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ABSTRACT

Cohort Effects in the Educational Attainment of Second Generation Immigrants in Germany: An Analysis of Census Data*

Even though second generation immigrants make up ever increasing population shares in industrialized countries we know little about their social integration and wellbeing. This study focuses on the educational attainment of German born children of immigrants. Their schooling success still lags behind that of natives. We investigate completed degrees and school attendance of German born immigrants and find considerable evidence suggesting that this group does not assimilate to native education standards but instead increasingly falls behind.

JEL Classification: I21, J24, J61

Keywords: Second generation immigrants, educational attainment, assimilation

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1. Introduction

Although they make up increasing shares of Western European populations, second generation immigrants do not receive much attention in economic research. Their role is instead heavily discussed in public debates on issues such as youth unemployment, school attainment, wage and employment discrimination, or crime. Formal analyses of this population suffer from a scarcity of data. The literature typically solves this problem by avoiding clear distinctions between first and second generation immigrants. Yet this begs the issue of looking at second generation immigrants as an increasingly important population in its own right and may produce biased results.

In a society where formal educational degrees are entry requirements at all levels of the vocational and academic training system, as in Germany, key factors for lifetime labor market success are determined early in life. If an increasing share of the population passes the educational system being systematically disadvantaged, this may justify the consideration of policy interventions. So far little evidence has been produced internationally to measure the educational success of second generation immigrants and its development over time.[1] This study addresses this important issue.

Given the importance of parental input in the child education process one would expect immigrant children to start in the educational system with a disadvantage deriving from their parents' lack of familiarity with the local schooling system. Several reasons suggest that the extent of this disadvantage might have declined in a country, which since the 1960s has become accustomed to the presence of guestworkers and their children: First, the schooling system may have adapted to the needs of growing shares of immigrant children. Second, ethnic capital theory suggests that the educational attainment of immigrant youth is higher, the more individuals of a given ethnicity are around

[1] Existing studies typically focus on differences in the educational attainment of immigrants in general as compared to natives, without paying attention to first vs. second generation and cohort effects. Chiswick's (1988) analysis concentrates on testing a child investment model of family decision making, Borjas (1992) tests for the persistence of ethnicity effects across generations, and Leslie and Drinkwater (1999) evaluate the incentives to invest in education for natives and immigrants. German studies investigate the factors correlated with the level of schooling attained, see e.g. Gang and Zimmermann (2000), Haisken-DeNew et al. (1997) or Alba et al. (1994).

and the better they do in the destination country (Borjas 1992). The number of immigrants in Germany has been rising over the last decades, suggesting overall positive cohort effects. Third, since immigration to Germany was concentrated in the 1960s and 1970s, the children of immigrants who were born in later years, are likely to have parents who are better assimilated to host country circumstances than parents of earlier born cohorts. Thus, the parents of more recently born children might better be able to guide their offspring during their formative years in Germany, again suggesting positive cohort effects.

In view of these arguments the questions posed here are first, whether German born children of immigrants achieve degrees as high as their native counterparts. If this is not the case we focus on whether the gap in educational achievement declines and the two groups' educational attainments converge over time.

The policy relevance of these issues results from several considerations: First, the human capital endowment of a population is a crucial input for economic success, and therefore deserves attention and monitoring. Second, sufficient education is a precondition for the social integration of foreign workers, which has important consequences not only for economic efficiency but also for social issues, such as political and cultural participation. Third, given the native and immigrant fertility differences (Mayer and Riphahn 2000) and demographic projections, the already high population share of second generation immigrants will continue to grow.[2] If a growing share of the population is poorly educated this endangers the funding of the pay as you go social security system beyond the problems deriving from the head counts typically considered in the calculation of dependency ratios. Fourth, European societies will open their boundaries for immigration from the east in the foreseeable future. It is important to learn the lessons from past immigration to improve education and integration policies for the migrants yet to come.

The questions raised above are answered based on data from annual German censuses

[2] Based on the Mikrozensus data it can be shown that second generation immigrants made up cohort shares of more than 10 percent among children already in 1995.

(*Mikrozensus*), which have not been applied to this issue before.[3] The main advantage of this data is the large number of observations and their representative nature. Two measures of educational attainment are analysed below: First, the highest educational degree completed by cohorts born between 1956 and 1974, and second the level of secondary school attended by those aged 16 through 19, which is analyzed for cohorts born 1970 through 1980.

The paper proceeds as follows. Section 2 briefly describes the data and gives background information on the German educational system. Section 3 provides descriptive statistics on the sample and variables used in the analysis of completed educational degrees, the results of which are presented in section 4. Sections 5 and 6 discuss data and results of the analysis of the type of school attended. Section 7 summarizes the paper and draws some conclusions.

2. Dataset and Institutions

2.1 The German *Mikrozensus*

Historically, German legislation required a complete population census every decade, and a one percent random sample of the population every year in between. These latter surveys are called "*Mikrozensus*" and have been administered since 1956. Since the year 2000 the statistical office provides public use files with information on 70 percent random samples of the Mikrozensus data of 1989, 1991, 1993, 1995, and 1996.[4] These datasets contain between 385,381 observations in 1989 and more than half a million after German unification in the 1990s.

