Explaining Gaps in Educational Transitions Between Migrant and Native School Leavers

Markus Zimmermann (HU Berlin)

Discussion Paper No. 156

May 24, 2019

Collaborative Research Center Transregio 190 | www.rationality-and-competition.de
Ludwig-Maximilians-Universität München | Humboldt-Universität zu Berlin
Spokesperson: Prof. Dr. Klaus M. Schmidt, University of Munich, 80539 Munich, Germany
+49 (89) 2180 3405 | info@rationality-and-competition.de

Explaining Gaps in Educational Transitions Between Migrant and Native School Leavers *

Markus Zimmermann†

May 2019

Abstract: This paper analyzes the reasons for the large and persistent gaps in transitions after secondary school between native pupils compared to second- and third generation immigrant pupils in Germany. I first document that differences in parental background, skills (such as school degrees or test scores), and school fixed effects explain part of the migrant-native gaps, but are not sufficient. Conditional on these factors, there is a "polarization" of educational choices: migrants are more likely to attend tertiary education, less likely to attend vocational education, and more likely to end without qualified training than their background and skills would predict. I then show that this polarization is driven by the migrant pupils' more academically oriented career aspirations and expectations before leaving school. On the one hand, these higher ambitions allow higher skilled migrants to achieve tertiary education despite their less favourable background characteristics. On the other hand, less skilled migrants who in Germany's tracked school system do not have the option to enter academic education, may be diverted from vocational training as a more viable alternative. These patterns are stronger for boys than for girls. Finally, I discuss various possible explanations for the migrants' different career plans, including expected labour market returns to education, expected discrimination, the intention to leave Germany, overconfidence, or information deficits.

Keywords: Migrant youth, vocational education, tertiary education, aspirations, expectations
JEL-Classification: I24, I21, J24, J15

---

*I thank Bernd Fitzenberger, Alexandra Spitz-Oener as well as conference participants at the 30th EALE Conference 2018 in Lyon and seminar participants at HU Berlin for helpful comments. I acknowledge financial support by the Deutsche Forschungsgemeinschaft (DFG) through the project "Education and Vocational Training, Transitions and Labor Market Outcomes" (No. Fi 692/11-1) and by the DFG through CRC TRR 190. All possible errors and omissions are my sole responsibility. The views expressed in this paper are those of the author and do not necessarily reflect the views of the Federal Statistical Office. This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Grade 9, doi:10.5157/NEPS:SC4:9.0.0. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network.

†Federal Statistical Office of Germany. Email: markus.zimmermann2@destatis.de

1 Introduction

Compared to their native peers, school leavers with a migration background in many countries are considerably less likely to take up qualified training after school and are more likely to be non-employed or to enter lower quality training. These differences have important implications for migrants' future integration into the labour market and society. A large literature has focused on migrants' worse parental background or skill endowments before leaving school as possible explanations for their different post-schooling outcomes.[1]

Another key aspect, however, is how young native and migrant pupils differ in their career planning, and which implications these differences have for their trajectories. Migrant pupils or their parents might face particular problems with formulating career plans due to information deficits or other frictions (Hunkler 2014). The highly stratified nature of many education systems requires school leavers to possess sufficient information on which occupations or educational options exist after school and which skills and efforts are necessary to reach a certain path. However, previous research has emphasized that some pupils may not always be able to formulate realistic career plans which are in line with their capabilities (Koch et al. 2015; Lavecchia et al. 2016). For example, pupils from low-SES background were found to have lower educational aspirations than pupils from high-SES backgrounds who have similar ability (Guyon and Huillery 2016; Hoxby and Avery 2013). On the other hand, there is the concern that some low-performing students have unrealistically high aspirations for academic education and may not be sufficiently informed about other alternatives such as vocational training (Goux et al. 2015).

This paper studies the context of Germany, which has a tracked secondary school system that restricts access to tertiary education to those school leavers from the higher secondary track. Vocational training is an alternative route which provides qualified training for those school leavers who do not enter tertiary education. I ask which factors explain the differences in transitions after secondary

[1]This includes, among others, Hunkler (2014) or Diehl et al. (2009) for Germany; Latina and Ramirez (2013) or Wolter and Zumbuehl (2017) for Switzerland; Belzil and Poinas (2010) for France; Colding et al. (2009) for Denmark; or Baert and Cockx (2013) for Belgium.

school between pupils of native German background and German-born pupils with a migration background.[2] The analysis focuses on the transition in the first year after having left secondary school and distinguishes between three possible states: no qualified training, vocational training, and tertiary education. The data come from the Starting Cohort 4 of the National Educational Panel Study (NEPS), a panel survey on pupils who were sampled in the 9th grade of secondary school and followed over subsequent years. The survey offers exceptionally rich information on school leavers, including school grades and degrees, test scores in reading and mathematics, or leisure activities. The data also allow to use school fixed effects to account for the sorting of migrant and native pupils to specific types of schools which also potentially affect transitions after school. Finally, career aspirations and expectations of both the pupils and their parents are surveyed in great detail.

The results can be summarized as follows. Parental background, skills, and school fixed effects go some way towards explaining the migrant-native gaps, in particular the higher risk of migrants to not take up qualified post-school training. However, these factors can't account for all differences. Conditional on these variables, there is a striking "polarization" in educational choices: migrants are more likely to attend tertiary education, more likely to end without qualified training, and less likely to attend vocational education than their background and skills would predict. That is, migrants are both more likely to be found at the bottom and the top than comparable natives, and less in the middle. This pattern is present for both genders, but is considerably stronger for men.

I argue that a key explanation for this polarization is that migrant pupils and their parents have on average more academically oriented career expectations and aspirations before leaving school than natives of similar parental background and skills. Correspondingly, migrants are less likely to apply for vocational training and if they do so, they tend to choose more competitive training occupations. These differences are present along the whole skill distribution, but they have very different effects for low- and high-skilled pupils. On the one hand, their higher aspirations allow high-skilled migrants to achieve tertiary education despite their less favourable background. On the other hand, less skilled

[2] In the remainder of the paper, all pupils who only have German as their mother tongue will be referred to as "natives", while pupils with a mother tongue other than German will be referred to as "migrants". Technically speaking, the latter are second- or third-generation migrants.

migrants who in Germany's tracked school system do not have the option to attend tertiary education, are diverted from vocational training as a more viable alternative. I show that these career aspirations and expectations can account for a large part of the remaining gaps.

Finally, I explore various possible explanations for the migrants' higher aspirations and expectations, including expected labour market returns to education, expected discrimination, the intention to leave Germany, overconfidence, or access to information. Compared to natives, migrants expect higher returns to tertiary compared to vocational occupations, and they also are more likely to intend to leave Germany in the future. Nevertheless, both factors only explain a small part of the migrants' more ambitious career plans. Moreover, there is no evidence that expected discrimination in the apprenticeship market is a contributing factor, nor do I find evidence that migrants generally overestimate their skills. I conclude that information deficits and the migrants' lower familiarity with the German education system likely play a key role for why migrants have both higher aspirations and expectations.

The present study is descriptive in nature and does not use e.g. experimental variation in aspirations or expectations. The literature using aspirations and expectations in explaining educational outcomes has been concerned about potential reverse causality, i.e. that individuals adapt their stated career plans depending on their educational performance (also called "ex-post rationalization", see e.g. Zafar 2011 and the literature cited therein for a detailed discussion). This issue, however, is mitigated in the present context due to the fact that in the NEPS data, pupils' aspirations and expectations are measured before leaving school and are thus not influenced by the post-school transition.[3] But more importantly, a simple story of reverse causality is also inconsistent with the fact that the migrants are more likely to expect to work in a tertiary occupation, but are more likely to end up without any qualified training. Moreover, the very detailed set of controls should at least mitigate many concerns about further unobserved variables simultaneously affecting career plans and outcomes.

The paper contributes to various strands of the literature. First, several papers have studied post-

[3]For example, Fortin et al. (2015) study a setting in which pupils' expectations about the future (namely, boys' and girls' expectations about labour market outcomes) are measured at the same time as the outcome variable (boys' and girls' performance in school), and acknowledge the possible problem of reverse causality. The same holds for Attanasio and Kaufmann (2014, 2017) who study pupils' expected returns to education.

schooling transitions of migrant and native youth, such as Hunkler (2014) or Diehl et al. (2009) for Germany; Latina and Ramirez (2013) or Wolter and Zumbuehl (2017) for Switzerland; Belzil and Poinas (2010) for France; Colding et al. (2009) for Denmark; or Baert and Cockx (2013) for Belgium. However, based on data limitations, these studies have only been able to control for a rather coarse set of characteristics. The present data allow me to control for a much richer set of variables, in particular detailed measures of cognitive skills (test scores in reading and mathematics), leisure activities, school fixed effects, as well as career plans.

An issue specific to Germany and a few other countries is the prominent role of the vocational training system, which mostly takes place in the form of firm-based apprenticeship training (see Wolter and Ryan 2011 for a detailed review). Vocational training provides qualified training also for those school leavers who do not complete the higher track secondary degree and are thus not eligible to attend tertiary education. It has been documented that migrants are less represented in the vocational training system (Diehl et al. 2009, Hunkler 2014). Since the apprenticeship market in principle works like a regular job market (that is, school leavers apply for training places at firms and firms decide on which applicant to hire for an open position), discrimination by firms against school leavers with a migration background is potentially an issue.[4] My paper does not rule out discrimination in vocational training as a further explanatory factor, as there remains an unexplained gap even after controlling for background, skills, and career plans. Still, the fact that these factors account for the bulk of the migrant-native differences suggests that they should be a prime focus for policy interventions.[5]

There is also a literature on migrants' performance within the school system, considering outcomes such as school degrees or cognitive test scores. This includes, among others, Ammermüller

[4]Kaas and Manger (2012) use fictitious applications to student internships (i.e., more high-skilled individuals than school leavers who apply for apprenticeships) and find lower callback rates for applicants with Turkish-sounding names as compared to otherwise similar applicants with German-sounding names. However, this differential disappears if the applications also include reference letters from previous firms. Another experimental study by Weichselbaumer (2015) shows lower callback rates for female Turkish applicants wearing a headscarf, but little effects for female Turkish applicants without a headscarf.

[5]As discussed in Section 5.1 below, I also show that pupils' *expected* discrimination in vocational training is not a driving factor for why migrants are more inclined towards pursing academic careers. This finding is in line with the existing literature for Germany, see Tjaden and Hunkler (2017) and Salikutluk (2016).

(2007), Kristen and Granato (2007), or Lüdemann and Schwerdt (2013) for Germany; Dustmann et al. (2010) for the UK; as well as Dustmann et al. (2012) in a cross-country analysis of OECD countries. These studies have demonstrated the relevance of parental background or language proficiency as explanatory factors for migrants' worse school performance, but they lack suitable data to consider individuals' transitions after school.

My study also contributes to the literature on the role of aspirations and expectations in making educational decisions, and how these factors vary across parental background groups as well as ethnic groups.[6] Pupils from low-SES background were found to have lower educational expectations than pupils from high-SES backgrounds (Kaufmann 2014, Boneva and Rauh 2017), even when comparing pupils of similar ability (Guyon and Huillery 2016). Among high-ability students, those coming from low-SES parents are also less likely to apply to selective colleges (Hoxby and Avery 2013). Moreover, it has been documented that migrants and ethnic minorities tend to have high educational ambitions, a pattern which holds for several industrialized countries (see Tjaden and Hunkler 2017, Salikutluk 2016, or Relikowski et al. 2012 for Germany; Jackson 2012 for the UK; Kao and Tienda 1995, 1998 for the U.S.; as well as Brinbaum and Cebolla-Boado 2007 for France).[7] I extend this literature by analyzing whether and to what extent these career plans do actually matter for pupils' transitions, which most papers could not analyze due to a lack of suitable data following individuals after school. Moreover, I show that these plans can have very different effects for low- and high-skilled pupils depending on which choices are attainable for an individual, and depending on the institutional context of the education system.[8]

In that sense, the findings of this paper relate to a key tradeoff involved when setting career goals. A number of studies has expressed concern that a lack of self-control and motivation can cause young

[6]See, among others, Stinebrickner and Stinebrickner (2014), Zafar (2013), Arcidiacono et al. (2012), Dominitz and Manski (1996) for the U.S.; Boneva and Rauh (2017) for England; as well as Kaufmann (2014) or Attanasio and Kaufmann (2014, 2017) for Mexico.

[7]For the U.S., Cameron and Heckman (2001) or Lang and Manove (2011) report that individuals from Black and Hispanic families show higher educational performance (in terms of high school graduation and college attendance) than White students after controlling for family background characteristics and ability (AFQT test scores).

[8]For example, a related analysis by Tjaden and Hunkler (2017) also uses the NEPS data and highlights the role of migrants' educational aspirations. However, as they use an earlier version of the data, their analysis is restricted to the subgroup of pupils in lower secondary school and they can only observe pupils' plans and not their actual transitions after school.

individuals to underinvest in education. This is based on the idea that effort, along with ability, is a key factor in the educational production function (see Koch et al. 2015 and the literature cited therein). Benabou and Tirole (2002) argue that high self-confidence can increase motivation and perseverance in the face of obstacles. However, they note that high self-confidence can also be detrimental to performance if individuals have unrealistic goals. Related to this second argument, Goux et al. (2015) find that many low-performing pupils have high educational aspirations for academic school tracks but also high dropout rates later on. They show that an intervention which informs pupils about more viable alternatives such as vocational training can help to restate career plans and to reduce dropout rates.

