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Ethnic Inequality in Vocational Education: The Impact of Educational Policy and Contextual Factors in Germany's Federal States

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The degree to which young people with a migrant background are underrepresented in vocational education and training (VET) varies between Germany's federal states. The present study applies a fuzzy-set qualitative comparative analysis (Fs/QCA) to investigate the effects of the amount of apprenticeships, the presence of full-time vocational schools, and a transition system in Germany's federal states on the degree of ethnic inequality in VET for first-generation migrants. The results indicate that a small supply of apprenticeships and a high presence of full-time vocational schools or transition programs in a federal state are related to a large degree of ethnic inequality in VET. A small degree of ethnic inequality in VET is seen in federal states with a large supply of apprenticeships and a small amount of full-time vocational schools or transition programs.

Keywords: Federalism; ethnic inequality; vocational education and training

INTRODUCTION

From primary school onwards in Germany, children with a migrant background have, on average, weaker education outcomes than their native German peers (Autorengruppe Bildungsberichterstattung 2014).[1] The comparatively low educational attainment of migrant children persists in the vocational education and training (VET) sector, although researchers have not explored this issue to any great extent. Young people with a migrant background less often participate in full qualifying vocational education (54 percent non-nationals versus 76 percent Germans), which leads to a large gap between the population with and without a migrant background with

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respect to the achievement of vocational degrees. Thirty-eight percent of the population with a migrant background do not attain any vocational degree compared to only 11 percent of the population without a migrant background (Autorengruppe Bildungsberichterstattung, 2014). Low educational achievement has a long-term impact, both on the individual and the economy. For the individual, education is a key factor for participation in the labor market and in society. For the economy, low educational achievement becomes more and more problematic as higher skill levels increasingly are required and skill shortages become imminent.

The main idea of this article is to examine how the supply of apprenticeships and the presence of full-time vocational schools and a transition system affect the level of ethnic inequality in VET in Germany. To analyze the impact of the contextual factors on the degree of ethnic inequality, a fuzzy-set qualitative comparative analysis (Fs/QCA) was applied. Hence, this study is placed in a growing literature that explores the impact of educational systems or programs on ethnic inequality (Darmody et al. 2014; Dronkers, van der Velden, and Dunne 2012; Stromquist 2012).

Much of the debate about ethnic inequality in VET has focused on individual resources like human or social capital as the causes of weaker educational outcomes (Beicht and Granato 2011; Helland and Støren 2006). Current research on the effects of educational systems focuses more on the international comparison of the effects of secondary school systems on migrants' school performance (Ammermüller 2005; Dronkers, van der Velden, and Dunne 2012) or on educational systems and labor market outcomes in general (Allmendinger 1989; Pfeffer 2008). However, research is lacking regarding the differences within the VET system. The few existing studies on the influence of contextual factors on the transition from general education school to VET in Germany suggest that different education policies may produce different outcomes (e.g., Seibert, Hupka-Brunner, and Imdorf 2009).

The present study focuses on disparities of the VET system within Germany rather than on a comparison with other countries. The advantage over an international evaluation is that the federal states are embedded in the same national political and economic system, so many characteristics can be treated as constant. However, the decentralization of the educational system in Germany—the 16 federal states enjoy educational autonomy—gives rise to major inter-state variations in educational structures.

The next section describes the German vocational educational system. Section 3 demonstrates why institutional or contextual factors play a crucial role in the transition from school to VET. Then I describe how the concept of ethnic inequality is defined in this study and how the method fs/QCA is used to answer the research questions. Section 5 and 6 provide the results of the analysis. The final section discusses the findings and implications of the study.

THE GERMAN VOCATIONAL EDUCATION SYSTEM

After general education in secondary schools, two paths are available for obtaining a vocational degree: The first is the tertiary sector (ISCED [International Standard Classification of Education] Levels 5–8), which is comprised of the different types of higher education institutions. The second is the vocational education and training (VET) system at the upper-secondary and post-secondary non-tertiary level (ISCED Levels 3 and 4) (UNESCO Institute for

Statistics 2012). Within the VET system, vocational degrees can be obtained through the following:

- Apprenticeships (combining vocational training in a company and a vocational school) (53% nationals, 37% non-nationals).

- Full-time vocational schools (22% nationals, 16% non-nationals) (Autorengruppe Bildungsberichterstattung 2014: 276).

While the federal states are responsible for vocational schools (Secretary General of the Standing Conference of the Ministers of Education and Cultural Affairs 2013), companies are responsible for the practical training of apprenticeships. Applicants for an apprenticeship apply directly to a company, which is comparable to the application process for a job.

The prerequisites for secondary school leaving certificates for these different paths vary. For the tertiary sector, a higher secondary school degree (*Abitur*) is required. Full-time vocational schools mostly require intermediate skills (*Mittlere Reife*). The formal requirements for apprenticeships are the lowest. In theory, people without a secondary school leaving degree or those with a low secondary school leaving certificate (*Hauptschulabschluss*) can apply for an apprenticeship. However, when apprenticeships are scarce, the trend is for companies to hire people with higher-level secondary school leaving degrees because the choice of applicants is greater.

As a reaction to the decline of apprenticeship positions over the past years, a so-called "transition system" has evolved. This system is comprised of different publicly financed preparatory or substitute training measures for graduates of general secondary schools who did not manage to enter the vocational educational system. It consists of an educational program lasting one year with an aim to provide the qualifications needed to enter the vocational educational system or make up for a general education degree. Furthermore, this transition system is an alternative to fulfil compulsory schooling that ends when a student reaches legal age (Vossenkuhl 2010). Programs in the transition system do not provide their graduates with a full qualifying vocational degree. Since the year 2000, about 40% of new entrants into the vocational educational system enter the transition system, almost as many as the young people entering apprenticeships (Baethge 2008). Although, in general, these programs have been created for disadvantaged adolescents, young people who have a foreign nationality are over-represented (24% nationals, 47% non-nationals) (Autorengruppe Bildungsberichterstattung 2014: 276).