The Mikrozensuses cover demographic issues, and are an important source of labor market information. The sampling is based on a nationwide grid of small regional units with up to 12 dwelling units of which 1 percent is randomly chosen for the survey. Whereas the entire questionnaire used to be mandatory, recently respondents were given the choice not to answer a number of questions

[3] Most of the data is available for research only since 2000.

[4] The 1995 Mikrozensus was made available as early as 1997. It is planned to provide the 1997 Mikrozensus soon, however, it was not available to the author when this research was completed.

(Emmerling and Riede 1997). The Mikrozensus uses a rotation scheme, where inhabitants of a given house or flat are reinterviewed for up to four years in sequence, during which time the actual inhabitants of the house or flat may leave or change. Unfortunately the 70 percent random sample provided for public use does not allow the identification of survey households over time.

2.2 Secondary Education in Germany

Before we can fruitfully discuss the issues involved in defining appropriate samples and dependent variables it is important to provide some background information on the German system of secondary education. In contrast to many countries it is defined by a differentiated track system. Already after four grades of primary education parents and teachers jointly choose the track that seems appropriate for each pupil. These tracks differ in academic orientation and requirements. The basic school (*Hauptschule*) graduates individuals after six years of secondary education and is traditionally a preparation for blue collar occupations. The middle school (*Realschule*) also lasts six years and trains for white collar employment. The highest track (*Gymnasium*) offers nine years of schooling and a degree (*Abitur*), which is a precondition for academic studies. Depending on the track, pupils typically finish school aged 16 or 19.[5]

3. Completed Degrees: Data Description

3.1 Sample

The first step in our analysis of educational attainment is to investigate individuals' highest completed schooling degrees. The data are taken from five pooled Mikrozensus surveys conducted between 1989 and 1996. Our sample consists of natives and second generation immigrants.

Individuals were coded as natives if they indicated German citizenship. A weakness of the survey instrument is that it does not allow one to distinguish between those persons who have *only* the

[5] See Riphahn (2000) for more detailed information.

German citizenship and those that hold the German citizenship as one out of two or more citizenships.[6] Those individuals who indicated that they are not German nationals were asked about the year they had entered Germany, with one possible answer "born in Germany." Foreign nationals who checked the latter are coded as second generation immigrants. This measure bears two disadvantages: First we overlook those immigrants who took on German nationality. However, up through the early 1990s only very small fractions of immigrants residing in Germany actually took on German nationality (see STBA, various years), as regulations were highly restrictive. Thus it is unlikely that selective naturalization biases our estimates. Second, the question on year of entry was answered voluntarily. Therefore we miss those who preferred not to answer this question, overall 9.2 percent of the non German sample.[7] Those foreign nationals who did provide a year of entry were coded as first generation immigrants. To keep the sample at a manageable size, a ten percent random sample of the native observations was drawn.

For the analysis of completed degrees it is important how old individuals are at the time of the survey, because the fraction of those with still uncompleted degrees increases for the younger ones. Even though the typical age to complete basic and middle school is 16 and that of leaving the highest track is 19, the sample conservatively considers only those individuals who were at least 22 years of age at the time of the survey, to reduce the number of cases with unobserved i.e. not yet completed degrees. Since we are interested in the educational attainment of recent cohorts, and because the number of second generation immigrants per birthyear declines as we go back in time, we considered only those individuals born after 1955. The last cohort observed is that of 1974, 22 years prior to the

[6] An exception is the 1996 Mikrozensus where individuals with double citizenship were explicitly asked about their second nationality. However, only 107 individuals in our final sample provided information on their second nationality, a number too small to permit separate analyses. Also, to avoid nonrandom selection when analysing these cases, it would be important to distinguish between those individuals who hold a second citizenship by accident (e.g. place of birth), as opposed to a conscious decision. These groups cannot be distinguished on the basis of the 1996 data.

[7] The share varies between 5.8 percent of the non German individuals in 1989, and the maximum of 18.2 percent in 1993. The author is unaware of reasons for the variation in answering behavior, as e.g. the question was posed in an identical manner.

1996 survey. After these steps our sample consists of 55,570 natives and 3,627 second generation immigrants. The sample composition is presented in Table 1 by group and survey year.

3.2 Dependent Variable

We categorize the information on schooling degrees in three levels: A low degree is coded if individuals completed no degree or the basic school (*Hauptschule*) degree. The medium category is reserved for those who graduated from either middle school (*Realschule*), its east German equivalent (*Polytechnische Schule*), or achieved the *Fachhochschulreife*, a degree granted to those who partially completed the highest track.[8] The advanced degree is coded for those who completed the "Abitur" degree at the advanced school (*Gymnasium*). Those observations for whom the degree indicator was missing, were dropped from the sample.

Table 2 presents the resulting distribution of schooling degrees across sample groups. The figures show clearly that the three groups differ in their educational attainment: The share of individuals holding advanced degrees is highest among natives. Second generation immigrants have a much higher chance of ending up with low or no degrees than natives. Thus, Table 2 already answers the first question posed in the introduction, whether second generation immigrants keep up with the schooling attainment of natives, they do not.