The rest of the paper is structured as follows. Section 2 gives a short description of the institutional features of the German education system and describes the different immigrant groups in Germany. Section 3 describes the data set. Section 4 shows the main empirical results. Section 5 presents additional analyses. Section 6 concludes.

2 Background

2.1 The German Education System

Germany has a tracked secondary school system in which children are typically tracked at age 10, after 4 years of primary school, based on their school performance. The three main tracks are lower secondary school (*Hauptschule*), which regularly finishes at age 15, middle secondary school (*Realschule*), which finishes at age 16, and higher secondary school (*Gymnasium*), which finishes at age 18/19. Secondary school leavers with lower or middle secondary degree have the option to apply for vocational training. School leavers with a higher track secondary degree additionally have the option to apply for tertiary education, but they can also apply for vocational training.

Tertiary education takes place at universities or universities of applied sciences. Entering tertiary education typically requires a degree from a higher track secondary school track. Individuals without this degree may enter tertiary education only if they have already completed a vocational training

degree. However, this is not yet an option for the young individuals in the present sample who have just left secondary school. Depending on the subject of study, further restrictions on entry to tertiary education may be based on the grade point average of the school degree. Contrary to e.g. the U.S., there are no affirmative action policies such as quotas for specific minority groups.

The vocational training system in Germany consists of two main sectors: firm-based apprenticeship training and full-time vocational schools. In *apprenticeships* (the most frequent option), young individuals attend vocational schools during part of the week, and obtain within-firm training during the rest of the week, which is why this type of training is also called "dual" vocational education. The apprenticeship market in principle works like a regular job market: school leavers apply for training positions and firms decide on which applicants they hire. Training is certified through a contract between the apprentice and the training firm. Apprenticeships typically last between 3 and 3.5 years, depending on the chosen occupation. Besides the apprenticeship system, there also exist *full-time vocational schools* (*Berufsfachschulen, Schulen des Gesundheitswesens*), which contain no within-firm training component. Full-time vocational schools offer only a limited number of occupations, typically in health and social services or assistant positions. Admission to full-time vocational schools is based on school degrees and grades and typically requires at least a middle secondary degree.

If a pupil leaves secondary school at age 15 or 16 and has not found a vocational training place (neither for a firm-based apprenticeship, nor at a full-time vocational school), she is not allowed in most Federal states to simply enter the labour market as an unqualified worker. Instead, she is then required to enter a measure in the so-called pre-vocational training system (*Übergangssystem*). As these measures last only one year and do not award full vocational certificates, they are classified in my analyses as "No qualified training".

2.2 Immigrants in Germany

The present paper considers only pupils who are born in Germany in order to reduce possible concerns of unobserved heterogeneity as far as possible. Those pupils labeled "migrants" in this paper are therefore second- or third-generation migrants. As the NEPS survey includes pupils who were in 9th

grade in the school year 2010/11, most of the individuals are born in 1994 or 1995. On the one hand, their families come from the classical guest worker countries (mainly Turkey, former Yugoslavia, Italy, Greece, Portugal, and Spain). In the 1950s and 1960s, workers from these countries were recruited by the then-West German government to fill shortages of workers in the industrial sector. These migrants were typically a negative selection in terms of skills and family background. On the other hand, there was another large wave of immigration in the late 1980s and early 1990s. Most of the immigrants at this time were "ethnic Germans" from the former Soviet Union and Eastern Europe (Glitz 2012), but also refugees from the civil wars in former Yugoslavia in the early 1990s.

3 Data

The empirical analysis relies on the Starting Cohort 4 of the National Educational Panel Study (NEPS).[9] This is an original sample of 16425 pupils who were in 9th grade during the school year 2010/11 and were followed up again in regular intervals. The sample is restricted to 15240 pupils in regular schools (excluding special needs schools), and further down to 13907 pupils who were born in Germany. "Migrants" are defined as those pupils who report a mother tongue other than German, while "natives" are those pupils that report only German as their mother tongue. Due to panel attrition, the number of individuals that are still observable in the data one year after finishing school is 10183.

The main outcome variable distinguishes between three activities after school: tertiary education (at universities or universities of applied sciences), vocational education (at firm-based apprenticeships or full-time vocational schools), or no qualified training. The third category includes not only employment or nonemployment episodes, but also one-year pre-vocational training programmes, which do not award full vocational degrees and are designed primarily for school leavers from lower and middle secondary schools who did not get a vocational training place. The activities are measured

[9] See also Blossfeld et al. (2011) for a general overview of the different data sets associated with the NEPS.

during the first survey wave after the person has left secondary school.[10,11]

The data provide exceptionally rich control variables such as parental background information, school degrees and school grades, performance in reading and mathematics test scores in 9th grade, and measures of leisure activities access to social networks. Additionally, there is the advantage that the NEPS data are in the form of a clustered school sample. Thus, including 9th grade school fixed effects in the estimation allows to account for the fact that migrants and natives are possibly non-randomly sorted to specific schools, also conditional on the type of the school track. In other words, I only compare the outcomes of migrant and native pupils who attend the same schools in 9th grade. Given the data structure, all standard errors in the regressions will be clustered at the school level.

Moreover, the survey asks detailed questions about pupils' career expectations and aspirations while in secondary school. Pupils are also surveyed retrospectively after having left school whether they have applied for vocational training and in which occupations. In order to characterize the aspired and expected occupations, and the occupation for which the person has applied, additional statistics are merged on the 3-digit occupational level based on external data sources. On the one hand, I merge information on the average educational levels of workers in the respective occupation. This information comes from a data set provided by Hausmann et al. (2015) and is based on German administrative data.[12] Moreover, for those pupils who have applied for firm-based vocational training, I merge information on the supply-demand ratio for training places in this occupation as a measure for the "competitiveness" of the vocational training market for these pupils. The information on supply-demand ratios comes from the Federal Institute for Vocational Education and Training (BIBB).[13]

[10]School years finish in the summer, and the survey usually takes place in the fall and winter (about 80 % are surveyed in the months from October to February). I control for interview month in the regressions.

[11]For individuals who perform a voluntary social or military service year after school (which applies mostly to school leavers with higher track secondary degree), the activity in the next survey wave after the voluntary service is considered.

[12]Hausmann et al. (2015) calculate the occupation-level information based on the Sample of Integrated Employment Biographies (SIAB), a 2 % random sample of all employees covered by social security. I use information from the years 2005-2010. The data are available at `http://doku.iab.de/fdz/reporte/2015/MR_09-15_Daten.zip`.

[13]These data are available at `https://www.bibb.de/de/75381.php`. Information on supply-demand ratios is not available for those training occupations (such as nurse or child care worker) which take place in the form of full-time vocational schooling. About 13 % of pupils who have applied for vocational training have applied for these occupations.

4 Results

4.1 Basic Facts

Table 1 presents descriptive evidence on the main outcomes, i.e. the realized transition in the first year after having finished secondary school, and the "raw" gaps in these transition rates between migrants and natives. As shown in Panel A, migrants have on average a higher probability to be without qualified training than natives, a lower probability to enter vocational training, and a lower probability to enter tertiary education. There are also striking gender differences – the migrants' higher risk of being without qualified training is much larger in magnitude among boys (+15.2 ppts.) than among girls (+8.3 ppts.).

Table 1: Transitions after leaving secondary school

	Boys			Girls		
	No qualified training	Vocational education	Tertiary education	No qualified training	Vocational education	Tertiary education
A. All school leavers						
Migrants	0.417	0.388	0.195	0.416	0.387	0.197
Natives	0.265	0.507	0.228	0.332	0.406	0.262
Migrant-Native Gap	0.152***	-0.119***	-0.033	0.083***	-0.019	-0.065***
	(0.022)	(0.022)	(0.020)	(0.019)	(0.021)	(0.018)
N	5100	5100	5100	5083	5083	5083
B. School leavers without higher track secondary degree						
Migrants	0.494	0.506	-	0.486	0.514	-
Natives	0.292	0.708	-	0.359	0.641	-
Migrant-Native Gap	0.202***	-0.202***	-	0.127***	-0.127***	-
	(0.027)	(0.027)	-	(0.026)	(0.026)	-
N	3030	3030	-	2463	2463	-
C. School leavers with higher track secondary degree						
Migrants	0.262	0.148	0.590	0.310	0.198	0.491
Natives	0.228	0.227	0.545	0.309	0.204	0.486
Migrant-Native Gap	0.034	-0.080***	0.045	0.001	-0.006	0.005
	(0.032)	(0.026)	(0.037)	(0.026)	(0.025)	(0.028)
N	2070	2070	2070	2620	2620	2620

Note: Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

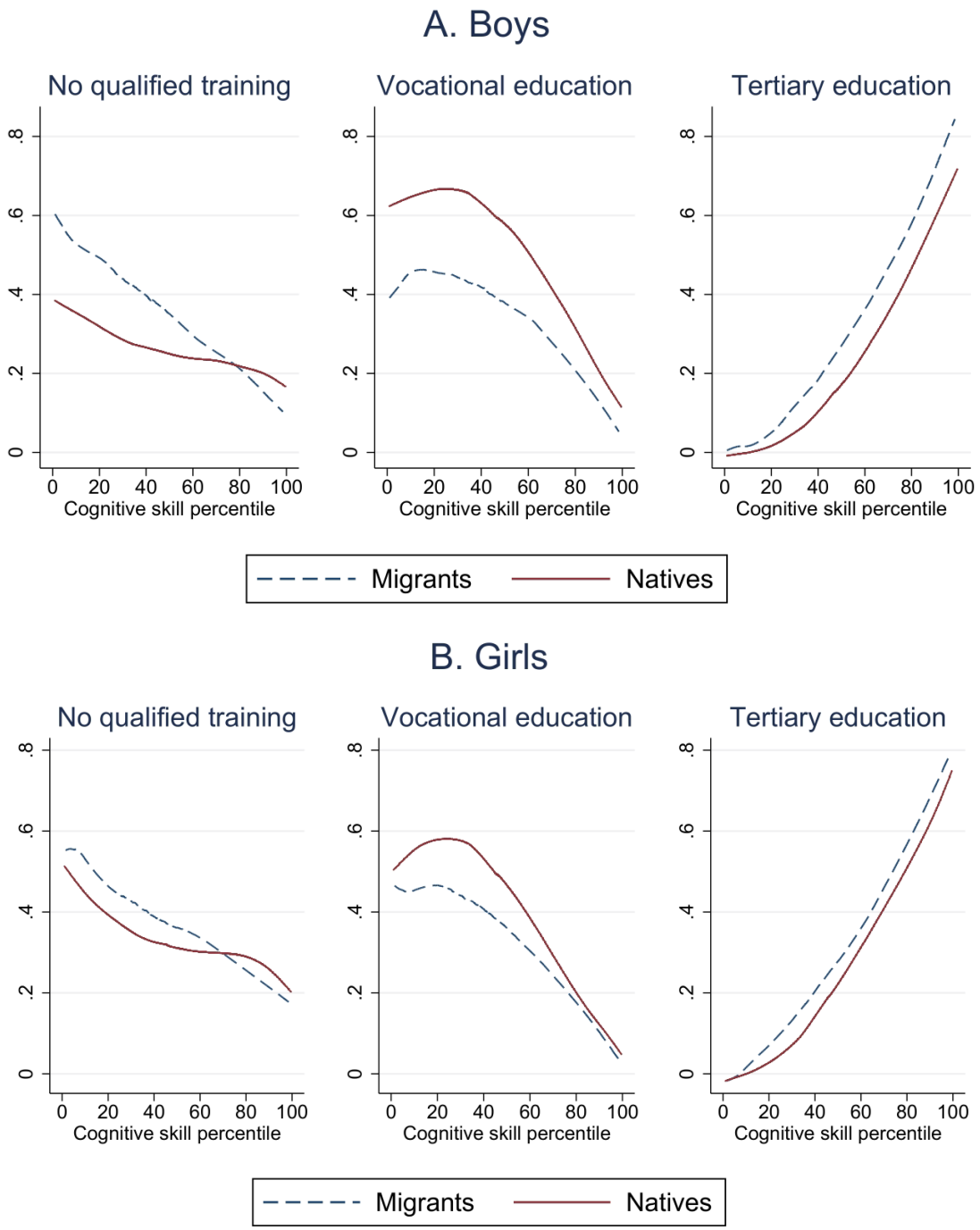
Given that migrants and natives differ in their schooling history and skill endowments before leaving school (as will be documented in more detail in Section 4.2. below), it is also important to analyze transitions conditional on school degrees and skills. While Panel A of Table 1 has shown the results when pooling school leavers with all types of secondary school degrees, Panels B and C present the results separately for pupils without and with higher track secondary degrees, respectively. In Germany's tracked school system, pupils without a higher track degree do not have the option to attend tertiary education directly after school, and vocational education is their only chance to achieve qualified post-school training. Nevertheless, it appears from Panel B that a relatively large share of these less skilled school leavers fails to enter qualified training in the first year after school. The migrant-native gap is stronger among less skilled boys (+20.2 ppts.) than among less skilled girls (+12.7 ppts.).

Panel C of Table 1 shows the results when restricting the sample to school leavers with a higher track secondary degree, who have the option to enter tertiary education. Among the high-skilled boys, migrants are again less likely to enter vocational training and more likely to enter tertiary education. Among the high-skilled girls, there are little differences between migrants and natives.