EFFECTS OF STRUCTURAL DIFFERENCES ON ETHNIC INEQUALITY

Recent research has argued that the disadvantage of people with migrant background is due not only to a lack of individual resources but also to the manner in which transition to VET

is affected by institutional or contextual factors (De Graaf and van Zenderen 2013; Thränhardt 2004). Based on the theories of Coleman (1990), Aybek (2008) pointed out that the access to VET also is determined by developments at the macro level (e.g., economic situation) or mesoscale (e.g., institutions, programs), since they regulate opportunity structures for young people in their search for a VET position at a specific time. Thus, the transition process is embedded in specific structural, cultural, and institutional contexts that differ between different states (Walther 2006). The differences in institutional arrangements have an impact on choices and decisions, and thus on the transition process itself (Raffe 2008). In the end, a successful transition to VET is an interplay between the institutional arrangements as well as social and individual resources (De Graaf and van Zenderen 2013).

Under German federalism, each federal state enjoys educational autonomy. As a result, educational policy varies widely within Germany. This influences the educational structure in every federal state, and thus the opportunity structures for individuals (Kramer 1998).

Literature has shown that differences in the subnational units of a country can affect educational inequality, as Stadelmann-Steffen (2011) shows for Switzerland, Freitag and Schlicht (2009) prove for Germany, and Ainsworth and Roscigno (2005) show for the United States. In fact, the German federal states vary substantially in terms of the number of apprenticeship positions available, the extent of the transition system, and the availability of full-time vocational schools (see Table 1).

The federal states also differ in other relevant areas concerning the transition to the vocational education system, for example, their unemployment rates, prevalent economic sector (BA 2014), funding of the vocational education system, and distribution of secondary school leaving certificates (Anger, Kemeny, and Plünnecke 2013). Entry into the vocational education system is smoother when plenty of jobs are available and the unemployment rate is low as in Bavaria or Baden-Wuerttemberg, for example. Also, the economic sector is reflected in the number of apprenticeships, being lower in federal states with a higher number of jobs in the tertiary sector (Berlin) (BA 2014).

The largest number of people with a migrant background between 15 and 24 years of age live in North Rhine-Westphalia, the largest federal state in Germany, which has 30 percent of the total population (see Table 2). This is among the highest in Germany, which also is high in the federal states of Hamburg, Baden-Wuerttemberg, Berlin, and Hesse. In contrast, the five eastern German federal states have a low number of migrants.

As is obvious from Table 3, the distribution of ethnic groups varies among federal states. The largest share of people with Turkish nationality lives in North Rhine-Westphalia and Berlin, whereas the largest share of people from other countries of recruitment lives in the southern German federal states. Also, in this aspect, Germany's eastern federal states differ from the rest of the country.

The organization of the VET system in Germany's federal states is mainly characterized by the distribution of three characteristics: the supply of apprenticeships, the number of full-time vocational schools, and the size of the transition system. The distribution of these three characteristics can be seen as the result of the different contexts of each federal state,

since, for example, the number of apprenticeships will influence the size of the transition system.

Eberhard (2012) reveals that the distribution of the main parts of a VET system, the supply of apprenticeships, and the number of full-time vocational schools or the presence of a transition system seem to produce different outcomes in VET for secondary school graduates in general. For this reason, the impact of these three characteristics on the degree of ethnic inequality in VET will be analyzed. The following sections examine the effects of the supply of apprenticeships and the presence of full-time vocational schools and transition system on a special group of people—those who have a migrant background.

Apprenticeships

Most secondary school graduates seek an apprenticeship. This phenomenon applies to graduates with a migrant background (62 percent) and without a migrant background (61 percent). This pursuit of an apprenticeship is especially true for youths whose highest secondary school certificate is a *Hauptschule* leaving certificate (Beicht and Granato 2011).

The literature discusses several reasons why young persons with a migrant background will nonetheless have lower chances to secure a place in an apprenticeship.

Especially for the group of *Gastarbeiter* and their descendants in Germany, the on average lower social origin can explain great parts of their lower educational success (Kalter, Granato, and Kristen 2007; Laganà et al. 2014; Urban 2012). This leads to the fact that migrants have on average lower school leaving certificates than their native German peers. In theory, people without a secondary school leaving degree or those with a low secondary school leaving certificate (*Hauptschulabschluss*) can apply for an apprenticeship. However, when apprenticeships are scarce, the trend is for companies to hire people with higher-level secondary school leaving degrees because the choice of applicants is greater. Since migrants have on average lower school leaving certificates than native Germans, they have in turn lower chances of securing a place in VET, especially when there are not enough apprenticeships for all applicants (Hunkler 2010). Furthermore, graduates with a migrant background in contrast to graduates without a migrant background more often cannot rely on relevant social networks, which can be very helpful especially for positions in smaller companies (Haug 2007).

Migration-specific characteristics, such as generation, ethnic origin (Seeber 2011; Seibert 2005), or bad language skills (Diehl, Friedrich, and Hall 2009) also play a crucial role. From current research we know for example that some ethnic groups have better chances to participate in VET than others. One reason for that which is often discussed is discrimination (for an overview of this discussion see Scherr 2015).

Arrow (1973) suggests a "statistical discrimination" which occurs with information deficits and beliefs in productivity 'beliefs' of special groups. But also prejudice and "taste" of the employer are suspected to play a role (Scherr 2015).

Regarding prejudices or attitudes held toward migrants, we know from current research that a preference seems to exist for culturally similar groups (Czymara and Schmidt-Catran 2016). Negative public attention is most often directed toward Turkish migrants-one of the

largest migrant groups in Germany-and their alleged failure to integrate (Diehl and Liebau 2015). Thus, it is not surprising that Turks apparently more often feel discriminated against than immigrants from other countries (Hans 2010) and have lower chances to participate in VET (Seeber 2011; Seibert 2005).