The second question then asks whether there is a cohort trend in this attainment gap. Did the children of immigrants have a harder time in the past and does schooling success show signs of convergence to that of natives over the last decades? A first step to answering this question is taken by describing the developments in schooling attainment over time, i.e. across birth cohorts. Figure 1 presents the share of natives and second generation immigrants completing advanced, and low degrees across cohorts. These figures show no signs of convergence. Whereas the share of natives with low degrees has been steadily declining, that of second generation immigrant cohorts went up, and vice

[8] The regulations on degrees vary somewhat across federal states.

versa for advanced schooling degrees. This descriptive evidence suggests increasing divergence. The multivariate analysis now tests whether these developments are statistically significant, whether they can be explained by covariates, or whether the cohort effects prove robust to the considered explanatory approaches.

3.3 Estimation Strategy and Independent Variables

The explanatory variables are chosen based on theoretical models explaining individual schooling outcomes. Three approaches can be distinguished in the literature: The child quantity vs. child quality model as developed by Becker (1981), the ethnic capital model as presented by Borjas (1992, 1994), and the optimal schooling model, which Chiswick (1988) explains. These models suggest that parent characteristics, assimilation and ethnicity are key determinants of educational attainment.

In order to investigate whether these factors explain the developments of educational attainment in Germany, we have to control for their effects in multivariate models. Here the main limitation of the Mikrozensus data becomes relevant, its limited set of variables. The empirical strategy is to first test whether various parameterizations of cohort effects support the lack of convergence in the educational achievement of natives and immigrants observed in Figure 1. In particular we consider first through third order polynomials in birth year, as well as detailed categorical birth year indicators.

In additional steps we then add controls for demographics, measures of assimilation, and finally vectors of regional, survey year, and country of origin fixed effects. The first columns of Table 3 describe the explanatory variables separately for the two subsamples. The demographic variables control for sex, whether the individual lives in East Germany (relevant after 1989), and the size of the person's city of residence, a measure that is not available in the 1996 survey. The only immigrant assimilation indicators available are whether the person has a partner or children in the home country. For German born individuals the traditional assimilation measure “years since migration” is not applicable, and a language ability indicator is unfortunately not available. The most important omission

however concerns variables describing the individuals' parents.[9] The results of the ordered probit estimations on educational attainment of natives and second generation immigrants are described next.

4. Completed Degrees: Results

First we test whether the two samples' divergence in schooling degree developments observed in Figure 1 is statistically significant. Table 4(a) presents the results of four ordered probit estimations which consider separate cohort effects for natives and immigrants. The results in the row labelled "test" indicate that in all four specifications the cohort effects are significantly different for the two subsamples, independent of the chosen parameterization.

To interprete the results, we predicted the probability of either schooling degree on the basis of these models. The predictions (see bottom of Table 4) yield that the difference in the probability of a low educational degree for the two groups rose from between six and ten percentage points for the 1956 cohort to about 24 for those born 16 years later. Similarly, the probabilities of attaining an advanced degree differed by four to six points for the 1956 cohort and more than 18 percentage points for the cohorts of the early 1970s. Separate estimations by sex confirmed these results with significantly different cohort developments for both sexes.

Next we added explanatory variables to the model with quadratic cohort specifications (model 2 in Table 4a). The results are presented in Table 4(b). In model 5 only demographic and assimilation measures are considered. The difference in cohort effects for the two samples remains statistically significant. Though the cohort coefficients are individually insignificant, the polynomial coefficients for each subsample are jointly significant at the one percent level. The predicted differences in degree probabilities remain almost unchanged compared to those discussed above.

The coefficients of the demographic and assimilation measures prove to be highly significant.

[9] The omission can be avoided in the second part of our analysis below, which evaluates school enrollment of younger students. There about 95 percent of the observations still live at home and we match parent records to the observations. For the question of completed degrees considered here this is not useful, because only a selected group of individuals still lives with their parents.

They yield a strong reduction in the log likelihood and are precisely estimated. Overall, men have lower degrees than women, West Germans have lower degrees than Easterners, and living in a large city appears to correlated with higher school attainment.

In model 6 we add a vector of regional state indicators, as well as survey year fixed effects. Both vectors are highly significant, but their addition does not affect the other results or the predictions. As before, we find highly significant differences in the cohort effects between natives and second generation immigrants. Finally, in model 7 we add a set of eleven indicators describing the nationality of the second generation sample. These are jointly as well as individually significant and indicate that individuals from Turkey, Italy, the former Yugoslavia, Spain, and Portugal (in this order) have the lowest degrees, whereas immigrants from Austria, Great Britain, Poland, France, and the "other" category on average attained the highest degrees.[10] Once these fixed effects are included in the model the significant difference in cohort effects for natives and second generation immigrants disappears, even though the predictions still yield an increasing gap in the probability of advanced degrees.