Figures 1a and 1b plot transition rates for natives and migrants holding constant 9th grade cognitive skills, with the x-axis showing the average percentile of the pupil's reading and mathematics test scores.[14] As expected, the share who attend tertiary education is increasing steeply in skill, while the share who have no qualified training or vocational education decreases with skill. Overall, the figures document a striking "polarization" of migrants' educational choices: compared to natives of the same skill level, migrants are both more likely to end without qualified training *and* more likely to attend tertiary education, and less likely to attend vocational education. In line with the analyses in Table 1, the migrant-native gap of not entering qualified training is much more pronounced among the less skilled, and then becomes smaller in magnitude when moving further up the skill distribution. These patterns are also more pronounced among boys than girls. In particular, less skilled migrant boys have much lower entry rates into vocational training than less skilled native boys (tertiary education

[14]Percentiles are defined for the pooled sample of migrants and natives, but separately by gender.

Figure 1: Transitions by percentile of 9th grade cognitive skill



Note: The graph shows results from a locally weighted regression. The cognitive skill percentile is obtained as the average of a pupil's percentiles in 9th grade reading and mathematics test scores. Percentiles are defined for the pooled sample of migrants and natives. Source: NEPS SC4, own calculation.

plays generally a small role for the less skilled). For girls, these gaps go in a similar direction, but are smaller in magnitude.

4.2 Differences in Characteristics Between Migrant and Native School Leavers

4.2.1 Differences in Background and Skills

The aim of the analysis is to show to what extent the large "raw" differences documented above can be explained by differences in characteristics between migrant and native school-leavers. I first consider detailed measures of parental background, school degrees, cognitive test scores, leisure activities, as well as variables at the school and regional level. Table 2 shows selected descriptive statistics of these variables, separately by migrant status and gender.[15] First consider the parental background variables. About 70 % of the German pupils have a parent with a vocational degree, compared to only about 39 % for migrants. In contrast, migrant pupils have a much higher percentage of parents without any postsecondary degree.

The pupil's school degree is another key predictor of post-schooling trajectories.[16] Not only does entry to tertiary education require a higher track secondary degree, but also in the apprenticeship market firms tend to give priority to school leavers with better school degrees and cognitive skills.[17] Migrant pupils are much less likely than German pupils to leave school with a higher track secondary *Abitur* degree (–10.5 ppts. for boys, and –14.5 ppts. for girls). Another skill indicator is the performance in reading and mathematics tests which were conducted in the NEPS survey when the pupils attended 9th grade. Migrants are behind natives in the order of about half a standard deviation in both reading and mathematics test scores.

[15] Separate statistics of pupils without and with higher track degree are presented in Tables A1a and A1b in the Appendix.

[16] I distinguish between five secondary school degrees: basic lower track secondary degree (*Hauptschulabschluss*), advanced lower track secondary degree (*erweiterter Hauptschulabschluss*), middle track secondary degree (*Mittlerer Schulabschluss*), as well as two types of higher track secondary degree: *Fachhochschulreife* and *Abitur*, with the former only granting access to universities of applied sciences.

[17] Various studies document the correlation between such ability signals and the chance of applicants to be invited for a job interview, and/or to be hired for the apprenticeship position, see e.g. Hunkler (2014). In an experimental study, Piopiunik et al. (2018) show part of these these correlations also seem to be causal. Using fictitious applications for apprenticeships, applicants who are randomly assigned better school grades and IT skills have higher chances to be invited for a job interview.

Table 2: Selected background characteristics: Parental background, skills, leisure activities, and regional variables

	Boys				Girls			
	Migrants	Natives	Diff.		Migrants	Natives	Diff.	
Parental Education:								
Vocational	.391	.703	-.312	***	.436	.684	-.248	***
Tertiary	.136	.226	-.09	***	.126	.244	-.118	***
No postsec.	.473	.071	.402	***	.438	.073	.366	***
Grew up with both parents	.745	.735	.011		.74	.733	.007	
Number of siblings	1.661	1.327	.334	***	1.752	1.3	.452	***
Secondary school degree:								
No school degree	.034	.019	.015	**	.024	.014	.01	*
Lower sec. (basic)	.215	.127	.088	***	.159	.085	.074	***
Lower sec. (advanced)	.129	.092	.037	**	.112	.058	.054	***
Middle sec.	.291	.343	-.052	**	.303	.304	-.001	
Higher sec. (FHR)	.076	.059	.017		.083	.075	.008	
Higher sec. (Abitur)	.255	.359	-.105	***	.319	.464	-.145	***
9th Grade Test Scores:								
Reading	-.62	-.089	-.53	***	-.38	.213	-.592	***
Mathematics	-.271	.217	-.488	***	-.576	-.077	-.5	***
Reads a lot in his/her spare time	.252	.283	-.031	*	.476	.571	-.095	***
Plays musical instrument	.263	.292	-.029		.363	.415	-.052	***
Member of a sports club	.621	.651	-.03		.427	.585	-.158	***
Member of a volunatry service club	.073	.152	-.079	***	.067	.088	-.021	**
Lives in a big city	.346	.206	.139	***	.321	.219	.102	***
University present in district	.363	.233	.13	***	.316	.246	.07	**
District with high youth unempl. rate	.42	.405	.015		.435	.416	.019	
N	738	4362			866	4217		

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table 2 also confirms previous findings in the literature on gender inequalities in education – in particular, the better performance of girls in achieving higher school degrees and their advantage in reading, as well as boys' advantage in mathematics.[18] These gender differences are present among both natives and migrants. The migrant-native gaps in human capital before leaving school are either similar for the genders, or in some cases slightly larger in magnitude among girls.

Further controls are whether the pupil reads a lot in his/her spare time or whether he/she plays

[18] See, among others, Autor et al. (2016), Fortin et al. (2015), Riphahn and Schwientek (2017), Buchmann et al. (2008), and Goldin et al. (2006).

a musical instrument. The share reporting these academically demanding activities is much higher among girls than among boys (regardless of migrant status), but since it is particularly high among native girls, the ethnic gaps are higher among girls than boys for these variables. I also consider whether the pupil is a member of a sports club or a voluntary social service organization. Such activities can not only help the person to acquire contacts who provide information on open positions, but they also signal social skills to employers that would otherwise be unobserved.[19] Migrant boys are less likely to participate in voluntary service organizations than native boys, while migrant girls are less likely to participate in sports clubs than native girls.

Table 2 further shows a number of regional characteristics. Since apprenticeship markets and the supply of tertiary educational institutions differ considerably across different regions in Germany, differences in the regional allocation of migrants and natives have potentially important effects on postsecondary educational choices.[20] Since school-leavers make their decision at a relatively young age of 15/16 (when leaving from the lower/middle track) or at age 18/19 (when leaving from the higher track), credit constraints and family ties are possibly relevant and impede regional mobility. Table 2 shows that migrant pupils are much more likely to live in big cities (which have a lower concentration of firms offering apprenticeship places), and they are more likely to live in districts in which a tertiary educational institution is present.[21] These factors, ceteris paribus, should contribute to migrants' lower representation in the vocational training system, and a higher tendency to apply for tertiary education.

Finally, the regressions will also control for school fixed effects to proxy for unobserved school-specific factors affecting transition rates. In Germany's tracked school system, pupils are sorted by school performance already at age 10, which should result in relatively large segregation across

[19] In an experimental study using fictitious school leavers' applications for apprenticeships, Piopiunik et al. (2018) find that applicants who signal social skills by social volunteering have a 37 ppts. higher probability to be invited for a job interview than otherwise identical applicants. In contrast, no effect is found for participation in sports clubs.

[20] Spieß and Wrolich (2010) provide evidence for Germany that distance to the next university affects enrollment in tertiary education. Kleinert and Kruppe (2012) analyze regional differences in apprenticeship markets.

[21] Those regions in Germany which historically have a larger share of migrants (big cities, or the industrial Ruhr area) have a lower supply-demand ratio for apprenticeship places, while many regions with a more favourable supply-demand ratio (such as rural areas in Bavaria or parts of East Germany) have a lower share of migrants. See also Glitz (2014) for an extensive analysis of regional and workplace segregation in Germany.

schools, and also between migrants and natives. This conjecture is supported by findings in Dustmann et al. (2012), who show that among all European countries, Germany has the largest migrant-native difference in terms of school quality (measured by peers' test scores).[22] In the NEPS data, I find that migrants are attending schools with peers whose 9th grade reading test scores are about 0.3 standard deviations below the peers of native pupils. Note, however, that the present data do not allow to distinguish the effect of schools from the effect of regional variables in the same regression, because the regional variables are merged based on the district of the school. I thus can't rule out that part of the school fixed effect in fact captures neighborhood characteristics on a finer regional level.

4.2.2 Differences in Career Plans

Turning next to various variables describing pupils' career plans, I start with considering occupational aspirations and expectations. For *aspirations*, pupils are asked to state their occupational preferences regardless of any possible constraints ("If you could decide just by yourself, in which occupation do you want to work?"). In contrast, pupils' *expectations* about the future ("In which occupation do you think you will work later?") reflect not only their preferences, but also subjective constraints such as ability or financial constraints.

Figure 2 shows how these occupational plans differ between migrant and native pupils when holding constant 9th grade cognitive skill. Compared to similarly skilled natives, migrants show both higher aspirations (Figure 2a) and higher expectations (Figure 2b) to work in occupations with more tertiary educated employees.[23] This gap is present along the whole skill distribution. For both migrants and natives, the share of tertiary employees in the expected occupation is generally lower than in the aspired occupation, suggesting that subjective constraints are important for a few pupils. There are also interesting gender differences. Migrant boys have both high aspirations *and* high expectations. Migrant girls have high aspirations, but their expectations are lower in comparison.

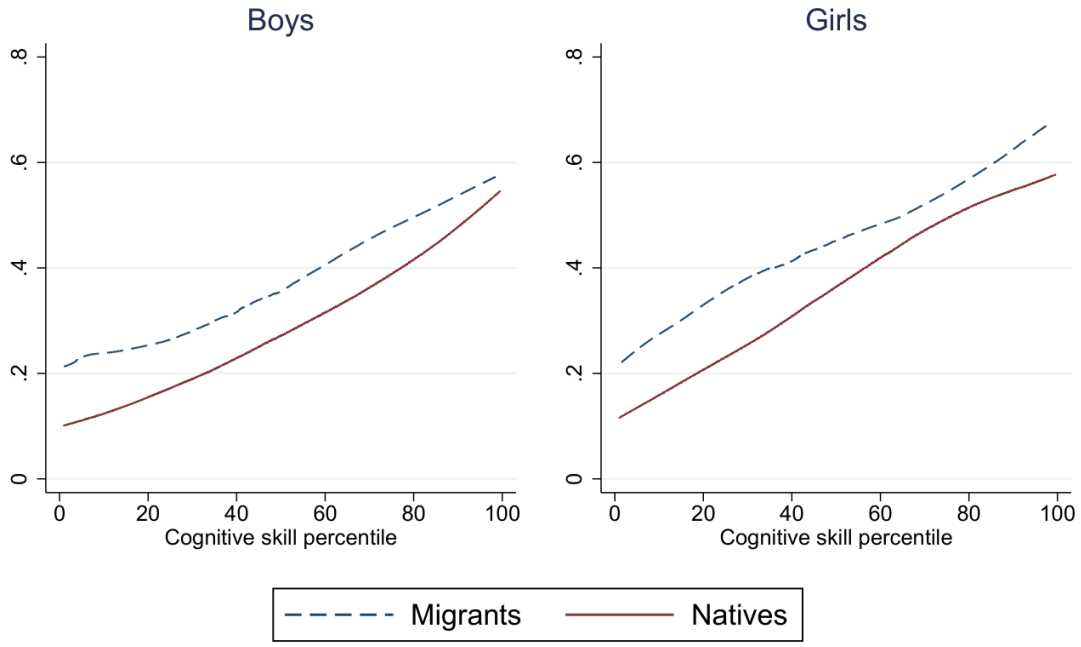
Table 3 corroborates this evidence by considering a larger set of variables describing pupils' ca-

[22] Studies for other countries have also demonstrated the importance of school quality, such as Fryer and Levitt (2004) or Hanushek and Rivkin (2009) for the Black-White test score gap in the U.S., or Dustmann et al. (2010) for the test score gap between White British and migrant pupils in the UK.

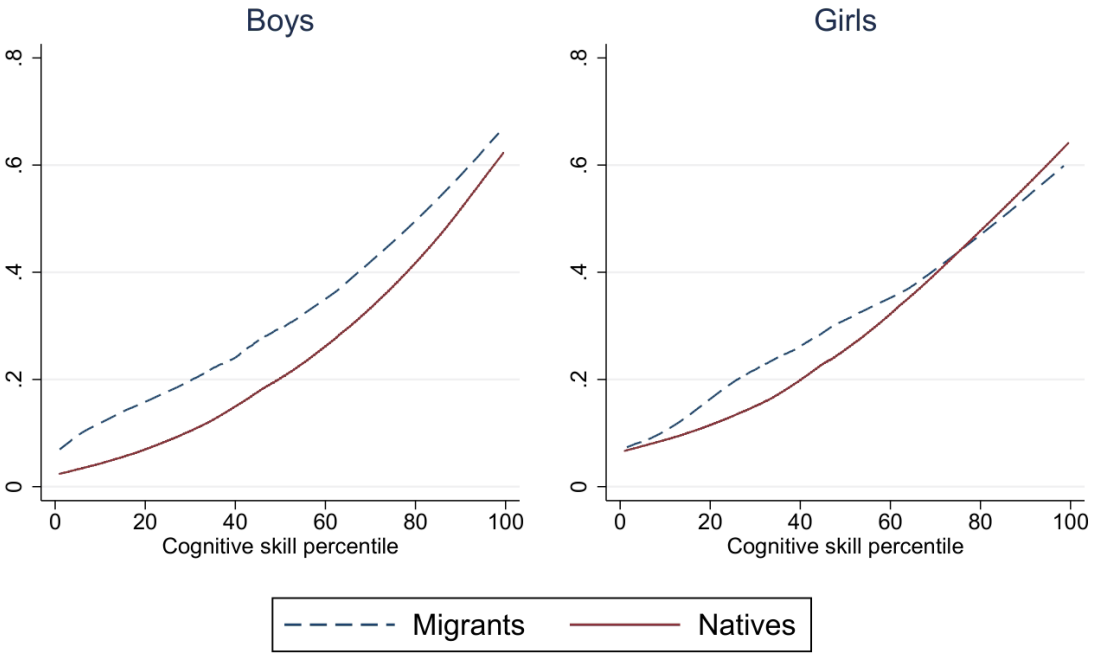
[23] As discussed in Section 3, the occupational information is merged based on administrative data.