When the demand for apprenticeships is higher than the supply, a competition of many high-performance applicants occurs. In this case, less preferred groups have a smaller probability of procuring apprenticeships (Thurow 1975). Empirical evidence can be found from Crul and colleagues (2012): If the native group has difficulties in certain educational phases there is a "multiplier effect" for immigrants who experience the same difficulties but even worse.

To sum up, since migrants might not be in the first row in a competition, as has been shown earlier, their chances to gain an apprenticeship will get progressively smaller as the supply of apprenticeships gets smaller.

Full-time Vocational Schools

The selection processes of full-time vocational schools are more standardized, focusing mostly on secondary school certificates and performance at school. Thus, the disadvantages of graduates with a migrant background with respect to social networks or a discriminatory selection process should not play a role.

However, a position in a full-time vocational school often requires higher secondary school certificates than a vocational education by way of an apprenticeship. But persons with a migrant background have an, on average, lower secondary school certificates than graduates without a migrant background (Hunkler 2010). Furthermore, vocational schools are often with costs and without apprenticeship pay, which is a disadvantage especially for children from families with less economic resources. These facts should, on average, decrease the chance of graduates with a migrant background to secure a place in a full-time vocational school. Seibert, Hupka-Brunner, and Imdorf (2009) found accordingly that men from Turkey and the ex-Yugoslavia living in Germany have a lower chance to gain entry into full-time vocational schools, even when controlling for a secondary education degree. However, the characteristics of the VET system are not independent from each other. The size of one part of the system influences the size of another. For example, a transition system will rather be present if there is a small supply of apprenticeships. Therefore the effect of one characteristic cannot be hypothesized independently from the others.

Therefore, it seems logical that a high presence of full-time vocational schools will have a negative effect on ethnic inequality if the number of available apprenticeships is small. In the case of a large supply of apprenticeships, enough alternatives would be available for many more migrants to secure a place in the VET system, so ethnic inequality would be reduced.

The Transition System

In times of higher demand than supply for apprenticeships, youths will have more difficulty in securing a place in the VET system. In these situations, young people might see their failure as a lack of personal qualifications. Consequently, they will try to find alternatives, for example, continue in secondary school or stay in a program in the transition system. But in times where there is a lack of apprenticeships, several young persons are in programs of the transition system even if their qualifications are not in deficit (Eberhard and Ulrich, 2010). Eberhard and Ulrich (2011) analyzed the impact of the size of the transition system in different regions of Germany and found a negative effect—the availability of a large number of these programs reduced the chances of graduates of secondary school to get into a VET. They indicated that a high number of transition system programs might also be a possible determinant for ethnic inequality in VET because statistics show that migrants are overrepresented in programs of the transition system (Baethge 2008).

A large number of transition programs might even be worse for graduates transitioning from school to VET when the number of apprenticeships is small. As migrants will suffer first from a shortage of apprenticeships, they are overrepresented in those programs instead of taking part in a fully qualifying VET program.

DATA AND METHODS

The empirical bases for the analyses are German Microcensus data (German Labour Force Survey). The German Microcensus, the official representative survey of the population and labor market, is an annual survey of 1 percent of all households of Germany. De facto anonymized scientific use files (SUFs) are available for research purposes. SUF data are a 70-percent sample of the original data. The size of the sample and the high response rate—also for individuals with a migrant background—are two of the advantages of this data.[2,3] In the present study, these data were used to compare ethnic inequality between Germany's federal states. Furthermore, aggregated data from the Statistical Offices of the Federation and the Länder and from the Federal Employment Agency was used (BIBB 2010, 2011; Statistische Ämter des Bundes und der Länder 2012; Statistisches Bundesamt 2013a) to compare the distribution of apprenticeships, full-time vocational schools, and the transition system between Germany's federal states.

The concept "ethnic inequality in VET" is based on results of binary logistic regressions and shows the correlation between migrant background and the dependent variable—to participate in VET or not to participate in VET. People with a migrant background are divided into those who were born in Germany or immigrated to Germany until age six (2./1.5 generation) and those who migrated to Germany later than age six (1. generation). This multivariate analysis was used to hold constant the differing compositions of the groups of persons with and without a migrant background and between the federal states in Germany, as well as interactions concerning the characteristics of sex, age, school leaving certificate, and migrant background. Binary logistic regressions were computed separately for each federal

state. VET as defined for this article includes both programs of the VET that lead to full-qualifying vocational degrees (apprenticeships and full-time vocational schools, compare The German Vocational Education System). The dependent variable is 1 if the person participates in VET (apprenticeship or full-time vocational school) and it is 0 if not (participating in transition system, employed without vocational degree, unemployed; see Table 4 for an overview of the distribution between different paths). People participating in the tertiary sector are excluded as all my hypotheses focus on the VET system. To increase the size of the sample to be able to compare the federal states in more detail, I use pooled cross-section data from 2008 to 2010. The Microcensus is designed as a rotating panel sample for which the households of a sample district are surveyed in four consecutive years. To avoid an overlapping of persons in the pooled data set, I filtered for new graduates from secondary school for the years 2009 and 2010. The analyses included persons ages 15 to 24 with and without a migrant background. Students in secondary schools, young persons in military duty or in community service, and persons who already have a training qualification are excluded from the analyses since I want to focus only on those individuals who have a chance and a motivation to participate in VET. Since the number of cases for the federal states Saarland and Bremen are quite low, these states were excluded from these analyses. Generally, not many people with a migrant background are living in Germany's eastern states of Thuringia, Saxony, Saxony Anhalt, Mecklenburg Pomerania, or Brandenburg, so they cannot be examined separately; however, due to the great similarity of the economic situation and educational policy in Germany's eastern states, they can be examined together as one case (as average of all eastern states) (see Table A4 in the Appendix for an overview of number of cases in federal states).