The pattern that significant cohort differences are robust to the addition of explanatory variables, regional and survey year fixed effects but disappear once nationality indicators are considered, is independent of the parameterization of cohort effects. This suggests that the country of origin composition of immigrants to Germany may be a determinant of the relative decline of second generation schooling attainment. Figure 2 depicts the distribution of second generation immigrants by nationality in our sample across cohorts. The distribution of nationalities changed strongly, where over time the share of Turkish and Ex-Yugoslavian second generation immigrants increased from under ten and five percent in the late 1950s to more than 50 and 20 percent in the 1974 cohort, respectively.

In order to evaluate inhowfar certain nationality groups determined the relative decline in educational attainment we estimated cohort effects separately by national group. Those countries, for

[10] These estimation results are not presented to save space.

which significant changes across cohorts could be measured at all, showed significant improvements.[11] However, as our argument centers not on absolute changes over time, but developments relative to the native subsample, in a second step we pooled each nationality group separately with the native sample and estimated a linear cohort effect and an interaction term for each nationality separately. Here the results were more mixed. For second generation immigrants from Greece, the Netherlands, Austria, and Turkey we find significantly stronger improvements in school attainment than for natives. For those from Great Britain, Italy, Poland, and the "other" category, improvements lagged significantly behind those of natives, and for the remaining nationalities (France, Yugoslavia, Portugal, Spain) no significant differences could be measured. Surprisingly, even though the share of immigrants form those countries with declining relative attainments (i.e. Great Britain, Italy or Poland, cf. Figure 2) fell between 1956 and 1974, their influence seems to dominate the overall development in relative schooling attainment among second generation immigrants.

The above analysis suffers from two disadvantages: First, we could only look at individuals born up until 1974 and second, parent characteristics were not available for the regression. The next section addresses these issues by focusing on a younger sample, which in most cases still lives with their families. First we describe the data, then we discuss the results.

5. Current School Type: Data Description

5.1 Sample and Dependent Variable

The data for the second part of the analysis are taken from the Mikrozensus surveys of 1989, 1991, 1993, and 1996.[12] The sample consists of natives and second generation immigrants, as defined above. The questionnaire asks whether a respondent is currently in school or training, and if so in what kind. Possible answers are kindergarten, primary school, school grades 5-10, advanced school grades

[11] The improvements in educational attainment were statistically significant at the one percent level for Greece, the Netherlands, Austria, and Turkey, and at the ten percent level for Portugal and Spain.

[12] The variable describing current school attendance was not provided in the available 1995 data.

11-13, vocational, and academic training. The question does not allow one to distinguish the alternative types of schools that pupils attend up to grade ten. However, for individuals age 16 and above we can determine whether they attend an advanced school (*Gymnasium*) or pursue other avenues, such as vocational training. Since the advanced school degree (*Abitur*) is a precondition for university studies and is ranked highest among secondary school degrees, it is meaningful to investigate the determinants of advanced school enrollment, on which we focus below.

The sample now consists of those 10,839 individuals aged 16 through 19, who might participate in advanced schooling in grades 11 through 13.[13,14] Table 5 describes the sample by group, age, survey year, and enrollment in an advanced school (*Gymnasium*). The descriptives confirm natives' higher participation rates in the *Gymnasium* compared to second generation immigrants of the same age.[15] The development across birth cohorts is depicted in Figure 3. In contrast to Figure 1 cohort trends are not as clear here. Enrollment rates appear to be declining for both subsamples. Below we investigate, whether different cohort trends can be distinguished for the two samples and what role parental characteristics play in the models for advanced school attendance.

5.2 Independent Variables

The first step of the analysis looks at the significance of cohort effects, and later we add controls for demographics and parental human capital. The assimilation measures we used in the first part of the analysis above, i.e. children or partner in the home country are not relevant for a sample of pupils below age 20. Since the surveys gather household information, parent information was matched

[13] Here it is important to point out that in principle pupils from any type of secondary school can enter the advanced school after grade 10, where the specific regulations vary across federal states.

[14] The older the sample, the higher the fraction of missing values for the school attendance variable. For those aged 16 and 17 it is less than 1 percent, at age 18 it increases to just under 5 percent and at age 19 it already exceeds 25 percent. Therefore, even though some individuals may still attend advanced school at age 20, they are not considered in the analysis.

[15] The noticeable drop in enrollment rates after 1989 is due to lower advanced school participation in East Germany, which was still excluded in 1989.

using the characteristics of the heads of households and their partners. This information was available for about 95 percent of all cases. For those youth, who were already heads of households or partners of household heads the indicator "independent" was coded and parent variables were set to zero as such information was not available. For the majority of the sample we have detailed information on parental school attainment and vocational training. The variables are described in the last columns of Table 3. For the immigrant sample we additionally measured the years since parents' migration. When the information was not available, the variable was coded zero and an indicator for missing values was introduced instead. The results of the probit estimations are discussed next.