Figure 2: Career plans, by percentile of 9th grade cognitive skill

A: Share of tertiary employees in the pupil's aspired occupation



B: Share of tertiary employees in the pupil's expected occupation



Note: Skill shares by occupation are merged at the 3-digit occupational level based on administrative data in Hausmann et al. (2015). The graph shows results from a locally weighted regression. The cognitive skill percentile is obtained as the average of a pupil's percentiles in 9th grade reading and mathematics test scores. Percentiles are defined for the pooled sample of migrants and natives. Source: NEPS SC4, own calculation.

Table 3: Differences in career plans

	Boys						Girls					
	Mig-rants	Na-tives	Raw Diff.		Cond. Diff.		Mig-rants	Na-tives	Raw Diff.		Cond. Diff.	
Parental educational aspirations:												
Academic	.436	.322	.114	***	.164	***	.473	.379	.094	***	.183	***
Vocational	.377	.473	-.096	***	-.115	***	.379	.41	-.031		-.108	***
None	.187	.204	-.018		-.049	***	.148	.212	-.064	***	-.075	***
Pupil's aspired occupation:												
Share of tertiary employees	.326	.289	.037	**	.079	***	.397	.372	.025	*	.077	***
Share of vocational employees	.608	.638	-.031	**	-.066	***	.560	.576	-.016		-.061	***
Share of unskilled employees	.067	.074	-.007	*	-.014	***	.044	.053	-.009	***	-.016	***
Has no aspired occupation	.142	.129	.013		-.008		.102	.083	.019	*	-.005	
Pupil's expected occupation:												
Share of tertiary employees	.253	.239	.013		.053	***	.243	.290	-.047	***	.019	***
Share of vocational employees	.680	.689	-.008		-.042	***	.703	.655	.048	***	-.010	***
Share of unskilled employees	.068	.073	-.005		-.01	*	.054	.056	-.002		-.01	**
Has no expected occupation	.202	.158	.044	***	.009		.143	.13	.013		-.013	
Aspires to complete higher sec. degree	.545	.543	.001		.102	***	.592	.647	-.055	**	.079	***
Expects to complete higher sec. degree	.358	.425	-.068	***	.042	***	.402	.516	-.115	***	.028	***
Plans to apply for voc. training after school	.447	.437	.01		-.039	*	.42	.381	.039	*	-.058	*
Done a voluntary internship during school	.108	.152	-.043	***	-.027	*	.112	.133	-.021		-.004	*
Has applied for voc. training	.592	.622	-.03		-.074	***	.538	.523	.015		-.055	***
Knows someone who gives info on voc. training	.581	.719	-.138	***	-.085	***	.717	.785	-.068	***	-.029	***
Knows someone who can help with application	.443	.623	-.18	***	-.083	***	.582	.739	-.157	***	-.041	***
Supply-demand ratio in occ. for which applied (if any)	.911	.921	-.01	*	-.013	**	.897	.903	-.006		-.02	**
N	738	4362					866	4217				

Note: For each variable, the column entitled "raw difference" shows the mean difference in the respective variable between migrants and natives. The column entitled "conditional difference" shows differences regression-adjusted for parental background, skills, and school fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

reer plans.[24] This table also shows the migrant-native differences both unconditional and conditional on background characteristics and skills (similar to Figure 2 which controlled for test scores as a single skill metric).[25] Migrants' parents show much higher aspirations that their children will attend a university later on and a lower aspiration for vocational education.[26] Interestingly, this holds for both boys and girls, even though many migrant families come from cultures with more conservative gender role models. There are also interesting patterns for the plans of the pupils themselves. Compared to native boys (girls) of similar background and skills, migrant boys (girls) expect to work in occupations with a 5.3 ppts. (1.9 ppts.) higher share of tertiary employees. Comparing the "conditional" and "unconditional" columns, migrants' more academic aspirations and expectations become more pronounced when controlling for the fact that migrants typically have more disadvantaged family backgrounds and are less skilled than native pupils.[27]

Appendix Table A3 further shows ethnic differences in expectations *conditional* on aspirations. It emerges that low-skilled migrant boys have higher expectations than low-skilled native boys to work in tertiary occupations also when holding aspirations constant. In contrast, this pattern does not exist for high-skilled boys or girls in general (whose high expectations can be fully explained by their higher aspirations). This suggests that low-skilled migrant boys are distinct not only by having different preferences about their future careers, but also by having more optimistic subjective assessments about which career is realistic for them.

Table 4 presents additional evidence on the field of the pupils' expected occupation. As expected, there are strong gender differences, with men being more inclined towards technical fields and women being more inclined towards health, social services, and education. Among less skilled boys, occupations in the category "production and construction" are by far the most frequent. However, migrant boys tend to expect these occupations much less frequently than native boys and more often expect to

[24]This table again shows the results for all school leavers pooled, while separate statistics for school leavers without and with higher track secondary degree are shown in Appendix Tables A2a and A2b.

[25]Specifically, the columns named "conditional difference" in Table 3 show the coefficient of a migrant dummy from a regression of the respective variable on the migrant dummy, parental background, skills, and school fixed effects.

[26]These variables are reported by the parents themselves in a separate questionnaire. Information on the parents' expectations about their children is not available.

[27]This is most salient for expectations: the migrant-native difference in the share of tertiary employees increases from 1.3 ppts. for boys (unconditionally) to 5.3 ppts. (conditionally).

work in service occupations such as "sales and gastronomy" or "management, law, and administration". This also holds for girls, albeit to a weaker extent.

Table 4: Occupational fields in % (expected occupation)

	Boys		Girls	
	Migrants	Natives	Migrants	Natives
A. School leavers without higher track secondary degree				
Agriculture	2.0	3.6	1.4	3.6
Production, Construction	47.5	58.0	5.2	8.8
Natural Sciences, IT	6.7	6.8	0.9	1.5
Transport, Logistics, Security	6.1	8.0	2.6	2.9
Sales, Gastronomy	11.7	6.9	23.4	16.8
Management, Law, Admin.	14.0	7.6	18.0	18.5
Health, Social Services, Education	7.5	6.4	46.8	45.5
Media, Culture, Literature	4.5	2.5	1.6	2.4
N	358	2033	427	1645
B. School leavers with higher track secondary degree				
Agriculture	0.4	1.3	0.0	0.9
Production, Construction	19.7	26.3	6.1	9.2
Natural Sciences, IT	12.6	15.4	5.1	4.7
Transport, Logistics, Security	8.5	7.1	4.1	3.6
Sales, Gastronomy	4.9	5.0	12.1	6.4
Management, Law, Admin.	30.5	19.8	27.1	22.4
Health, Social Services, Education	19.3	16.7	34.4	42.2
Media, Culture, Literature	4.0	8.4	11.1	10.6
N	223	1565	314	2009

Note: The categories follow the 1-digit KldB 2010 occupational classification by the German Statsitical Office. Source: NEPS SC4, own calculation.

The migrants' more academic career plans are mirrored by a lower inclination towards vocational training. While still in school, they are less likely to report they plan to apply for vocational training, and after school they are also less likely to actually have applied (see Table 3). Moreover, migrants also are less likely to have completed a voluntary firm internship while in school.[28] Related to this is the access to social networks, measured by whether the pupil knows someone who can provide information about open apprenticeship positions or who can help with writing an application. Migrant youth (in particular, migrant boys) report to receive less support than native youth.

[28]Many pupils are required to do an internship by their school, and there is no migrant-native difference in compulsory internships.

Importantly, as shown in Appendix Table A2a, the migrants' more ambitious career expectations and aspirations are also present among those school leavers who leave school without a higher track secondary degree. In Germany's tracked school system, these less skilled pupils do not have the option to attend tertiary education, and vocational training is their only viable chance for qualified training. Even among this group, there is a larger share of migrant students who report that they did not apply for vocational training.

Moreover, even if migrants actually do apply for vocational training, they tend to select more competitive occupations than natives. This is illustrated in the last row of Table 3, which shows (for those who have applied) the supply-demand-ratio for vocational training places in the respective occupation the pupil has applied for.[29] Migrants apply for occupations with a lower supply of training places relative to demand. Of course this does not imply that migrant boys have a higher preference for competition per se. Rather, this may again be a by-product of their occupational preferences (see Table 4 above) as migrants are less likely to aim for production and crafts occupations (where the supply-demand-ratio is higher) and more likely to apply for occupations in the service sector (with a less favourable supply-demand-ratio).

4.3 Contribution of Characteristics to the Migrant-Native Gaps

Returning now to the paper's main question of what can explain migrant-native gaps in post-school transitions, Table 5 shows how these gaps change after successively controlling for various blocks of variables.

Starting from a "raw" model (Table 5, columns 1 and 5), I first add parental background variables (Table 5, columns 2 and 6). The migrants' less favourable parental background completely explains their lower chance of entering tertiary education and a small part of their higher risk of remaining without qualified training. The next specification (columns 3 and 7) further conditions on skills (school degrees and grades, cognitive test scores in reading and mathematics, leisure activities) as well as school fixed effects. For boys, this generates a polarization of migrants' educational choices:

[29] As discussed in Section 4.3, this information is based on merged data from the Federal Institute for Vocational Education and Training (BIBB), see `https://www.bibb.de/de/75381.php`.

Table 5: Migrant-native gaps in transitions after secondary school (all school leavers)

	Boys				Girls			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimated gap between migrants and natives in the transition to...								
No qualified training	0.152***	0.137***	0.077***	0.045**	0.083***	0.064***	-0.007	-0.005
	(0.022)	(0.022)	(0.022)	(0.022)	(0.019)	(0.019)	(0.020)	(0.020)
Vocational training	-0.119***	-0.135***	-0.110***	-0.055***	-0.019	-0.044**	-0.022	0.006
	(0.022)	(0.022)	(0.020)	(0.020)	(0.021)	(0.021)	(0.019)	(0.018)
Tertiary education	-0.033	-0.002	0.033**	0.010	-0.065***	-0.020	0.029**	-0.001
	(0.020)	(0.019)	(0.014)	(0.014)	(0.018)	(0.016)	(0.014)	(0.014)
Parental background		✓	✓	✓		✓	✓	✓
Skills and school fixed effects			✓	✓			✓	✓
Career plans				✓				✓
N	5100	5100	5100	5100	5083	5083	5083	5083

Note: This table shows coefficients from Linear Probability Models. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table 6: Migrant-native gaps in transitions after secondary school (by school degree)

	Boys				Girls			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Pupils without higher track secondary degree								
Estimated gap between migrants and natives in the transition to...								
No qualified training	0.202***	0.185***	0.096***	0.045	0.127***	0.109***	0.024	0.015
	(0.027)	(0.027)	(0.028)	(0.027)	(0.026)	(0.026)	(0.027)	(0.027)
Vocational education	-0.202***	-0.185***	-0.096***	-0.045	-0.127***	-0.109***	-0.024	-0.015
	(0.027)	(0.027)	(0.028)	(0.027)	(0.026)	(0.026)	(0.027)	(0.027)
N	3030	3030	3030	3030	2463	2463	2463	2463
B. Pupils with higher track secondary degree								
Estimated gap between migrants and natives in the transition to...								
No qualified training	0.034	0.035	0.027	0.027	0.001	0.003	-0.043	-0.024
	(0.032)	(0.034)	(0.034)	(0.034)	(0.026)	(0.027)	(0.031)	(0.030)
Vocational education	-0.080***	-0.097***	-0.128***	-0.067***	-0.006	-0.018	-0.021	0.026
	(0.026)	(0.026)	(0.028)	(0.026)	(0.025)	(0.026)	(0.027)	(0.023)
Tertiary education	0.045	0.062	0.102***	0.040	0.005	0.016	0.064**	-0.001
	(0.037)	(0.038)	(0.036)	(0.035)	(0.028)	(0.029)	(0.032)	(0.030)
N	2070	2070	2070	2070	2620	2620	2620	2620
Parental background		✓	✓	✓		✓	✓	✓
Skills and school FE			✓	✓			✓	✓
Career plans				✓				✓

Note: This table shows coefficients from Linear Probability Models. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

compared to natives of similar background and skill, migrants are more likely to remain without qualified training (+7.7 ppts.), less likely to attend vocational education (-11 ppts.) and more likely to attend tertiary education (+3.3 ppts). For girls, parental background and skills explain the complete migrant-native differential in terms of remaining without qualified training. However, similar to migrant boys, migrant girls also show a higher rate of tertiary attendance (+2.9 ppts.) and a lower rate of vocational attendance (-2.2 ppts.) than their background and skills would predict. Finally, controlling for career plans (Table 5, columns 4 and 8) explains a large part of the remaining gaps for all three transitions. While among boys, there remains an "unexplained" gap in the order of 4.5 ppts. when considering the risk of remaining without qualified training, it is substantially smaller in magnitude than without controlling for career plans.