Table 5 shows the probability for young persons with a migrant background from 2./1.5 and first generation to gain entrance into VET in each federal state.[4] Since the model coefficients are reported as average marginal effects (AME) to be able to compare them between federal states, these coefficients can be interpreted as the average additive effects of an independent variable on the probability of being in VET (Mood 2010), which is higher for higher values and lower for lower values. The level of ethnic inequality in VET varies across the federal states. For example, ethnic inequality for first-generation migrants is highest in Berlin where the probability of getting into VET is 23 percentage points lower for first-generation migrants than for native Germans. The difference between the two groups is only 10 percentage points and statistically insignificant in Schleswig-Holstein.[5]

The differences in the chances for 1.5 or second-generation migrants to get into VET are not as great as for first-generation migrants. These probabilities range between 11 percentage points in Berlin to 4 percentage points in Germany's eastern states. For this reason, further analyses will focus on first-generation migrants.[6]

For the purpose of examining how the characteristics of the VET system affect ethnic inequality, a Fs/QCA was applied. As explained earlier, I expect that the degree of ethnic inequality can be explained by a specific combination of institutional characteristics rather than by one single dimension. The amount of apprenticeships, the amount of programs in the transition system, and the amount of full-time vocational schools are indicators that have to be analyzed in their connection to one another since the size of one sector has an influence on the two

TABLE 1
Contextual Factors in Germany's Federal States

| | | Distribution of Members of VET System | | | |
	Apprenticeships Demand and Supply Ratioa	Apprentice-ships	Full-time Vocational Schools	Transition System	Total
Federal State					
Bavaria	91.1	52.9	26.6	20.5	100
Rhineland-Palatinate	85.4	34.5	31.5	34.0	100
Schleswig-Holstein	88.2	33.4	25.2	41.4	100
Baden-Wurttemberg	86.8	30.3	28.0	41.7	100
North Rhine-Westphalia	80.7	37.7	29.5	32.8	100
Lower Saxony	81.7	32.2	27.4	40.4	100
Hamburg	88.8	51.5	23.7	24.8	100
Hesse	81.4	45.3	24.6	30.1	100
Berlin	73.2	41.6	36.1	22.3	100
Germany's eastern states	75.4	45.5	35.4	19.1	100

aRelation between supply (number of new training contracts in apprenticeships plus at the *Agentur für Arbeit* [Federal Employment Agency] reported vacant apprenticeships) and demand (number of new training contracts plus the at the *Agentur für Arbeit* reported applicants who are still looking for an apprenticeship). This relation shows how many apprenticeship positions can be offered to 100 applicants. Thus, the larger the number the better the supply of apprenticeship positions.

Source: BIBB (2010, 2011), Statistische Ämter des Bundes und der Länder (2012), Statistisches Bundesamt (2013a), average of the data of 2008–2010.

other sectors. With Fs/QCA, it is possible to demonstrate the connections between these characteristics and the amount of ethnic inequality (Schneider & Wagemann 2007; Ragin 2000).

To use this method, all conditions (supply of apprenticeships, full-time vocational schools, transition system) and the outcome (ethnic inequality in VET for first-generation migrants) are converted into "fuzzy sets." Thus, a federal state can have a membership in a condition and in the outcome with a value between 0 and 1, where 0 is fully out and 1 is fully in. The crossover point allows a qualitative distinction of cases being more in or more out of a specific set. These fuzzy sets provide a way to capture the complexities of educational policies and the variations between the federal states. The fuzzy sets for this analysis are constructed using the direct method (Schneider and Wagemann 2007) on the basis of the values presented in Tables 1 and 3. The qualitative thresholds that were used to do this are presented in Table 6. Table 7 presents an overview of all the fuzzy-set scores of the conditions and the outcome.

FINDING PATTERNS

With the help of these fuzzy sets, patterns of similarities and differences across the federal states (cases) (necessary and sufficient conditions) can be discovered behind the variations in ethnic inequality in VET for first-generation migrants. The computer program fs/QCA was used to test the hypotheses.[7]

TABLE 2.
Distribution of People With and Without a Migrant Background (Column Percentages)

Federal State	Without Migrant Background	With Migrant Background	N
Schleswig Holstein	84.1	15.9	957
Hamburg	70.7	29.3	566
Lower Saxony	78.8	21.2	2.624
North Rhine-Westphalia	69.7	30.3	6.319
Hesse	66.1	33.9	2.117
Rhineland Palatinate	77.2	22.8	1.436
Baden-Wuerttemberg	69.6	30.4	3.564
Bavaria	76.5	23.5	4.214
Berlin	70.9	29.2	1.115
Germany's eastern states	95.8	4.2	4.294
N	20.792	6.414	27.206

Note. People at the age of 15–24.
Source: Microcensus 2008–2010; own analysis.

The values in Table 7 are now transformed into dichotomous values: 1 for fuzzy scores larger than 0.5 and 0 for scores smaller than 0.5. The results are shown in Table 8, with 1 meaning the condition is available and 0 meaning the condition is absent. Table 8 lists all the logically possible combinations of conditions and shows the correspondence of cases to those configurations of characteristics according to their best fit. Column 5 in Table 8 displays the consistency score, which shows to what degree each condition is consistently associated with a high ethnic inequality in VET (Schneider and Wagemann 2007).

Row 3 of Table 8 presents an ideal type that is characterized by the absence of all conditions that are hypothesized to be connected with high ethnic inequality (a small supply of apprenticeships, a large number of full-time vocational schools, and a large number of transition programs). We can see that the absence of these characteristics, as in Hamburg and Bavaria, is connected with low ethnic inequality (fuzzy score <0.5; see Table 5).

Other similarities can be seen between the federal states of Schleswig-Holstein and Baden-Wuerttemberg. Both federal states are characterized by a large number of

TABLE 3.
Distribution of Ethnic Groups (by Nationality) in Federal States (Column Percentages)

Federal State	Turkey	Former Soviet Union	Other Migrant Background	N
Schleswig Holstein	16.8	24.5	58.7	143
Hamburg	23.6	13.4	63.1	157
Lower Saxony	22.5	33.0	44.5	519
North Rhine-Westphalia	28.2	19.8	52.0	1.797
Hesse	24.4	15.4	60.2	664
Rhineland Palatinate	20.1	34.5	45.4	304
Baden-Wuerttemberg	23.7	20.5	55.9	988
Bavaria	24.1	21.7	54.1	929
Berlin	32.1	15.7	52.2	312
Germany's eastern states	5.4	38.7	56.0	168
N	1.475	1.308	3.198	5.981

Note. People at the age of 15–24, only people who have a foreign nationality.
Source: Microcensus 2008–2010; own analysis.