6. Current School Type: Estimation Results

a. Cohort Effects

Table 6 presents the results of the probit estimations for native and second generation immigrant youth aged 16 through 19. Linear cohort effects and immigrant interactions are estimated in all models. The specifications differ with respect to the fixed effect controls, where first no fixed effects (model 1), then regional controls (model 2), additional survey year effects (model 3), and country of origin indicators are considered (model 4). We observe significant negative cohort effects already for natives, suggesting that over time the probability of advanced school attendance has declined. Relative to the falling enrollment for natives, immigrant enrollment falls even more, as the first four models all yield significant negative interaction terms. Predictions on the basis of models 1 and 2 (results not presented to save space) yield that the difference in enrollment probabilities for the two subsamples increased from about 8 percentage points for the 1970 cohort to almost twelve percentage points for the 1980 cohort.

While these results seem to corroborate the results of the first part of our analysis, it is important to stress their limitations. First, higher order cohort polynomials did not yield statistically significant coefficient estimates in the probit models, which may be due to the limited variation of the cohort variable within the 1970 - 1980 range. Second, the results with linear cohort effects are

sensitive to the consideration of the last two cohorts 1979 and 1980. Third, as soon as more complete models are applied the prediction results change to either no or even a reverse effect. Therefore we cannot derive throrougly convincing evidence regarding diverging cohort effects from this part of the analysis. Still it is of interest to briefly review the evidence on the other determinants of educational enrollment.

b. Other factors

The first extension of the above analysis was to consider demographic characteristics. They were included in model 5 without fixed effect controls. Then, in models 6 and 7 first state and then survey year effects were added. The conclusion from the analysis of completed degrees in Table 4 above was that women, Easterners and residents of larger cities had completed significantly higher secondary school degrees. While not statistically significant, models 5 - 7 in Table 6 also yield that females have a higher probability of advanced school enrollment. Surprisingly, the advantage of East Germans seems to have expired: For recent cohorts, the probability of advanced school participation is in some models even significantly lower than for West Germans. The citysize effect remains robust to the change of sample and outcome. Pupils in large cities have a significantly higher chance of attending advanced schools, and the consideration of fixed effects in the models did not modify these conclusions. All vectors of fixed effects improved the fit of the model at high levels of statistical significance.

In model 8 of Table 6 indicators for parent characteristics are considered. As the literature suggests parent human capital is indeed highly relevant for the child education outcome. Surprisingly, the indicator for not living in the parental household does not seem to have a significant effect on school enrollment. We control separately for fathers' and mothers' schooling and vocational training. The effects of parental schooling are very strong, and jointly as well as individually highly significant. The reference category is an advanced educational degree defined as anything beyond a basic school degree. The coefficients suggest a significantly lower probability to attend advanced school for the

children of parents with no or a low educational degree. Interestingly, the coefficients for maternal schooling are almost twice as large as those for fathers.

While only one of the three coefficients of fathers' vocational degree is statistically significant, they are jointly significant at the one percent level. Among the four categories information missing, no degree, basic vocational training such as an apprenticeship, and advanced vocational training, which includes academic and polytechnical studies, no vocational training is the reference group here. The coefficient estimates suggest that compared to the reference category only fathers' advanced vocational training has a significant positive impact on child schooling. The coefficients for mothers' training are all significant yielding that everything is better for child school enrollment than a mother without a vocational degree. Again the magnitude of the positive coefficients is larger than those obtained for men.

Finally we used parents' years since migration as indicator for household assimilation. Since this is based on a question with voluntary answers (cf. section 3.1 above), not all individuals provided the information. We have ten and seven percent missing values for fathers and mothers, respectively. The results yield significant coefficients only for fathers. However father and mother years since migration are jointly significant at the one percent level. The positive coefficients show that indeed longer presence in the destination country appears to be positively correlated with child enrollment in advanced education. These assimilation effects are robust to the consideration of fixed effects.[16]

In an estimation presented in the Appendix the parent variables were interacted with the second generation indicator. Only few coefficients were individually significant. However, jointly the interacted parent effects improved the explanatory power of the model at the one percent significance level, and almost every subset of the categorical indicators was jointly significant, suggesting that parental human capital affects immigrants and natives differently. The direction of the interaction effects does not follow clear patterns, however, overall the effects of parental vocational degrees appear to

[16] Estimates no presented to save space, but available upon request from the author.

be much less pronounced for immigrants than for natives, and compared to native fathers, a low schooling degree for immigrants yields a significantly stronger positive effect for child enrollment. The effects of cohort and demographic variables appear to be unaffected by the additional consideration of interaction terms in the model.

7. Conclusion

This study is the first one to investigate the educational attainment of German second generation immigrants using reliable and representative data of the Mikrozensus surveys. In order to evaluate whether the children of first generation immigrants succeeded in their integration in the German society, their educational attainment was compared to that of natives, with a special focus on developments over time. Simple descriptive statistics readily yield that using any measure of educational outcome, second generation immigrants do lag behind native children. The critical question is whether this attainment lag diminishes over time, as the society learns how to foster the integration of immigrants. The alarming result of this study is that such an integration is not taking place with respect to educational attainment. To the contrary, the educational success of the more recently born immigrant cohorts differs more from their native counterparts, than it used to be the case in the past. These results are strong and significant when comparing the highest degree completed for the birth cohorts of 1956 through 1974. The performance of cohorts born through 1980, for which we focused on enrollment in advanced secondary schools, provides only weak statistical evidence in support of these trends.