Table 6 then documents that the previous results, which have been obtained for the pooled sample of all school leavers, are actually driven by very different patterns in the bottom and the top of the skill distribution. This table shows separate estimations by whether a pupil left school without (Panel A) or with a higher track secondary degree (Panel B). First consider the results for less skilled individuals who do not have the option to attend tertiary education. As discussed above, the migrant-native gaps are particularly large in this group (+20.2 ppts. for boys and +12.7 ppts. for girls). For boys, the migrants' higher risk of remaining without qualified training can only partly be explained by parental background and skills (Table 6, Panel A, column 3). However, the remaining gap can be explained to a large extent by the fact that less skilled migrants have more ambitious career plans and are applying to vocational education to a much lesser extent than less skilled natives. After controlling for all characteristics, there remains an insignificant "residual" migrant-native gap of +4.5 ppts. For girls, conditioning on parental background and skills is sufficient to explain most of the migrants' higher risk of remaining without qualified training (Table 6, Panel A, column 7).

The patterns look different when considering school leavers with a higher track secondary degree in Panel B of Table 6. For this group, the migrant-native difference in taking up tertiary education turns strongly positive when parental background and skills are added to the regression (to +10.2 ppts. for boys, and +6.4 ppts. for girls). In other words, high-skilled migrant school leavers of both genders "swim upstream" and have much higher tertiary education attendance rates than their family

background and cognitive skills would predict. The migrants' more ambitious career plans can to a large part resolve this puzzle.

An alternative strategy is to conduct a Blinder-Oaxaca decomposition which estimates the contribution of each block of variables holding the others fixed.[30] Results are shown in Appendix Table A4. For pupils without higher track school degree, the migrants' higher risk of remaining without tertiary education (+20.2 ppts. for boys and +12.7 ppts for girls) is explained both by cognitive skills (+7.9 for boys, +7.1 ppts. for girls) and career plans (+7.0 ppts. for boys, +3.6 ppts. for girls). As discussed above, there is an unexplained gap for boys, but almost all of the gaps are explained for girls. For pupils with higher track school degree, migrants' worse endowment with cognitive skills works against them pursuing tertiary education (in the order of -3.1 ppts. for boys and -3.8 ppts. for girls), while their more academic career plans work in the opposite direction (with an effect of +3.8 ppts. for boys, and +4.0 ppts. for girls).

To sum up, I find that while migrants are more likely to have academic career aspirations and expectations and are less likely to apply for vocational training, these differences have very different effects for pupils at the bottom and the top of the skill distribution. One the one hand, the high aspirations tend to divert less skilled migrants (in particular boys) from vocational training as a more viable alternative, resulting in them "swimming downstream" and having a higher risk of remaining without qualified training than similarly skilled natives. On the other hand, high aspirations lead the high-skilled migrants to "swim upstream" and participate in tertiary education to a greater extent than their skills would predict.

[30]Note that the results are not necessarily the same as in the sequential decompositions above since the effect of one variable could also work indirectly through its effect on other covariates. For example, as parental background likely affects school choice and career plans, considering only the "ceteris paribus" effect of parental background probably understates its impact.

5 Further Analyses

5.1 What Explains the Differences in Career Plans?

This section will examine a number of potential explanations for the different career aspirations and expectations of migrants.

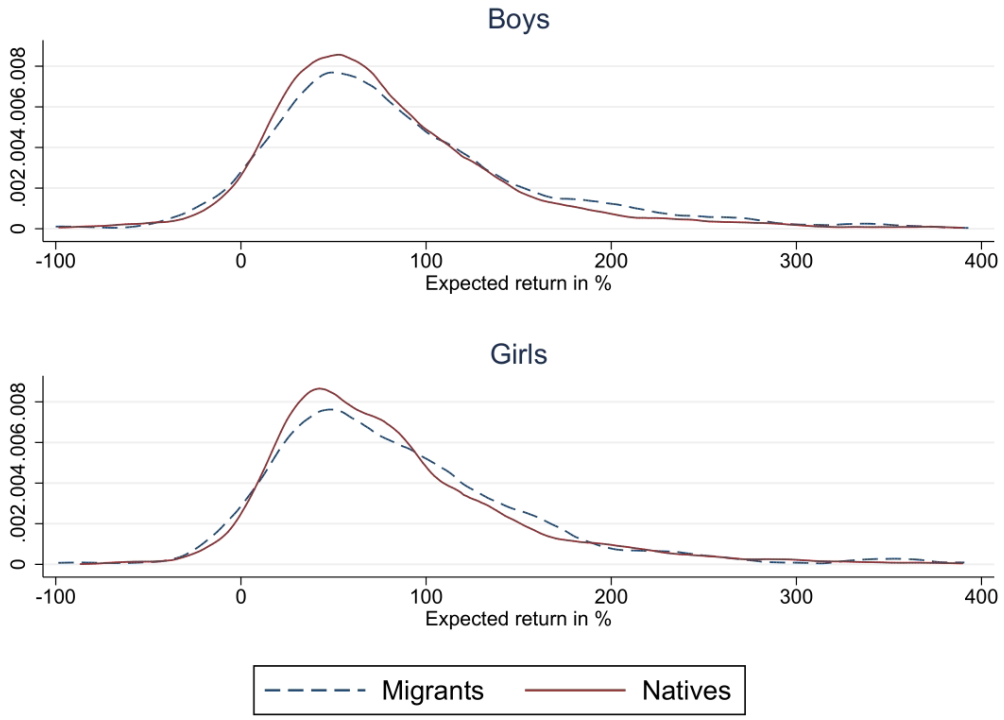
Expected Labour Market Returns to Education. The first possible explanation is that migrants differ from natives in their expectations of the returns to different post-schooling pathways. The classic economic model of Becker (1964) argues that individuals trade off the expected returns and costs of different educational paths when making educational decisions. A growing literature has investigated the effect of students' subjective expected returns on their actual educational choices, and typically found that students indeed do sort based on expected returns.[31] Expected returns to education were also found to differ by parental background, but I know of no evidence on migrant-native differences. In the NEPS survey, pupils are asked about what they think are the average earnings in six different occupations, including occupations which require a tertiary degree (medical doctor and teacher) as well as occupations that require a vocational degree (car mechatronic, bank clerk, hairdresser, and nurse). I use the average difference of the expected earnings of tertiary and vocational occupations as a proxy for the expected returns to tertiary education.[32]

The measure for expected returns in the present data also has a number of limitations, though. While the survey asks pupils about what they think an average worker in a certain occupation earns, a probably more relevant question would be to ask pupils which earnings *they personally* expect if they would work in this occupation. For example, it is possible that migrants expect that because of discrimination, the earnings penalty of migrants is stronger in vocational compared to academic occupations. Finally, there is no information on expected non-monetary returns or expected costs of

[31] See e.g. Dominitz and Manski (1996), Arcidiacono et al. (2012) for the US; Boneva and Rauh (2017) for England; or Attanasio and Kaufmann (2014, 2017) as well as Kaufmann (2014) for Mexico.

[32] More precisely, the return variable is constructed as $\frac{(Exp_{Med}+Exp_{Teacher})/2-(Exp_{CarMech}+Exp_{Bank}+Exp_{Nurse}+Exp_{Hairdr})/4}{(Exp_{CarMech}+Exp_{Bank}+Exp_{Nurse}+Exp_{Hairdr})/4}$. Using alternative weights, such as assuming that the expected earnings of car mechanics matter only for boys and expected earnings of nurses and hairdressers matter only for girls, gave very similar results.

Figure 3: Distributions of subjective expected mean earnings differences of tertiary vs. vocational occupations



Note: Expected returns are based on pupils' subjective assessment of earnings in tertiary and vocational occupations. Further descriptions see text. Source: NEPS SC4, own calculation.

different educational paths.[33]

Keeping those caveats in mind, I plot in Figure 3 the distributions of expected returns. The graph shows that almost all respondents understand the fact that workers in tertiary occupations on average earn more than those in vocational occupations, but that there is still considerable variation across individuals. For example, the 10th percentile of the distribution of expected returns (pooled for all respondents) is 17 %, the median is 67 %, and the 90th percentile is 165 %. Moreover, the distribution of expected returns among the migrants is visibly shifted to the right of the distribution among the natives. Further analyses show that migrant boys' (girls') expected returns are 16.2 ppts. (10.4 ppts.) higher than comparable natives' expected returns.

Expected Discrimination. It is also possible that migrants, if they expect discrimination by firms

[33]For example, Zafar (2013) or Boneva and Rauh (2017) find that expected non-monetary returns to education, such as job satisfaction, work-family balance, or social life, play a key role in explaining schooling decisions.

in the apprenticeship market, have a lower incentive to put in effort searching for an apprenticeship place, and instead focus on more academic paths to improve their chances in the labour market (Tjaden and Hunkler 2017, Heath and Brinbaum 2007).[34] Note that for this argument, it is the *perceived* discrimination that matters, regardless of whether discrimination actually takes place or not. In the present data, expected discrimination is proxied by the question: *"Do you think it is more difficult to find a vocational training place for persons with a foreign sounding name?"*, with the answer options "Yes", "Rather yes", "Rather no", "No", and "Don't know". 35% of migrant pupils answered "Yes" or "Rather yes", compared to 27% of natives.

The Intention to Leave Germany. Some migrants only plan to stay in their host country for a few years before returning to their home country, which has possible effects on their investment in human capital (Dustmann and Görlach 2016, Dustmann and Glitz 2011). In particular, if a migrant intends to leave the host country in the foreseeable future, she may be more inclined to invest in academic skills, which are more portable across countries, rather than in specific vocational skills which may only be of value in the host country. This might be relevant given that vocational training does not carry the same value in many other countries as it does in Germany. However, it is questionable whether this channel plays a major role for the pupils in my sample, given that these individuals are all born in Germany. The NEPS survey contains a question of whether a person plans to stay in Germany forever, or whether she may leave Germany at some time in the future. However, this question was only asked to the migrant pupils, and also among those about half of the respondents have missing values. Among the non-missing observations, 15 % of the migrant pupils said they may leave in the future.

Overconfidence. Given the "mismatch" documented above, i.e. the fact that relatively less skilled pupils plan to work in tertiary occupations which are not viable alternatives for them, one might conjecture that migrants generally tend to overestimate their academic abilities (Relikowski et al. 2012). I make use of a survey question which asks respondents whether they think they learn quickly

[34]Lang and Manove (2011) develop a signalling model which predicts that when expecting statistical discrimination, blacks invest more in education than whites of similar ability, in order to signal their human capital to employers.

in German lessons, and compare this subjective assessment with the individual's performance in the reading test. In particular, a pupil is classified as being "overconfident" if she answers "Rather yes" or "Yes" to the question whether she learns German quickly, but reaches a reading test score below the median (with alternative classifications providing very similar results). However, further analyses show no difference in overconfidence between migrants and natives after controlling for background and skills.[35]

How much can these factors explain the differences in career plans? Table 7 analyzes the question to what extent the mechanisms discussed above can account for the gaps in career plans between migrants and natives. I also allow for heterogeneous effects and include interaction terms of the transmission channels with the migrant dummy (except for the variable "intention to leave" as this question was only asked for the migrants).[36]

First consider as outcome the share of tertiary employees in the aspired occupation (in Table 7, Panel A). Pupils who expect higher labour market returns to tertiary occupations tend to aspire more skilled occupations, although the magnitude is not large: an increase in expected returns by about 10 ppts. is associated with an increase in the occupational share of tertiary employees by 1.9 ppts. This effect is identical for natives and migrants. There is the surprising finding that natives who expect discrimination aspire to work in an occupation with more tertiary workers (by 1.9 ppts.), but that the effect is negative for the migrants (1.9 ppts. - 4.2 ppts. = -2.3 ppts). This is actually the opposite of what one would expect. However, in any case, these results do not support the theory that expected discrimination is a reason for why migrants have more academically oriented career plans.[37] The effect of overconfidence is also rather small (and does not contribute to explaining the gaps as migrants were not found to be more overconfident than natives in the first place). The intention to leave Germany in the future is associated with an insignificant 2.7 ppts. higher propensity to aspire a

[35]Note that when considering the raw difference, migrants mechanically have a higher probability of being overconfident, simply because they have lower skills.

[36]To save space, results are presented pooled for both genders, but the main results are very similar for boys and girls.

[37]This also holds in separate estimations for the sample of Turkish pupils, for whom discrimination is possibly more relevant than for other ethnic groups. These results are consistent with Tjaden and Hunkler (2017), who also use the NEPS data, albeit a different mode of analysis, as well as Salikutluk (2016). Both studies also find no role for expected discrimination as a driver of migrants' educational aspirations.

Table 7: Possible explanatory factors for migrants' different career plans

	(1)	(2)	(3)	(4)	(5)
A. Dep. var: Share of tertiary employees in aspired occupation					
Migrant	0.079***	0.075***	0.092***	0.076***	0.075***
	(0.011)	(0.011)	(0.013)	(0.012)	(0.011)
Expected return to tertiary occ.		0.019***			
		(0.005)			
Migrant × Expected return to tertiary occ.		0.000			
		(0.001)			
Expected discrimination			0.019***		
			(0.008)		
Migrant × Expected discrimination			-0.042**		
			(0.020)		
Overconfidence				0.008	
				(0.012)	
Migrant × Overconfidence				0.018	
				(0.022)	
Migrant × Wants to leave Germany					0.027
					(0.024)
N	9071	9071	9071	9071	9071
B. Dep. var: Share of tertiary employees in expected occupation					
Migrant	0.038***	0.035***	0.048***	0.039***	0.039***
	(0.009)	(0.010)	(0.011)	(0.011)	(0.010)
Expected return to tertiary occ.		0.012***			
		(0.004)			
Migrant × Expected return to tertiary occ.		0.001			
		(0.000)			
Expected discrimination			0.015**		
			(0.007)		
Migrant × Expected discrimination			-0.032*		
			(0.017)		
Overconfidence				0.010	
				(0.009)	
Migrant × Overconfidence				0.003	
				(0.018)	
Migrant × Wants to leave Germany					-0.003
					(0.021)
N	8662	8662	8662	8662	8662
Further controls	Yes	Yes	Yes	Yes	Yes

Note: This table shows coefficients from OLS regressions, additionally controlling for parental background, skills, and school fixed effects. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

skilled occupation. Nevertheless, the explanatory power of this channel is also limited, as there is still a 7.5 ppts. difference (the baseline coefficient of "migrant" in Panel A) between migrant pupils who do not want to leave and natives. Similar results emerge when considering as the outcome the share of tertiary employees in the expected occupation (in Panel B of Table 7).