TABLE 4.
Trajectories of School Graduates Who Are Registered at the Federal
Employment Agency

	Total	Western Germany	Eastern Germany
School/university/internship	15.8	17.1	9.4
Vocational education	51.4	49.7	59.5
Employment	5.2	5.5	3.8
Social/nonprofit services	1.5	1.5	1.7
Transition programs	6.5	7.0	4.0
No information	19.6	19.2	21.6
Total	100.0	100.0	100.0

Source: BIBB (2011).

TABLE 5.
Binary Logistic Regression on Probability to Participate in Vocational Education Separately for Each
Federal State

	1.Generation Migrants		1.5/2.Generation Migrants	
Federal State	Odds Ratios	AME	Odds Ratios	AME
Berlin (BE)	0.257***	−0.231***	0.552**	−0.111**
Germany's eastern states (GES)	0.368***	−0.211***	0.811	−0.44
North Rhine-Westphalia (NW)	0.340***	−0.208***	0.698***	−0.074***
Lower Saxony (LS)	0.390***	−0.194***	0.778	−0.053
Baden-Wuerttemberg (BW)	0.494***	−0.149***	0.716***	−0.071
Bavaria (BV)	0.532***	−0.134***	0.651***	−0.090***
Hesse (HE)	0.505***	−0.129***	0.587***	−0.102***
Rhineland Palatinate (RP)	0.536*	−0.128*	0.627*	−0.096*
Hamburg (HH)	0.567	−0.114	0.675	−0.080
Schleswig-Holstein (SH)	0.616	−0.101	0.435**	−0.171***

Notes. Only young adults between 15 and 24 years, reference categories: persons without migrant background.
Controlled for age, sex, secondary school certificate, and year of the survey. AME: Average Marginal Effect
* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.
Source: Microcensus 2008–2010; own analysis.

apprenticeship positions, a small number of full-time vocational schools, and a large number of transition programs, which in both cases is connected with a small degree of ethnic inequality (fuzzy score <0.5).[8]

The cases just described all have a common similarity in that either all the characteristics that are hypothesized to lead to high ethnic inequality are absent, or only one characteristic is present. This also is the case with Hesse and Rhineland-Palatinate.

Germany's eastern states (including Berlin) and North Rhine-Westphalia have a small supply of apprenticeships, a large number of full-time vocational schools, and a small number of transition programs. All of these cases show a large degree of ethnic inequality (fuzzy score >0.5). Lower Saxony, which is characterized by the presence of two conditions that are hypothesized to be connected with high ethnic inequality (small supply of apprenticeships, large number of transition programs) also shows a comparably large degree of ethnic

TABLE 6.
Qualitative Thresholds

	Threshold Full Non-Membership	Crossover Point	Threshold Full Membership
High ethnic inequality in VET for 1.generation migrants	–0.108	–0.172	–0.221
Small supply of apprenticeships	90.0	83.6	74.3
High presence of transition system	19.8	37.2	41.6
High presence of school-based VET	24.2	28.8	35.8

TABLE 7.
Fuzzy-Set Data Matrix

Cases	Outcome High Ethnic Inequality in VET for 1.Generation Migrants	Small Amount of Apprenticeships	High Presence of Full-Time Vocational Schools	High Presence of the Transition System
Schleswig-Holstein (SH)	0	0.10	0.09	0.95
Hamburg (HH)	0.06	0.08	0	0.11
Rhineland Palatinate (RP)	0.11	0.30	0.76	0.37
Hesse (HE)	0.12	0.67	0.06	0.23
Bavaria (BV)	0.14	0	0.19	0.05
Baden-Wuerttemberg (BW)	0.25	0.18	0.37	1
Lower Saxony (LS)	0.79	0.65	0.29	0.90
North Rhine-Westphalia (NW)	0.90	0.72	0.57	0.32
Germany's eastern states (GES)	0.92	0.93	0.94	0
Berlin (BE)	1	1	1	0.07

inequality (fuzzy score >0.5). To summarize, the patterns just described show that at least two of the conditions need to be present to produce a high degree of ethnic inequality in a federal state.

However, no evident case exists that describes the ideal type in the last two rows of Table 8. So, no state has a large supply of apprenticeships, a high number of transition programs, and a high number of full-time vocational schools, or a large supply of apprenticeships, a large number of full-time vocational schools, and a large number of transition programs.

NECESSARY AND SUFFICIENT CONDITIONS

Fuzzy QCA helps to find the necessary and sufficient conditions within the patterns just shown. A condition is necessary when it occurs with the presence of the outcome.

A higher consistency benchmark of 0.90 was used for the necessity test. For all analyses, only empirically observable configurations were included, which favors empirical complexity but is the more conservative solution (Schneider and Wagemann 2007). The necessity test showed that none

TABLE 8.
Dichotomous Truth Table Including the Ideal Types

Small Amount of Apprenticeships	High Presence of Full-time Vocational Schools	High Presence of Transition System	Cases	Consistency Sufficiency Outcome High Ethnic Inequality in VET for 1.Generation Migrants
1	1	0	NW, GES, BE	0.92
0	0	1	SH, BW	0.44
0	0	0	HH, BV	0.32
1	0	1	LS	0.80
1	0	0	HE	0.54
0	1	0	RP	0.55
1	1	1	–	
0	1	1	–	

BE: Berlin; GES: Germany's eastern states; NW: North Rhine-Westphalia; LS: Lower Saxony; BW: Baden-Wuerttemberg; BV: Bavaria; HE: Hesse; RP: Rhineland Palatinate; HH: Hamburg; SH: Schleswig-Holstein.

of the characteristics of the VET system analyzed appears to be consistently necessary for high ethnic inequality in VET. The same applies for the outcome of "low ethnic inequality in VET."