One possible cause of diverging educational outcomes might be related to the changing country of origin composition of second generation immigrants, even though the analysis did not yield a clear pattern justifying this rationale. The analysis of possible determinants of schooling outcomes confirmed the literature with respect to the dominant role of parent characteristics and the beneficial impact of parental assimilation to the host country.

Important policy conclusions can be drawn from these findings. While immigrant integration

has always been a policy concern, we now have evidence that the pathways pursued so far did not succeed in providing equitable education to natives and the German born children of first generation immigrants. So it might be worthwhile to direct policy attention to this question. The benefits of a well educated workforce for economic efficiency and social integration are obvious enough. Apparently there are some lessons to learn before Germany is ready for the impending immigrant inflows from Eastern Europe.

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Table 1 Sample of Individuals born 1956-1974 by Group and Survey Year

Group	1989	1991	1993	1995	1996	Total
Natives	7127	10822	11802	12640	13179	55570
Second Gen. Immigrants	304	473	759	1015	1076	3627
First Gen. Immigrants	5120	5872	7369	9386	9562	37336
All	12551	17167	19957	23041	23817	96533

Source: Mikrozensus surveys of various years.

Table 2 Distribution of Sample Groups over Schooling Degrees (in percent)

Degree	-------- Original Sample --------				-------- Applied Sample --------		
	Natives	Second Gen.	First Gen.	All	Natives	Second Gen.	All
Low	3074	4966	4955	3873	33.50	55.88	34.87
Medium	4098	2410	1584	3062	43.50	25.50	42.39
High	2167	1759	1870	2037	23.00	18.62	22.73
missing	661	866	1591	1029	-	-	-
No. of Individuals	55570	3627	37336	96533	52351	3427	55778

Source: Mikrozensus surveys of various years.

Table 3 Explanatory Variables: Completed Degree and In School Samples

Variable	Description	------- Completed Degree -------				---- Current School Type ----			
		Natives		Second Gen.		Natives		Second Gen.	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Cohort Indicators									
cohort	year of birth - 1900	63.43	4.662	67.60	4.446	74.91	2.862	75.24	2.690
cohort2	cohort * cohort / 100	40.44	5.962	45.89	5.894	-	-	-	-
cohort3	cohort2 * cohort / 10	259.3	57.49	312.8	58.90	-	-	-	-
coh5658	1 if born 1956 - 1958	0.183	0.387	0.041	0.199	-	-	-	-
coh5961	1 if born 1959 - 1961	0.197	0.398	0.069	0.253	-	-	-	-
coh6264	1 if born 1962 - 1964	0.206	0.404	0.121	0.326	-	-	-	-
coh6567	1 if born 1965 - 1967	0.200	0.400	0.214	0.411	-	-	-	-
coh6870	1 if born 1968 - 1970	0.135	0.342	0.231	0.422	-	-	-	-
coh7173	1 if born 1971 - 1973	0.070	0.256	0.273	0.445	-	-	-	-
coh7476	1 if born 1974 - 1976	0.009	0.095	0.050	0.219	-	-	-	-
Demographic Variables									
male	1 if male sex	0.503	0.500	0.558	0.497	0.403	0.491	0.404	0.491
east	1 if in East Germany	0.205	0.404	0.029	0.169	0.213	0.409	0.059	0.236
smallcity	1 if in city <20K inhabitants	0.321	0.467	0.156	0.363	0.353	0.478	0.168	0.374
bigcity	1 if in city >500K inhabitants	0.117	0.322	0.171	0.377	0.09	0.286	0.201	0.401
city miss	1 if citysize missing	0.242	0.428	0.299	0.458	0.273	0.445	0.291	0.454
Assimilation Measures									
h_partner	1 if partner in home ctry.	0.000	0.000	0.007	0.083	-	-	-	-
h_kids	1 if children in home ctry	0.000	0.000	0.005	0.068	-	-	-	-
Survey Year Indicator									
mzyear89	1 if survey of 1989	0.134	0.341	0.086	0.280	0.218	0.413	0.177	0.381
mzyear91	1 if survey of 1991	0.189	0.391	0.136	0.343	0.258	0.437	0.257	0.437
mzyear93	1 if survey of 1993	0.206	0.404	0.216	0.411	0.252	0.434	0.276	0.447
mzyear95	1 if survey of 1995	0.229	0.420	0.263	0.440	-	-	-	-
mzyear96	1 if survey of 1996	0.242	0.428	0.299	0.458	0.273	0.445	0.291	0.454
Parent Variables									
indep	1 if not in parent household	-	-	-	-	0.055	0.228	0.043	0.203
fschool0	1 if father no schoolg/missg.	-	-	-	-	0.225	0.418	0.324	0.468
fschool1	1 if father lowest degree	-	-	-	-	0.435	0.496	0.581	0.494
fschool2	1 if father higher degree	-	-	-	-	0.340	0.474	0.095	0.294
fvocat0	1 if father vocat.info missg.	-	-	-	-	0.227	0.419	0.166	0.372
fvocat1	1 if father no vocat. traing.	-	-	-	-	0.086	0.281	0.502	0.500
fvocat2	1 if father basic training	-	-	-	-	0.436	0.496	0.292	0.455
fvocat3	1 if father adv.vocat. traing.	-	-	-	-	0.251	0.434	0.041	0.197
mschool0	1 if mother no schoolg/missg.	-	-	-	-	0.135	0.342	0.366	0.482
mschool1	1 if mother lowest degree	-	-	-	-	0.487	0.500	0.556	0.497
mschool2	1 if mother higher degree	-	-	-	-	0.378	0.485	0.078	0.268
mvocat0	1 if mother vocat.info missg.	-	-	-	-	0.142	0.349	0.132	0.339
mvocat1	1 if mother no vocat. traing.	-	-	-	-	0.230	0.421	0.720	0.449
mvocat2	1 if mother basic training	-	-	-	-	0.492	0.500	0.128	0.335
mvocat3	1 if mother adv.vocat. traing.	-	-	-	-	0.137	0.344	0.019	0.138
Parent Assimilation Variables									
f ysm	father years since migration	-	-	-	-	0.183	2.179	20.009	9.189
f ysm miss	1 if father ysm missing	-	-	-	-	0.937	0.243	0.101	0.302
m ysm	mother years since migration	-	-	-	-	0.188	2.087	19.242	7.918
m ysm miss	1 if mother ysm missing	-	-	-	-	0.936	0.244	0.069	0.254
Number of Observations		52351		3427		7482		3357	

