution for reducing the number young people in a NEET status. On the contrary, the results of this article emphasise the importance of taking into account social group specific effects of certain strategies. For example, just to introduce the dual apprenticeship system like Great Britain and Ireland (Busemeyer and Vossiek 2016) have done recently can have positive effects on youth labour markets, but may leave behind

¹¹ This leads to a reduction of the context level units (and their individual level units) from 63 to 54. We are losing the information for the nine federal states in the year 2006 because $LMPOL_{2005}$ is not available in our data.

young women and migrants. It is also important to see that boosting labour demand in general is an important strategy, but in face of our results, it is probable that only certain population groups will benefit from it. An exception seems to be active labour market policy, which has a more general impact on most of the analysed groups. Therefore, we can conclude that for reducing the NEET rate a broad policy mix is necessary, addressing individual risk factors, the needs of different groups and institutional and economic strategies.

Nowadays, shortcuts in the educational and labour market policy are discussed. Based on our analysis, this policy has two negative effects: it increases the NEET risk and deepens the gap between young Austrians and young non-Austrians. It is important to be aware of both effects, as they may endanger social cohesion in Austria. These results support the current critiques at the EU level (Matsumoto et al. 2012; Hüttl et al. 2015) concerning the austerity programmes that impair the policy room in which the EU member states are able to combat youth unemployment.

Finally, some limitations should be taken into account. First, the sample size on the context level is still relatively small to reveal significant effects. With regard to the estimation accuracy of the context-level fixed-effect parameters, however, simulation studies conducted by Maas and Hox (2005) as well as Bryan and Jenkins (2016) indicate that with 63 contextual observations one can expect fairly stable estimates with negligible bias at the most, but with a marginal underestimation of their sampling variances. We accounted for this fact by additionally introducing a (quite strict) relevance criterion besides statistical significance for the substantial interpretation of context-level effects (see Sect. 4.3). Second, we only have poor measures of contextual variables. The federal states may apply further or different strategies that are not directly covered by our indicators to reduce the NEET rate. For instance, the federal state may have different implementation strategies—the same amount of money may be spent in a more effective way in one federal state than in another. Third, we did not take into account the dynamic character of policy measures. Politicians on the regional level may react to an increase of the NEET rate by spending more money for ALMP or for upper secondary school, so that it would have been preferable to reverse the causal order. Fourth, we raise doubts about whether it is possible to properly separate the impact of the dual apprenticeship system and the active labour market policies in Austria. There are too many connections and interactions which make it hard to identify the isolated success for each of the two systems. However, the insignificant results of active labour market policy for the age group between 15 and 19 years are not plausible according to

the literature. Thus, further investigation with more and better data is recommended in order to produce estimates affected by less uncertainty. Regional differences in active labour market policy may be the results of negotiation processes of the past. Hence, they may be characterised by inertia, and this inertia can perhaps also explain the missing influence.

Additional file

Additional file 1:A1. Fair comparison of federal states. **Table A1.** Estimation results for individual-level linear probability model (unstandardised). **Table A2.** NEET rates of federal states with and without control of social structure. **B1.** Specification of multilevel models.

Authors' contributions

The work is a product of the intellectual environment of the whole team; all members have contributed in various degrees. Especially, DT supplied important contributions to the literature review and the theoretical perspectives as well as to the concluding remarks, HL contributed to the analytical strategy and carried out the empirical analyses. JB is responsible for the conception and design of the study and together with DT the interpretation of the results, CK for data acquisition and data preparation. All authors read and approved the final manuscript.

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