The reason for this finding might be that a high degree of ethnic inequality is caused by varying or multiple conditions. Therefore, the appearance of sufficient conditions will be analyzed. A condition is sufficient if the outcome occurs whenever the condition is present. Thus, the fuzzy score of a sufficient condition must be equivalent to or smaller than the fuzzy score of the outcome.

Regarding the outcome of high ethnic inequality in VET, the consistency threshold was set at 0.82 to configure the program to recognize consistently higher scores than this as reasonable subsets of the outcome. The Quine-McCluskey algorithm also can be used to show the conditions connected with the level of ethnic inequality; however, in a less complex but logically equivalent way.

Two different combinations of characteristics are connected with a high level of ethnic inequality in VET. The large degree of ethnic inequality in Lower Saxony is explained by a small supply of apprenticeships in combination with a high presence of transition programs and a low presence of full-time vocational schools. The second path, which is a sufficient condition for the outcome of high ethnic inequality in VET, is a small supply of apprenticeships and a high presence of full-time vocational schools with a low presence of transition programs. This path covers Berlin and Germany's other eastern federal states and North Rhine-Westphalia.

To compare the relevance of these two paths to each other, it is useful to take a look at the coefficients of raw coverage and unique coverage. Thirty-four percent of high ethnic inequality can be explained by the small number of apprenticeships and a high presence of transition programs (raw coverage: 0.34; unique coverage: 0.20; consistency: 0.80). Sixty-three percent of federal states with a high level of ethnic inequality in VET can be explained by the small number of apprenticeships combined with a high presence of full-time vocational schools (raw coverage: 0.63; unique coverage: 0.49; consistency: 0.92).

These two paths can explain all the cases with a high outcome.[9] However, the results also showed that a small number of apprenticeships is not a sufficient condition on its own. It needs to be combined with a high presence of transition programs or with a high presence of full-time vocational schools.

The next step is to test for the sufficient conditions for the outcome of low ethnic inequality in VET. In this case all the conditions with a consistency higher than 0.87 were considered to be sufficient. The analyses showed that low ethnic inequality in VET is achieved by characteristics that are opposite to those connected with high ethnic inequality: a large supply of apprenticeships and a small amount of full-time vocational schools (raw coverage: 0.74; unique coverage: 0.28; consistency: 0.93) or a large supply of apprentice-ships and a small number of transition programs (raw coverage: 0.53; unique coverage: 0.08; consistency: 0.92). However, the analyses did not explain the small degree of ethnic inequality in the federal state of Hesse. This state may have other causes of ethnic inequal-ity. Hesse is characterized by a relatively small supply of apprenticeships but does not compensate with a higher presence of full-time vocational schools or more transi-tion programs.

In summary, the three characteristics of the VET system can explain ethnic inequality for first-generation migrants in 9 out of the 10 federal states.[10]

CONCLUSION

The present study investigated how the supply of apprenticeships and the presence of full-time vocational schools or transition programs affect the level of ethnic inequality in VET for first-generation migrants. Two main limitations of the study should be mentioned here. First, due to data restrictions the social background of the person cannot be considered adequately in the analyses. Second, ethnic groups can either be identified by generation or by nationality, even if a combination of both characteristics would deliver more precise results. But bearing these limitations in mind, the findings of this analysis confirm that ethnic inequality in VET for first-generation migrants cannot be explained by a single factor but has multiple background factors.

Factors that are connected to high ethnic inequality in VET are a small supply of appren-ticeships in combination with a high presence of full-time vocational schools and a low pres-ence of transition programs. This finding is the case in Berlin and other eastern states and in North Rhine-Westphalia. On the other hand, low ethnic inequality in VET is present in federal states with a large supply of apprenticeships in combination with a low presence of full-time vocational schools. In four federal states, these conditions were present—Baden-Wuerttemberg, Bavaria, Schleswig-Holstein, and Hamburg.

These findings are in line with those of Seibert, Hupka-Brunner, and Imdorf (2009), who found a negative correlation of a high presence of full-time vocational schools on the prob-ability of migrants to get into VET. The current study extends this knowledge by showing that a high presence of full-time vocational schools contributes to high ethnic inequality only when combined with a small supply of apprenticeships.

High ethnic inequality also can exist when another combination of conditions is present: a small supply of apprenticeships in combination with a high number of transition programs and a small amount of full-time vocational schools. This is the case in Lower Saxony. This finding supports Eberhard and Ulrich's (2011) hypotheses that suggest that a high number of transition programs might also be a possible determinant for ethnic inequality in VET.

The opposite set of conditions produces a small degree of ethnic inequality: a large supply of apprenticeships and a low number of transition programs. This is the case in Rhineland Palatinate, Hamburg, and Bavaria.

In both paths a small supply of apprenticeships alone does not necessarily lead to a high level of ethnic inequality in VET, which occurs only when a small supply of apprenticeships is combined with a high presence of full-time vocational schools or a large number of transition programs.

The results show that it is not only important to compare the outcomes of countries with one another but also to take into account regional differences. It could be worth investigating regional differences of other countries in future research and to compare them to the results of this article since the results that have been shown for Germany do not necessarily have to be the same for other countries. The special context and background of each country has to be taken into account, and by comparing regions within countries and countries with one another we could learn much about the interconnection of individual and context factors.

In Switzerland, for example, the transition system has a rather good reputation. Does the transition system in Switzerland work better regarding the integration of migrants? What is different and why? This comparison could provide insight into processes that have an impact on the success of such programs. Regarding the impact of full-time vocational schools, a comparison with France could provide further interesting results. The vocational education system of France is more focused on full-time vocational schools. How does the integration of migrants into the vocational education system work in France compared to Germany, given that comparable ethnic groups are analyzed? In Germany, a wide range of such full-time vocational schools exist. Do they all increase ethnic inequality or are there good examples of how a vocational school might be suited to decreasing ethnic disadvantages?