Table 4(a) Estimation Results and Predictions:
Ordered Probit Estimates of Cohort Effects on Completed Degree

	Model 1		Model 2		Model 3		Model 4	
	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
Estimations								
Second Gen.	1.178**	0.311	-0.221	4.038	46.926	55.04	-0.652**	0.039
Cohort	0.026	- 0.001	0.013	0.028	-0.792	0.556	-	-
Cohort2	-		0.010	0.022	1.266	0.868	-	-
Cohort3	-	-	-	-	-0.065	0.045	-	-
Cohort * Sec.G.	-0.03**	0.005	0.018	0.122	-2.135	2.485	-	-
Cohort2 * Sec.G.	-	-	-0.033	0.093	3.229	3.797	-	-
Cohort3 * Sec.G.	-	-	-	-	-0.164	0.193	-	-
coh5658	-	-	-	-	-	-	-0.382**	0.021
coh5961	-	-	-	-	-	-	-0.314**	0.020
coh6264	-	-	-	-	-	-	-0.237**	0.020
coh6567	-	-	-	-	-	-	-0.150**	0.020
coh6870	-	-	-	-	-	-	-0.065**	0.022
coh5658 * Sec.G.	-	-	-	-	-	-	0.487**	0.105
coh5961 * Sec.G.	-	-	-	-	-	-	0.236**	0.087
coh6264 * Sec.G.	-	-	-	-	-	-	0.218**	0.071
coh6567 * Sec.G.	-	-	-	-	-	-	0.124*	0.059
coh6870 * Sec.G.	-	-	-	-	-	-	0.116*	0.058
μ_1	1.23	0.07	0.81	0.88	-16.31	11.86	-0.64	0.02
μ_2	2.39	0.07	1.96	0.88	-15.16	11.86	0.51	0.02
Log Likelihood	-59034.33		-59034.18		-59032.39		-59034.96	
Test	**30.40****		**30.13****		**28.67****		**28.52****	
Predictions								
Cohort of 1956: Probab. Natives - Probab. Second Gen. Immigrants								
Degree Low	-0.097		-0.106		-0.072		-0.065	
Degree Medium	0.040		0.045		0.028		0.024	
Degree Advanced	0.056		0.061		0.044		0.041	
Cohort of 1972: Probab. Natives - Probab. Second Gen. Immigrants								
Degree Low	-0.243		-0.245		-0.241		-0.244	
Degree Medium	0.060		0.061		0.060		0.062	
Degree Advanced	0.182		0.185		0.181		0.182	

(b) Estimation Results:
Ordered Probit Estimates of Cohort Effects on Completed Degree with Further Controls