Overall, these findings do not allow to pinpoint the exact reasons for differences in career plans of migrants and natives. I find that while the migrants' higher expected returns to education and their higher intention to leave Germany play some role, the magnitude of both effects are rather small. Moreover, there is no evidence that anticipated discrimination is a major reason for why migrants are more likely to aspire tertiary occupations. Finally, there is no evidence that migrants are more ambitious because they generally overestimate their cognitive skills.

Another reason that has been proposed in the literature is the presence of information deficits and the migrants' lower familiarity with the institutions of the German education system (Relikowski et al. 2012, Hunkler 2014). In many of the migrant families' home countries, vocational education is considered inferior and academic education is often seen as the only route towards success. This is because many countries lack a German-style apprenticeship system which also offers qualified training for less-skilled pupils. Moreover, information deficits could also lead to the migrant pupils or their parents having less clear information about which occupations are best suited for them given their school level. Information differences are consistent with my findings that migrants are not only more likely to aspire academic occupations, but also more likely to expect to work in these occupations, even among those pupils for whom the high-skilled occupations are out of reach.

5.2 Comparing Migrant Subgroups

Tables 8a and 8b compare migrant youth from the largest nationality groups in Germany, in particular those of Turkish origin, those from Southern Europe (Spain, Portgual, Italy, Greece), former Yugoslavia, the Former Soviet Union (FSU), and Poland.

First consider the characteristics in Table 8a. In terms of mathematics and reading skills, youth from Turkish background are behind all other groups, with test scores that are about 0.7-0.9 standard

Table 8a: Comparing different migrant subgroups (characteristics)

	Mathematics test scores		Reading test scores		Share of tertiary workers in aspired occ.		Share of tertiary workers in expected occ.	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Gaps relative to natives:								
Turkey	-0.778***	-0.734***	-0.941***	-0.934***	0.105***	0.119***	0.058***	0.060***
	(0.057)	(0.057)	(0.069)	(0.064)	(0.026)	(0.027)	(0.022)	(0.021)
Southern Europe	-0.316***	-0.525***	-0.244**	-0.581***	0.075*	-0.066	0.079**	0.000
	(0.094)	(0.077)	(0.107)	(0.116)	(0.038)	(0.032)	(0.039)	(0.026)
Former Yugoslavia	-0.485***	-0.611***	-0.518***	-0.720***	0.083**	0.082*	0.067	0.032
	(0.118)	(0.102)	(0.136)	(0.120)	(0.045)	(0.044)	(0.046)	(0.036)
Former Soviet Union	-0.473***	-0.364***	-0.532***	-0.569***	0.027	0.073**	0.006	0.008
	(0.126)	(0.088)	(0.106)	(0.085)	(0.036)	(0.037)	(0.029)	(0.031)
Poland	-0.304**	-0.470***	-0.208	-0.434***	0.106*	0.100**	0.047	-0.000
	(0.146)	(0.098)	(0.133)	(0.106)	(0.054)	(0.039)	(0.046)	(0.036)
Other	-0.221***	-0.292***	-0.211**	-0.285***	0.062**	0.075***	0.049*	0.018
	(0.084)	(0.064)	(0.093)	(0.079)	(0.028)	(0.027)	(0.025)	(0.024)
N	4942	4904	4758	4732	4425	4646	4255	4407

Note: This table shows coefficients from OLS regressions. The regressions for the tertiary share in the aspired/expected occupation additionally control for parental background, skills, and school fixed effects. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table 8b: Comparing different migrant subgroups (transitions)

	Boys			Girls		
	No qualified training	Vocational education	Tertiary education	No qualified training	Vocational education	Tertiary education
A. Unconditional gaps relative to natives:						
Turkey	0.241***	-0.151***	-0.090***	0.100***	-0.038	-0.063*
	(0.031)	(0.030)	(0.022)	(0.033)	(0.036)	(0.033)
Southern Europe	0.061	-0.007	-0.054	0.150***	-0.039	-0.110***
	(0.046)	(0.052)	(0.041)	(0.052)	(0.047)	(0.040)
Former Yugoslavia	0.126**	-0.116*	-0.009	-0.007	0.164***	-0.157***
	(0.061)	(0.060)	(0.054)	(0.054)	(0.055)	(0.037)
Former Soviet Union	0.080	-0.031	-0.050	0.062	-0.002	-0.060*
	(0.055)	(0.057)	(0.043)	(0.047)	(0.045)	(0.036)
Poland	0.080	-0.052	-0.028	0.125**	0.009	-0.134***
	(0.068)	(0.072)	(0.060)	(0.051)	(0.054)	(0.037)
Other	0.136***	-0.194***	0.058	0.061*	-0.078**	0.017
	(0.040)	(0.038)	(0.040)	(0.034)	(0.035)	(0.034)
B. Gaps conditional on parental background, skills, and school fixed effects:						
Turkey	0.148***	-0.185***	0.038**	-0.008	-0.069**	0.077***
	(0.033)	(0.035)	(0.019)	(0.037)	(0.033)	(0.025)
Southern Europe	-0.012	0.025	-0.013	0.084	-0.070	-0.014
	(0.046)	(0.044)	(0.031)	(0.052)	(0.047)	(0.033)
Former Yugoslavia	0.052	-0.099*	0.047	-0.091	0.106*	-0.015
	(0.058)	(0.055)	(0.031)	(0.056)	(0.059)	(0.037)
Former Soviet Union	0.052	-0.101*	0.049**	-0.065	0.009	0.056**
	(0.058)	(0.056)	(0.024)	(0.048)	(0.047)	(0.026)
Poland	-0.006	-0.025	0.031	0.055	-0.017	-0.039
	(0.064)	(0.076)	(0.043)	(0.054)	(0.055)	(0.036)
Other	0.079**	-0.119***	0.041	-0.017	-0.023	0.040
	(0.036)	(0.030)	(0.026)	(0.033)	(0.030)	(0.027)
C. Gaps conditional on parental background, skills, school fixed effects, and career plans:						
Turkey	0.100***	-0.107***	0.007	-0.022	0.000	0.022
	(0.034)	(0.035)	(0.019)	(0.038)	(0.032)	(0.025)
Southern Europe	-0.039	0.047	-0.008	0.076	-0.061	-0.015
	(0.046)	(0.040)	(0.033)	(0.052)	(0.044)	(0.033)
Former Yugoslavia	0.027	-0.023	-0.004	-0.058	0.098*	-0.040
	(0.055)	(0.053)	(0.027)	(0.057)	(0.054)	(0.039)
Former Soviet Union	0.020	-0.047	0.027	-0.025	-0.028	0.053*
	(0.055)	(0.052)	(0.024)	(0.046)	(0.043)	(0.030)
Poland	-0.033	0.008	0.025	0.041	0.008	-0.049
	(0.056)	(0.061)	(0.037)	(0.052)	(0.050)	(0.038)
Other	0.061*	-0.077**	0.016	-0.027	0.028	-0.001
	(0.036)	(0.032)	(0.026)	(0.033)	(0.026)	(0.025)
N	5100	5100	5100	5083	5083	5083

Note: This table shows coefficients from OLS regressions. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

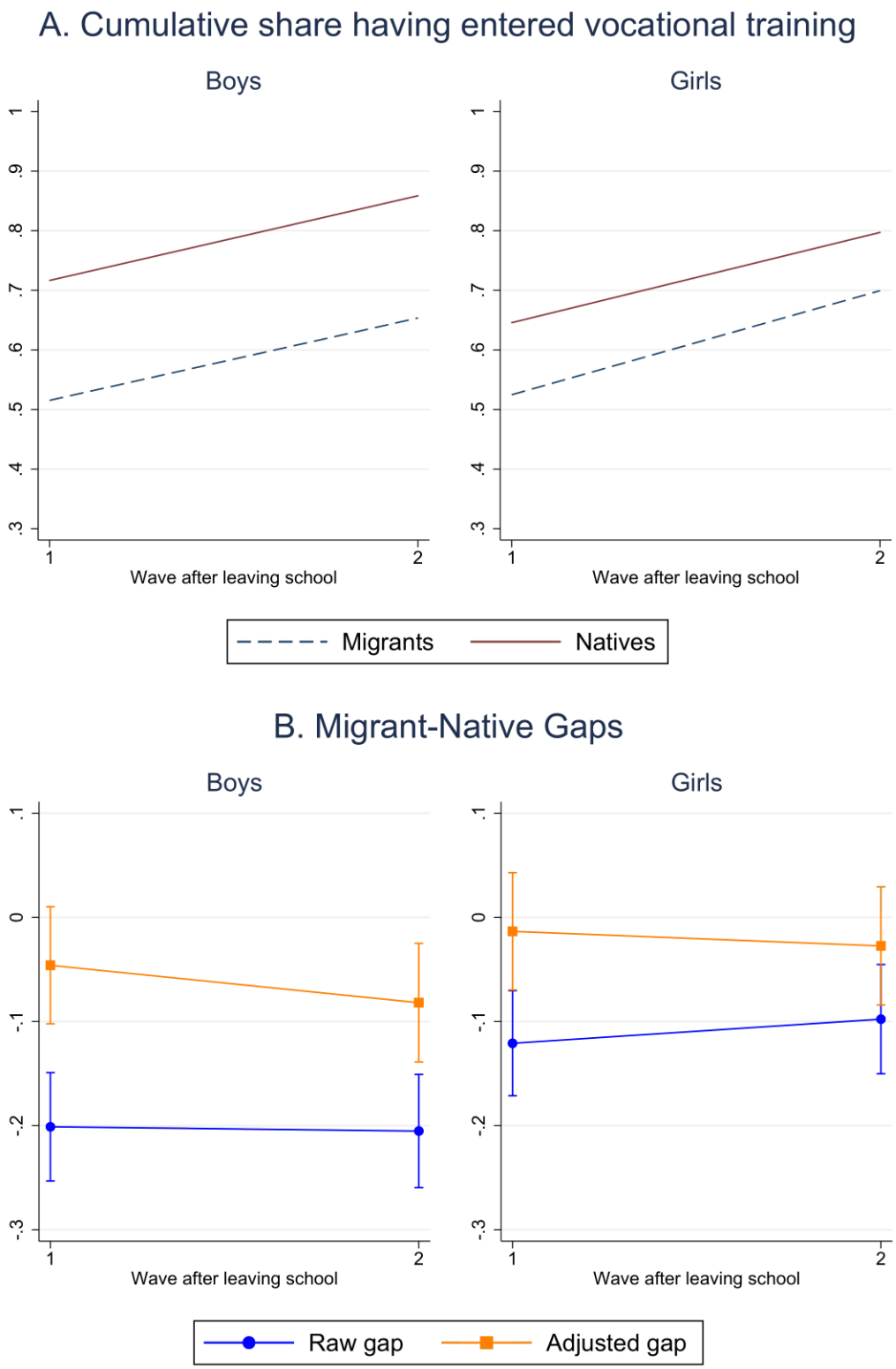
deviations lower than those of native pupils. However, migrants from other guest worker countries and the FSU also have lower scores than natives. In terms of career plans (conditional on background and skills), there are also some differences between the nationalities. Turkish pupils of both genders consistently have much more academic aspirations and expectations than similarly skilled natives. For the other nationality groups, the differences are typically smaller in magnitude (in particular for expectations). Overall, it is remarkable that the group with the lowest educational performance and the arguably greatest cultural distance to German society (pupils from Turkish origin) at the same time has the most ambitious career plans. This pattern speaks for the presence of information deficits as a possible channel.

Table 8b then compares post-school transitions between different migrant groups. Panel A shows unconditional differences relative to natives. Turkish youth have the highest risk of remaining without qualified training (in the order of 24.1 ppts. for boys and 10.0 ppts. for girls), which is in line with the previous literature (see Hunkler 2014 for a review). As shown in Panel B, the pattern of polarization conditional on background and skills is visible for Turkish, Yugoslavian, FSU and "Other" boys. Turkish and FSU girls have higher transition rates to tertiary education than skills and background would predict. Finally, as shown in Panel C, there also exists a fairly large "unexplained" gap for the "no qualified training" transition for Turkish boys (10 ppts.), but not for Turkish girls.