In addition to that, while Seibert, Hupka-Brunner, and Imdorf (2009) show that a higher share of full-time vocational schools decreases the chance for migrants to participate in VET in Germany, as it is also shown in the results of this current article, the authors also show in the same article that the opposite seems to be the case in Switzerland. Seibert, Hupka-Brunner, and Imdorf (2009) suggest that this difference may be explained by the fact that full-time vocational schools have a better reputation in Switzerland, while in Germany it is rather a compensation for the decrease in the offer of apprenticeships.

Migrants suffer more from a lack of apprenticeships than natives, which explains the lower chances of migrants to secure a place in the VET system in regions with a lower offer of apprenticeships. However, due to the on average lower secondary school leaving certificates of migrants, this alternative offer of full-time vocational schools does not compensate the lack of apprenticeships for migrants, which again lowers their chances to participate in VET.

In addition, the transition system came up due to a lack of apprenticeships. It gives young people who did not succeed in getting into a full-qualifying vocational education program an alternative and the possibility to develop further skills needed for participation in the vocational education system. However, this leads to the situation that those young people ending up in a transition system receive the label of not having enough skills to be able to participate in an apprenticeship in the first place. So there is a shift of responsibilities from companies who provide fewer apprenticeships to young people who are accused of having a lack of skills. One of the initial tasks of the programs in the transition system is to increase the integration of migrants into vocational education. To determine whether these programs are successful in this task requires an evaluation of their impact. The results of the present study indicate that these transition system programs may not have achieved their aim to increase the integration of migrants into vocational education. However, causal effects have to be investigated first before providing advice to policy-makers about how to organize programs to decrease the degree of ethnic inequality. An analysis based on a panel design could determine the impact of an increase of programs in the transition system in combination with a decline of apprenticeships on the degree of ethnic inequality. In future studies, National Educational Panel Study data may help to increase the knowledge on this topic.

However, one policy implication is clear: to foster the increase of higher school leaving certificates of migrants early on.

This article focused on the differences between federal states for first-generation migrants. For 1.5/2. generation migrants no such pattern can be found. The reason for this might be that the variation of ethnic inequality for this group is not that large between Germany's federal states. This result indicates that context factors may not have that strong of an impact on second-generation migrants anymore.

The conditions found to explain high and low ethnic inequality do not explain the low ethnic inequality in the federal state of Hesse. Future research could focus on this federal state to learn more about its success in the structural integration of persons with migrant backgrounds. Furthermore, research could profit from the evaluation of special programs for persons with migrant backgrounds to increase their chances for placement in the VET system. Another reason for low ethnic inequality in VET could be, for example, programs like supplementary apprenticeships in organizations with migrant proprietors (*Migranten schaffen zusätzliche Lehrstellen*) (TG S-H) in Schleswig-Holstein.

Several further conditions also could be playing a role in creating high ethnic inequality. The fact that with each condition taken into the analysis the number of possible combinations, and therefore the number of combinations where there are no cases increases, limits the choice of conditions that can be analyzed. Further research also could discuss the role of the prevalent economic sector. In addition, analyses on smaller regional level would be necessary. An analysis also could be done to consider ethnic inequality in full-time vocational schools and in apprenticeships. In part, this research also could discuss the differences in vocational schools in the various federal states. The effects of educational policies and contextual factors on different ethnic groups also could be tested. Furthermore, the impact of the higher education sector could also be analyzed with respect to the degree of ethnic inequality in the different federal states.

NOTES

1. According to the official German Federal Statistical Office definition, "people with a migrant background" (as used in this article) are "all persons who have immigrated into the territory of today's Federal Republic of Germany after 1949, all foreigners born in Germany and all persons born in Germany who have at least one parent who immigrated to the country or was born as a foreigner in Germany" (Statistisches Bundesamt 2013b).

2. The rate of household attrition—2.5 percent to 3 percent—is relatively low. This is due to the fact that the provision of information for the Microcensus is compulsory.

3. For more information on these data, see http://www.gesis.org/en/services/data-analysis/official-microdata/microcensus/microcensus-grundfile/.

4. To take the varying distribution of people belonging to different nationalities in the different federal states into account (see Table 3), the federal states were standardized in a second step. This standardization adjusts for the different distribution of the three groups of people with a Turkish background, those from other countries of recruitment (Italy, Greece, Portugal, ex-Yugoslavia, Spain, Marokko), and those from all other countries. This standardization is accomplished by setting the percentage of the group in the federal state in proportion to the percentage of the group in Germany on average. Due to the small number of cases in the nationality groups in Schleswig-Holstein, Hamburg, and Germany's eastern states, the weights cannot be computed for those federal states. The results of the standardized regression models are shown in Table A1 in the Appendix.

5. To test the statistical significance of the variation between the federal states, I calculated a model including all federal states and interaction effects between having a migrant background and the federal state. The difference between the federal states in the amount of ethnic inequality is statistically not significant for the federal states of North Rhine Westphalia-Germany's eastern states, Hesse-Rhineland Palatinate, Hamburg-Schleswig-Holstein.

6. As the German Microcensus is a household survey, information about the respondent's family and household context is available, but only for those young people who still live with their parents. Otherwise, no information on the parents is available. Thus, to control also for the education of the parents leads to a biased selectivity above all for the group over 18 years of age. However, to make sure that results are not biased by the omission of social background information, I computed the regression models with and without a variable with the information of the education of the parents (general secondary school education and vocational education; see Table A3 in Appendix). A comparison of the group chosen as the focus of the present study and the group who still lives with their parents shows, without controlling for the education of the parents, that ethnic inequality in the group who still lives with their parents is either over- or underestimated for 2./1.5- and 1.generation migrants. Controlling for the education of the parents, the results show that parents with a higher education have a positive effect on the chances of their children to gain entrance into VET, but the size of the effects is considerably smaller (except Hamburg, Bavaria, and Germany's eastern states) and in some cases insignificant (Schleswig Holstein, Rhineland Palatinate, Hesse, Berlin) compared to the effect of the school leaving certificate of the analyzed population. The ranking of the federal states regarding the level of ethnic inequality changes only marginally. However, the proportion of states with high and low ethnic inequality stays the same.

7. See http://www.u.arizona.edu/~cragin/fsQCA/software.shtml.

8. In Baden-Wuerttemberg, people who are in their first year of their apprenticeship are taught in a full-time vocational school for one year. This partially explains the high number of transition programs in Baden-Wuerttemberg (Baethge, Solga and Wieck 2007).

9. The results for ethnic inequality are the same as those obtained from the standardized regression models in Table A1 in the Appendix.

10. For 1.5/2.-generation migrants no such pattern can be found. The reason for this might be that the variation of ethnic inequality for this group is not that great among Germany's federal states. Furthermore, the same analyses have been carried out for the two groups with Turkish and a former Soviet Union nationality to test the results for different ethnic groups. This can only be done for people with a foreign nationality; Germans with a migrant background will therefore be in the same group as Germans without a migrant background. Furthermore, these analyses could only be done for six federal states, which had a sufficient number of cases. However, for the group with Turkish nationality, no sufficient conditions could be found for a high or low ethnic inequality. Since generation seems to play a larger role than nationality—both ethnic groups include both 1-. and 1.5/2.-generation migrants—no clear results were found. Unfortunately, the number of cases of the group with Turkish nationality was not sufficient to determine the impact of the 1. and 1.5/2.generations. However, a sufficient condition for high ethnic inequality was found for the group with a former Soviet Union nationality. Interestingly, ethnic inequality in VET was higher for this group in federal states with a high amount of apprenticeships and a low amount of full-time vocational schools. Ethnic inequality in VET was also high in federal states with a low amount of full-time vocational schools and a high number of transition programs. For detailed results, see Table A2 in the Appendix.

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APPENDIX

TABLE A1.
Binary Logistic Regression on Probability to Participate in Vocational Education Separately for Each Federal State (Weighted for Different Distributions of Nationality Groups)

Federal State	*AME on chances to be in VET*	
	1.Generation Migrants	1.5/2.Generation Migrants
Berlin (BE)	–0.208***	–0.109***
North Rhine-Westphalia (NW)	–0.205***	–0.071***
Lower Saxony (LS)	–0.216***	–0.052
Baden-Wuerttemberg (BW)	–0.147***	–0.073***
Bavaria (BV)	–0.134***	–0.090***
Hesse (HE)	–0.113**	–0.101***
Rhineland Palatinate (RP)	–0.123*	–0.111**

Notes. Only young adults between 15 and 24 years, reference categories: persons without a migrant background. AME: Average Marginal Effect.

Controlled for age, sex, secondary school certificate, and year of the survey. Weighted for different distributions of nationality groups in different federal states.

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Source: Microcensus 2008–2010; own analysis.

TABLE A2. Minimal Solution of Sufficient Conditions for the Outcome 1 "High Degree of Ethnic Inequality in Non-Academic VET" for People With a Former Soviet Union Nationality (Complex Solution)

Measures of Fit	Sufficient Conditions High Amount of Apprenticeships **AND** Low Amount of Full-time Vocational Schools	OR	Low Amount of Full-time Vocational Schools **AND** High Presence of Transition System
Raw coverage	0.70		0.68
Unique coverage	0.23		0.21
Consistency	0.89		0.95
Cases explained	Bavaria, Baden Wuerttemberg		Lower Saxony, Baden Wuerttemberg
Cases not explained	–		
Solution consistency		0.91	
Solution coverage		0.89	

TABLE A3.
The Role of Social Background

Federal State Generation	Model 1		Model 2		Model 3	
	1.5/2. Gen.	1.Gen.	1.5/2.Gen.	1.Gen.	1.5/2.Gen.	1. Gen.
Berlin	−0.111**	−0.231***	−0.100	−0.096	−0.057	−0.062
Germany's eastern states	−0.440	−0.211***	−0.205***	0.047	−0.197***	0.051
North Rhine-Westphalia	−0.074***	−0.208***	−0.076***	−0.110**	−0.061*	−0.094*
Lower Saxony	−0.053	−0.194***	−0.110***	−0.109*	−0.097***	−0.101*
Baden-Wuerttemberg	−0.071	−0.149***	−0.082***	−0.161***	−0.066***	−0.148***
Bavaria	−0.090***	−0.134***	−0.056	−0.179***	−0.045	−0.158**
Hesse	−0.102***	−0.129***	−0.094*	−0.117	−0.076	−0.091
Rhineland Palatinate	−0.096*	−0.128*	−0.106***	−0.053	−0.095**	−0.041
Hamburg	−0.080	−0.114	−0.119*	−0.228**	−0.146**	−0.244***
Schleswig-Holstein	−0.171***	−0.101	−0.044	−0.163*	−0.018	−0.135

Notes.

Model 1: Controlled for education, age, sex, and year of the survey. Reference groups: Native Germans. Coefficients from Table 5.

Model 2: Controlled for education, age, sex, and year of the survey. Reference groups: Native Germans. Only persons who are still living with their parents, without controlling for education of the parents.

Model 3: Controlled for education, age, sex, and year of the survey and here additionally for education of the father and of the mother. Reference groups: Native Germans. Only persons who are still living with their parents.

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$.

Source: Microcensus 2008–2010; own analysis.

TABLE A4.
Number of Cases for Different Migrant Groups in Each Federal State

Federal State	1.Generation Migrants	1.5/2.Generation Migrants
Schleswig Holstein	55	96
Hamburg	65	100
Lower Saxony	173	381
North Rhine-Westphalia	518	1,380
Hesse	211	505
Rhineland Palatinate	117	209
Baden Wuerttemberg	323	745
Bavaria	317	667
Berlin	120	200
Germany's eastern states	106	72

Source: Microcensus 2008–2010; own analysis.