5.3 Cumulative Transition Rates over Time

Especially for less skilled pupils, the school-to-work transition has become increasingly complex since many of them do not move to qualified vocational training immediately after school, but instead enter e.g. pre-vocational programmes which do not award full vocational degrees (Solga 2015). However, it is possible that a person who has not found a vocational training place directly after school can find a place later. For the purpose of this study, a key question thus is whether, despite their worse performance directly after school, migrants can catch up relative to natives over time. I address this issue by considering individuals' activities in the second wave after leaving school for the subgroup

Figure 4: Cumulative transition rates into vocational training (school leavers without higher track secondary degree)



Note: "Adjusted gaps" are based on regression models controlling for parental background, skills, school fixed effects, as well as career plans. 95 % confidence intervals for raw and adjusted gaps are shown. Source: NEPS SC4, own calculation.

of pupils who leave school without a higher track secondary degree.[38]

As shown in Figure 4a, the share having entered vocational education increases considerably over time for both migrants and natives. Among boys, the cumulative share who have entered any vocational education in the second wave is 86 % for natives and 65 % for migrants. Among girls, the shares are 80 % for natives and 70 % for migrants. Figure 4b shows that the "raw" migrant-native gaps remain fairly constant over time at around -20 ppts. for boys and -10 ppts. for girls. In other words, while migrants make progress over time, they don't yet catch up relative to natives.

6 Conclusion and Discussion

This paper has used rich German survey data to better understand the gaps in post-schooling transitions between native pupils compared to second and third generation immigrant pupils. I find that standard measures of parental background, human capital, or school fixed effects play a role in accounting for the gaps, but are not sufficient. The analyses highlight an additional role of career aspirations and expectations. Migrants have more academically oriented career plans than natives of similar parental background and skills. While these differences are present throughout the skill distribution, they have different effects for less skilled and high-skilled pupils. On the one hand, less skilled migrants, who in Germany's tracked school system do not have the option to attend tertiary education, are diverted from more viable alternatives such as vocational training. On the other hand, high-skilled migrants are more likely to attend tertiary education than their background would predict.

The finding that high-skilled migrants "swim upstream" in terms of tertiary attendance may be viewed as a good thing as this may contribute to upward social mobility relative to the parental generation and foster their integration into the labour market and society. However, one caveat is that while migrants have higher rates of tertiary attendance, they might also have higher dropout rates later on if they are less prepared for their studies. This could not yet be analyzed with the present data, but there is evidence that dropout rates from university can be substantial and are also typically higher

[38] Since these pupils leave school earlier (regularly at age 15 or 16) than those who completing the higher track (regularly at age 18 or 19), their post-schooling activities can be observed for a longer period of time in the data.

among minority students.[39] For the less skilled pupils, the paper has shown that higher aspirations can be problematic if these pupils are less prepared for vocational education as a more viable alternative, at least in the short run. While it is in principle possible that the less skilled migrants catch-up to natives later on, the evidence in this paper has shown little evidence for such a catch-up. Moreover, the literature on scarring effects of youth unemployment has shown that inactivity at early stages of the career has causal negative long-term consequences (see e.g. Schmillen and Umkehrer 2018).

The analyses do not completely rule out discrimination in the vocational training market as a further explanatory factor since there are unexplained gaps for some subgroups such as less skilled boys and boys of Turkish origin. In an observational study like the present one, it is unclear whether this unexplained effect in fact is due to discrimination or whether it simply reflects some unobserved differences in productivity between migrants or natives. Nevertheless, I find that the bulk of the migrant-native gap can be explained by pupils' parental background, skills, and career plans. I also find no evidence that migrants' different career planning is simply driven by them expecting discrimination in the apprenticeship market.

These results thus suggest that any policy that tries to improve migrant youths' transitions might focus on improving their skills and on providing them more extensive measures of career counselling, at least for the less skilled pupils. Previous research has shown that interventions such as providing counselling or information can be effective to help school leavers to make better informed choices.[40] It would also be highly relevant to understand whether such interventions can contribute to closing the gaps between native and migrant youth.

[39] See e.g. Arcidiacono and Koedel (2014) for a detailed analysis of the higher college dropout rates among Black compared to White students in the U.S.

[40] For example, Peter and Zambre (2017) have shown that information provision contributes to closing the gap in college enrollment between youth from different parental backgrounds. Goux et al. (2015) find that counselling can help less skilled pupils to formulate more realistic educational aspirations and reduce dropout rates.

Literature

Ammermüller, A. (2007): Poor Background or Low Returns? Why Immigrant Students in Germany Perform so Poorly in the Programme for International Student Assessment, *Education Economics*, 15(2), 215-230.

Arcidiacono, P. and C. Koedel (2014): Race and College Success: Evidence from Missouri, *American Economic Journal: Applied Economics*, 6(3), 20-57.

Arcidiacono, P., Hotz, V.J., Kang, S. (2012): Modelling College Major Choices Using Elicited Measures of Expectations and Counterfactuals, *Journal of Econometrics*, 166 (1), 3–16.

Attanasio, O. and K. Kaufmann (2017): Education choices and returns on the labor and marriage markets: Evidence from data on subjective expectations, *Journal of Economic Behavior and Organisazion*, 140, 35-55.

Attanasio, O. and K. Kaufmann (2014): Education Choices and Returns to Schooling: Mothers' and Youths' Subjective Expectations and Their Role by Gender, *Journal of Development Economics*, 109, 203-216.

Autor, D., D. Figlio, K. Karbownik, J. Roth and M. Wasserman (2016): Family Disadvantage and the Gender Gap in Behavioral and Educational Outcomes, NBER Working Paper No. 22267.

Baert, S. and B. Cockx (2013): Pure Ethnic Gaps in Educational Attainment and School to Work Transitions: When Do They Arise?, *Economics of Education Review*, 36, 276-294.

Becker, G. (1964): *Human Capital. A Theoretical and Empirical Analysis, With Special Reference to Education*, Chicago: University of Chicago Press.

Belzil, C., and F. Poinas (2010): Education and Early Career Outcomes of Second-Generation Immigrants in France, *Labour Economics*, 17, 101–110.

Benabou, R. and J. Tirole (2002): Self-Confidence and Personal Motivation, *Quarterly Journal of Economics*, 117(3), 871-915.

Blossfeld, H.-P., H.-G. Roßbach and J. von Maurice (Eds., 2011): *Education as a Lifelong Process – The German National Educational Panel Study (NEPS)*, Zeitschrift für Erziehungswissenschaft: Special Issue 14.

Boneva, T. and C. Rauh (2017): Socio-Economic Gaps in University Enrollment: The Role of Perceived Pecuniary and Non-Pecuniary Returns, HCEO Working Paper 2017-080.

Brinbaum, Y. and Cebolla-Boado, H. (2007): The school careers of ethnic minority youth in France: success or disillusion?, *Ethnicities*, 7, 445–474.

Buchmann, C., T. DiPrete, and A. McDanile (2008): Gender Inequalities in Education, *American Review of Sociology*, 34, 319-337.

Cameron, S., and J. Heckman (2001): The Dynamics of Educational Attainment for Black, Hispanic, and White Males, *Journal of Political Economy*, 109(3), 455-499.

Colding, B., L. Husted, and H. Hummelgaard (2009): Educational Progression of Second Generation Immigrants and Immigrant Children, *Economics of Education Review*, 28, 434–443.

Diehl, C., M. Friedrich and A. Hall (2009): Jugendliche ausländischer Herkunft beim Übergang in die Berufsausbildung: Vom Wollen, Können und Dürfen, *Zeitschrift für Soziologie*, 38(1), 48-67.

Dominitz, J. and C. Manski (1996): Eliciting Student Expectations of the Returns to Schooling, *Journal of Human Resources*, 31(1), 1–26.

Dustmann, C. and J.-S. Görlach (2016): The Economics of Temporary Migrations, *Journal of Economic Literature*, 54(1), 98-136.

Dustmann, C. and A. Glitz (2011): Migration and Education, in: E. Hanushek, S. Machin and L. Wößmann (Eds.): *Handbook of the Economics of Education*, Elsevier, Chapter 4, 327-439.

Dustmann, C., T. Frattini and G. Lanzara (2012): Educational Achievement of Second Generation Immigrants: An International Comparison, *Economic Policy*, 27(69), 143-185.

Dustmann, C., S. Machin and U. Schönberg (2010): Ethnicity and Educational Achievement in Compulsory Schooling, *Economic Journal*, 120, 272–297.

Fleischmann, D. and C. Kristen (2014): Gender Inequalities in the Education of the Second Generation in Western Countries, *Sociology of Education*, 87(3), 143-170.

Fortin, N., P. Oreopoulos, and S. Phipps (2015): Leaving Boys Behind: Gender Disparities in High Academic Achievement, *Journal of Human Resources*, 50(3), 549-579.

Fryer, R. and S. Levitt (2004): Understanding the Black-White Test Score Gap in the First Two Years After School, *The Review of Economics and Statistics*, 86(2), 447-464.

Glitz, A. (2014): Ethnic Segregation in Germany, *Labour Economics*, 29, 28-40.

Glitz, A. (2012): The Labor Market Impact of Immigration: A Quasi-Experiment Exploiting Immigrant Location Rules in Germany, *Journal of Labor Economics*, 30(1), 175-213.

Goldin, C., L. Katz and I. Kuziemko (2006): The Homecoming of American College Women: The Reversal of the College Gender Gap, *Journal of Economic Perspectives*, 20(4), 133-156.

Goux, D., M. Gurgand, and E. Maurin (2015): Adjusting Your Dreams? High School Plans and Dropout Behaviour, *The Economic Journal*, 127(602), 1025-1046.

Guyon, N. and E. Huillery (2016): Biased Aspirations and Social Inequality at School: Evidence from French Teenagers, LIEPP Working Paper No. 44.

Hanushek, E. and S. Rivkin (2009): Harming the Best: How Schools Affect the Black-White Achievement Gap, *Journal of Policy Analysis and Management*, 28(3), 366-393.

Hausmann, A.-C., A. Zucco and C. Kleinert (2015): Berufspanel für Westdeutschland 1976-2010 (OccPan), Dokumentation zur Erstellung und Anonymisierung, FDZ-Methodenreport, 09/2015.

Heath, A. and Y. Brinbaum (2007): Explaining Ethnic Inequalities in Educational Attainment, *Ethnicities*, 7(3), 291-304.

Hoxby, C. and C. Avery (2013): The Missing "One-Offs": The Hidden Supply of High-Achieving, Low-Income Students, *Brookings Papers on Economic Activity*, 2013(1), pages 1-65.

Hunkler, C. (2014): *Ethnische Ungleichheit beim Zugang zu Ausbildungsplätzen im dualen System*, Springer: Wiesbaden.

Jackson, M. (2012): Bold choices: how ethnic inequalities in educational attainment are suppressed, *Oxford Review of Education*, 38, 189-208.

Kaas, L. and C. Manger (2012): Ethnic Discrimination in Germany's Labour Market: A Field Experiment, *German Economic Review*, 13(1), 1-20.

Kao, G. and M. Tienda (1995): Optimism and Achievement: The Educational Performance of Immigrant Youth, *Social Science Quarterly*, 76(1), 1-19.

Kao, G. and M. Tienda (1998): Educational Aspirations Among Minority Youth. *American Journal of Education*, 106(3), 349-384.

Kaufmann, K. (2014): Understanding the Income Gradient in College Attendance in Mexico: The Role of Heterogeneity in Expected Returns, *Quantitative Economics*, 5(3), 583-630.

Kleinert, C. and T. Kruppe (2012): Neue Typisierung: Regionale Ausbildungsmärkte verändern sich, IAB-Kurzbericht 17/2012.

Koch, A., J. Nafziger and H. S. Nielsen (2015): Behavioral Economics of Education, *Journal of Economic Behavior and Organization*, 115, 3-17.

Kristen, C. and N. Granato (2007): The Educational Attainment of the Second Generation in Germany: Social Origins and Ethnic Inequality, *Ethnicities*, 7(3), 343-366.

Kristen, C., D. Reimer, and I. Kogan (2008): Higher Education Entry of Turkish Immigrant Youth in Germany, *International Journal of Comparative Sociology*, 49, 127-151.

Lang, K. and M. Manove (2011): Education and Labor Market Discrimination, *American Economic Review*, 101(4), 1467-1496.

Latina, J. and J. Ramirez (2013): Migrant integration in a VET-oriented schooling system: A ladder hard to climb, University of Geneva Working Papers.

Lavecchia, A., H. Liu and P. Oreopoulos (2016): Behavioral Economics of Education: Progress and Possibilities, in: Hanushek E., Machin, S., Woessmann, L. (Eds.), *Handbook of the Economics of Education*, Elsevier, Volume 5, Chapter 1, 1-74.

Lüdemann, E. and G. Schwerdt (2013): Migration Background and Educational Tracking: Is There A Double Disadvantage for Second-Generation Immigrants?, *Journal of Population Economics*, 26(2), 455-481.

Peter, F. and V. Zambre (2017): Intended College Enrollment and Educational Inequality: Do Students Lack Information?, *Economics of Education Review*, 60(3), 125-141.

Piopiunik, M., G. Schwerdt, L. Simon, L. Woessmann (2018): Skills, Signals, and Employability: An Experimental Investigation, CESifo Working Paper No. 6858/2018.

Relikowski, I., E. Yilmaz and H.-P. Blossfeld (2012): Wie lassen sich die hohen Bildungsaspirationen von Migranten erklären?, in: R. Becker, H. Solga (2012): *Soziologische Bildungsforschung*, Springer VS.

Riphahn, R. and C. Schwientek (2015): What Drives the Reversal of the Gender Education Gap? Evidence from Germany, *Applied Economics*, 48(53), 5748-5775.

Salikutluk, Z. (2016): Why Do Immigrant Students Aim High? Explaining the Aspiration-Achievement Paradox of Immigrants in Germany, *European Sociological Review*, 32(5), 581-592.

Schmillen, A. and M. Umkehrer (2018): The scars of youth – Effects of early-career unemployment on future unemployment experience, *International Labour Review*, 156, (3/4), 465-494.

Solga, H. (2015): A fault confessed is half redressed. Review essay on low-achieving school leavers' access to apprenticeships and their returns to participation in prevocational training measures, WZB Discussion Paper SP I 2015-501.

Spieß, C. and K. Wrolich (2010): Does Distance Determine Who Attends a University in Germany?, *Economics of Education Review*, 29(3), 470-479.

Stinebrickner, R. and T. Stinebrickner (2014): A Major in Science? Initial Beliefs and Final Outcomes for College Major and Dropout, *The Review of Economic Studies*, 81(1), 426–472.

Tjaden, J. D. and C. Hunkler (2017): The Optimism Trap: Migrants' Educational Choices in Stratified Education Systems, *Social Science Research*, 67, 213-228.

Weichselbaumer, D. (2015): Discrimination Against Female Migrants Wearing Headscarves, IZA Discussion Paper No. 10217.

Wolter, S. and P. Ryan (2011): Apprenticeship, in: E. A. Hanushek, S. Machin, and L. Wößmann (Eds.): *Handbook of the Economics of Education*, Vol. 3, Amsterdam: North-Holland, 521-576.

Wolter, S. and M. Zumbuehl (2017): The Native-Migrant Gap in the Progression into and through Upper-Secondary Education, IZA Discussion Paper No. 11217.

Zafar, B. (2011): Can Subjective Expectations Data Be Used in Choice Models? Evidence on Cognitive Biases, *Journal of Applied Econometrics*, 26, 520-544.

Zafar, B. (2013): College major choice and the gender gap, *Journal of Human Resources*, 48(3), 545–595.

Appendix

Table A1a: Selected background characteristics (school leavers without higher track secondary degree)

	Boys				Girls			
	Migrants	Natives	Diff.		Migrants	Natives	Diff.	
Parental Education:								
Vocational	.451	.802	-.351	***	.491	.81	-.32	***
Tertiary	.041	.102	-.06	***	.038	.068	-.031	**
No postsec.	.508	.096	.411	***	.472	.121	.351	***
Grew up with both parents	.697	.671	.027		.681	.632	.049	*
Number of siblings	1.79	1.374	.415	***	1.962	1.372	.59	***
Secondary school degree:								
No school degree	.051	.033	.018	*	.041	.031	.01	
Lower sec. (basic)	.322	.219	.103	***	.266	.185	.081	***
Lower sec. (advanced)	.192	.158	.035		.187	.125	.062	***
Middle sec.	.435	.59	-.155	***	.506	.659	-.153	***
Higher sec. (FHR)	0	0	0	.	0	0	0	.
Higher sec. (Abitur)	0	0	0	.	0	0	0	.
9th Grade Test Scores:								
Reading	-.948	-.509	-.44	***	-.804	-.343	-.461	***
Mathematics	-.622	-.274	-.348	***	-.945	-.665	-.281	***
Reads a lot in his/her spare time	.211	.218	-.008		.39	.452	-.062	**
Plays musical instrument	.231	.21	.021		.249	.277	-.028	
Member of a sports club	.563	.572	-.009		.336	.468	-.132	***
Member of a volunatry service club	.083	.187	-.104	***	.066	.103	-.038	***
Lives in a big city	.314	.165	.149	***	.286	.172	.114	***
University present in district	.308	.196	.111	***	.243	.194	.049	
District with high youth unempl. rate	.372	.397	-.025		.384	.397	-.013	
N	494	2536			518	1945		

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table A1b: Selected background characteristics (school leavers with higher track secondary degree)

	Boys				Girls			
	Migrants	Natives	Diff.		Migrants	Natives	Diff.	
Parental Education:								
Vocational	.307	.594	-.287	***	.378	.603	-.224	***
Tertiary	.27	.364	-.094	**	.219	.356	-.137	***
No postsec.	.423	.043	.381	***	.403	.041	.362	***
Grew up with both parents	.838	.819	.019		.824	.817	.008	
Number of siblings	1.427	1.268	.158	*	1.464	1.241	.222	***
Secondary school degree:								
No school degree	0	0	0	.	0	0	0	.
Lower sec. (basic)	0	0	0	.	0	0	0	.
Lower sec. (advanced)	0	0	0	.	0	0	0	.
Middle sec.	0	0	0	.	0	0	0	.
Higher sec. (FHR)	.23	.141	.088	***	.207	.14	.067	***
Higher sec. (Abitur)	.77	.859	-.088	***	.793	.86	-.067	***
9th Grade Test Scores:								
Reading	.009	.474	-.465	***	.25	.666	-.416	***
Mathematics	.418	.891	-.473	***	-.044	.415	-.459	***
Reads a lot in his/her spare time	.336	.372	-.036		.603	.673	-.069	**
Plays musical instrument	.328	.406	-.078	**	.532	.533	-.001	
Member of a sports club	.738	.76	-.022		.563	.684	-.121	***
Member of a volunatry service club	.053	.105	-.051	***	.069	.074	-.005	
Lives in a big city	.41	.263	.146	***	.374	.259	.115	***
University present in district	.475	.285	.191	***	.425	.29	.135	***
District with high youth unempl. rate	.516	.416	.101	**	.511	.432	.079	*
N	244	1826			348	2272		

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table A2a: Career aspirations and expectations (school leavers without higher track secondary degree)

	Boys						Girls					
	Mig-rants	Na-tives	Raw Diff.		Cond. Diff.		Mig-rants	Na-tives	Raw Diff.		Cond. Diff.	
Parental educational aspirations:												
Academic	.277	.114	.164	***	.148	***	.278	.119	.159	***	.166	***
Vocational	.502	.703	-.201	***	-.132	***	.558	.705	-.147	***	-.129	***
None	.221	.183	.038	*	-.015		.164	.176	-.012		-.037	
Pupil's aspired occupation:												
Share of tertiary employees	.242	.178	.065	***	.090	***	.295	.220	.075	***	.097	***
Share of vocational employees	.679	.730	-.051	***	-.070	***	.650	.705	-.054	***	-.075	***
Share of unskilled employees	.079	.093	-.014	***	-.019	***	.056	.076	-.02	***	-.022	***
Has no aspired occupation	.19	.175	.015		-.009		.141	.116	.025		.009	
Pupil's expected occupation:												
Share of tertiary employees	.133	.089	.043	***	.053	***	.127	.110	.017		.039	***
Share of vocational employees	.780	.814	-.034	***	-.041	***	.809	.813	-.004		-.020	***
Share of unskilled employees	.088	.097	-.009		-.012	*	.065	.078	-.014	***	-.019	*
Has no expected occupation	.261	.179	.083	***	.034		.174	.151	.023		.001	
Aspires to complete higher sec. degree	.346	.247	.099	***	.125	***	.332	.284	.048	*	.096	***
Expects to complete higher sec. degree	.121	.104	.017		.028		.12	.105	.015		.034	
Plans to apply for voc. training after school	.579	.625	-.046	*	-.026		.585	.617	-.032		-.051	
Done a voluntary internship during school	.134	.204	-.07	***	-.031		.129	.178	-.049	*	-.017	
Has applied for voc. training	.733	.824	-.091	***	-.058	***	.697	.745	-.049	*	-.027	***
Knows someone who gives info on voc. tr.	.518	.667	-.149	***	-.095	***	.67	.748	-.078	***	-.047	***
Knows someone who can help with application	.338	.488	-.15	***	-.068	***	.434	.594	-.159	***	-.052	***
Supply-demand ratio in occ. for which applied (if any)	.909	.922	-.013	***	-.014	**	.899	.908	-.009		-.02	**
N	494	2536					518	1945				

Note: For each variable, the column entitled "raw difference" shows the mean difference in the respective variable between migrants and natives. The column entitled "conditional difference" shows differences regression-adjusted for parental background, skills, and school fixed effects. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table A2b: Career aspirations and expectations (school leavers with higher track secondary degree)

	Boys						Girls					
	Mig-rants	Na-tives	Raw Diff.		Cond. Diff.		Mig-rants	Na-tives	Raw Diff.		Cond. Diff.	
Parental educational aspirations:												
Academic	.758	.612	.146	***	.175	***	.764	.601	.163	***	.189	***
Vocational	.123	.153	-.03		-.077	***	.112	.157	-.045	**	-.062	***
None	.119	.234	-.116	***	-.098	***	.124	.242	-.119	***	-.127	***
Pupil's aspired occupation:												
Share of tertiary employees	.470	.427	.043	*	.060	**	.534	.494	.040	*	.060	**
Share of vocational employees	.485	.524	-.039	*	-.059	***	.438	.472	-.034	*	-.053	***
Share of unskilled employees	.046	.05	-.004		-.001		.028	.035	-.006	**	-.008	
Has no aspired occupation	.045	.065	-.02		-.009		.043	.054	-.011		-.013	
Pupil's expected occupation:												
Share of tertiary employees	.449	.440	.01		.052	**	.404	.439	-.035	*	.000	*
Share of vocational employees	.517	.521	-.004		-.044	*	.557	.524	.032	*	.001	*
Share of unskilled employees	.035	.041	-.006		-.008	*	.039	.037	.002		-.001	*
Has no expected occupation	.082	.129	-.047	**	-.043	*	.098	.113	-.015		-.017	*
Aspires to complete higher sec. degree	.947	.955	-.008		.032	*	.98	.958	.022	**	.042	*
Expects to complete higher sec. degree	.836	.871	-.035		.059	**	.822	.869	-.047	**	.011	**
Plans to apply for voc. training after school	.18	.177	.003		-.058	**	.175	.18	-.004		-.062	**
Done a voluntary internship during school	.057	.079	-.021		-.011		.086	.094	-.008		.012	
Has applied for voc. training	.308	.343	-.035		-.105	***	.309	.335	-.026		-.079	***
Knows someone who gives info on voc. tr.	.709	.792	-.083	***	-.078	**	.787	.817	-.03		-.007	**
Knows someone who can help with application	.656	.81	-.154	***	-.113	***	.802	.863	-.061	**	-.027	***
Supply-demand ratio in occ. for which applied (if any)	.928	.916	.012		.015		.889	.889	0		-.009	
N	244	1826					348	2272				

Note: For each variable, the column entitled "raw difference" shows the mean difference in the respective variable between migrants and natives. The column entitled "conditional difference" shows differences regression-adjusted for parental background, skills, and school fixed effects. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table A3: Expectations conditional on aspirations

	All school leavers		School leavers without higher track secondary degree		School leavers with higher track secondary degree	
	Boys	Girls	Boys	Girls	Boys	Girls
Dependent variable: Share of tertiary employees in expected occupation						
Migrant-native differences in expectations, unconditional on aspirations						
Migrant	0.052***	0.022**	0.052***	0.039***	0.050*	0.005
	(0.015)	(0.013)	(0.016)	(0.013)	(0.026)	(0.024)
Migrant-native differences in expectations, conditional on aspirations						
Migrant	0.018	-0.005	0.025*	0.019	0.017	-0.019
	(0.014)	(0.011)	(0.015)	(0.012)	(0.024)	(0.020)
Further controls	Yes	Yes	Yes	Yes	Yes	Yes
N	4004	4276	2235	1981	1769	2295

Note: This table shows coefficients from OLS regressions, additionally controlling for parental background, skills, and school fixed effects. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.

Table A4: Decomposition of migrant-native gaps in transitions

	School leavers without higher track secondary degree				School leavers with higher track secondary degree					
	Boys		Girls		Boys			Girls		
	No qualified training	Vocational education	No qualified training	Vocational education	No qualified education	Vocational training	Tertiary education	No qualified education	Vocational training	Tertiary education
Migrants	0.494	0.506	0.486	0.514	0.262	0.148	0.590	0.310	0.198	0.491
Natives	0.292	0.708	0.359	0.641	0.228	0.227	0.545	0.309	0.204	0.486
Difference	0.202***	-0.202***	0.127***	-0.127***	0.034	-0.080***	0.045	0.001	-0.006	0.005
	(0.026)	(0.026)	(0.025)	(0.025)	(0.032)	(0.026)	(0.037)	(0.026)	(0.024)	(0.028)
Explained	0.157***	-0.157***	0.112***	-0.112***	0.008	-0.012	0.005	0.025	-0.032	0.006
	(0.018)	(0.018)	(0.020)	(0.020)	(0.023)	(0.024)	(0.031)	(0.021)	(0.020)	(0.024)
Unexplained	0.045**	-0.045**	0.015	-0.015	0.027	-0.067***	0.040	-0.024	0.026	-0.001
	(0.022)	(0.022)	(0.021)	(0.021)	(0.029)	(0.022)	(0.029)	(0.026)	(0.019)	(0.025)
Explained by:										
Parental background	0.009*	-0.009*	0.006	-0.006	0.004	-0.002	-0.002	0.003	-0.007	0.004
	(0.005)	(0.005)	(0.006)	(0.006)	(0.008)	(0.006)	(0.007)	(0.008)	(0.006)	(0.007)
Skills and school fixed effects	0.079***	-0.079***	0.071***	-0.071***	0.015	0.017	-0.031	0.045***	-0.007	-0.038**
	(0.016)	(0.016)	(0.017)	(0.017)	(0.019)	(0.011)	(0.020)	(0.015)	(0.009)	(0.015)
Career plans	0.070***	-0.070***	0.036***	-0.036***	-0.011	-0.027	0.038*	-0.023	-0.018	0.040**
	(0.011)	(0.011)	(0.012)	(0.012)	(0.014)	(0.020)	(0.020)	(0.015)	(0.017)	(0.017)
N	3030	3030	2463	2463	2070	2070	2070	2620	2620	2620

Note: This table shows results from a Blinder-Oaxaca decomposition, using as reference the coefficients from a pooled model including a migrant dummy. Standard errors in parentheses, clustered at the school level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: NEPS SC4, own calculation.