	Model 5		Model 6		Model 7	
	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
Estimations						
Second Gen.	2.517**	4.052	3.986	4.059	1.665	4.220
Cohort	0.001	0.028	0.004	0.028	0.004	0.028
Cohort2	0.020	0.022	0.017	0.022	0.017	0.122
Cohort * Sec.G.	-0.066	0.123	-0.109	0.123	-0.087	0.128
Cohort2 * Sec.G.	0.030	0.093	0.062	0.093	0.068	0.097
Demographics						
Male	-0.046**	0.010	-0.046**	0.010	-0.045**	0.010
East	0.380	0.012	0.411**	0.042	0.416**	0.042
Smallcity	-0.291**	0.012	-0.301**	0.013	-0.303**	0.013
Bigcity	0.181**	0.016	0.181**	0.019	0.179**	0.019
City missg.	-0.131	0.013	-0.134**	0.018	-0.134**	0.018
Assimilation						
h_partner	-0.565*	0.278	-0.551*	0.278	-0.281	0.286
h_kids	-0.471	0.345	-0.465	0.346	-0.335	0.355
Regional FE	-	-	yes**	-	yes**	
Survey FE	-	-	yes*	-	yes*	
Country of Origin FE	-	-	-	-	yes**	
μ_1	0.39	0.89	0.463	0.90	0.479	0.90
μ_2	1.567	0.89	1.648	0.90	1.667	0.90
Log Likelihood		-57948.89		-57690.85		-57468.42
Test	**28.81****		**32.46****		**0.86**	
Predictions						
Cohort of 1956: Probab. Natives - Probab. Second Gen. Immigrants						
Degree Low		-0.081		-0.068		-0.157
Degree Medium		0.032		0.026		0.072
Degree Advanced		0.048		0.042		0.085
Cohort of 1972: Probab. Natives - Probab. Second Gen. Immigrants						
Degree Low		-0.231		-0.235		-0.141
Degree Medium		0.055		0.058		0.021
Degree Advanced		0.176		0.177		0.120

Note: 1. **,*, and **R** indicate statistical significance and the 1,5, and 10 percent level.
2."Test" provides the Wald test statistic for a joint test of the cohort interactions for second generation immigrants.

Table 5 Sample Composition: Current School Type

	1989	1991	1993	1996	All
Number of Observations					
Natives	*1628*	*1928*	*1887*	*2039*	*7482*
age 16	351	459	474	568	1852
age 17	412	503	466	468	1849
age 18	385	454	477	520	1836
age 19	480	512	470	483	1945
Second Generation Immigrants	*593*	*862*	*926*	*976*	*3357*
age 16	177	225	242	257	984
age 17	175	262	233	240	1001
age 18	129	213	244	236	892
age 19	112	162	207	243	809
All	2221	2790	2813	3015	10839
Share in Advanced School					
Natives	*31.27*	*21.78*	*23.11*	*26.19*	*25.38*
age 16	35.33	10.02	6.75	10.56	14.15
age 17	35.19	20.28	25.32	25.00	26.07
age 18	33.77	31.94	32.08	37.12	33.82
age 19	22.92	24.80	28.30	33.95	27.46
Second Generation Immigrants	*22.43*	*14.04*	*15.01*	*15.06*	*16.09*
age 16	19.77	8.00	6.61	5.06	9.10
age 17	25.71	12.60	13.73	11.25	15.05
age 18	27.91	19.72	21.31	24.58	22.87
age 19	15.18	17.28	18.84	20.16	18.37
All	28.91	19.39	20.44	22.59	22.50

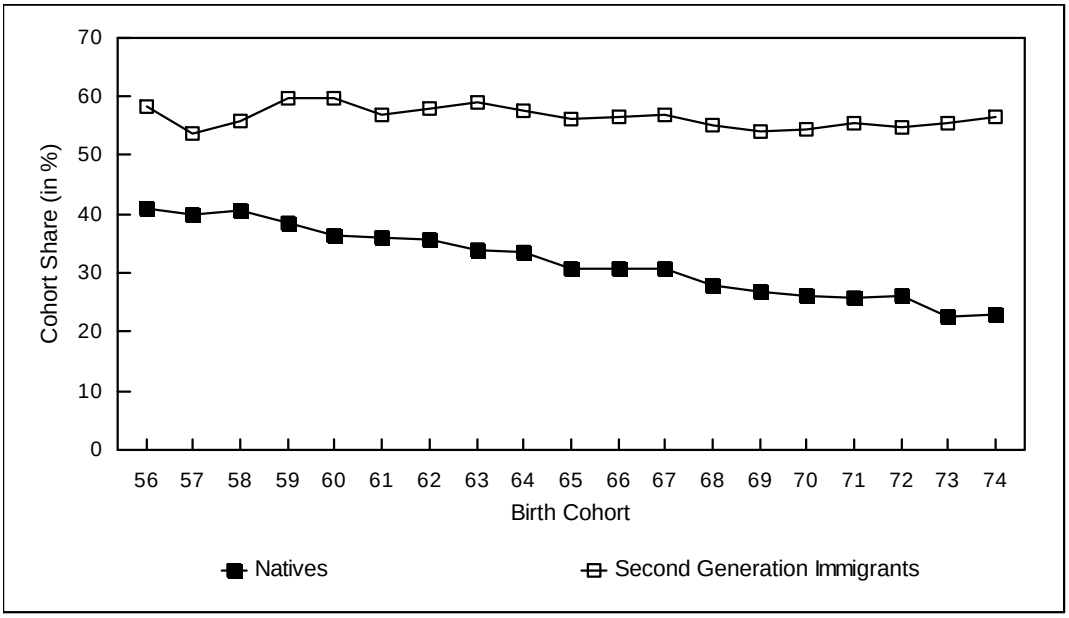
Source: Own calculations based on Mikrozensus surveys 1989, 1991, 1993 and 1996.

Table 6 Estimation Results: Probit Estimates on Whether Current School Type is an Advanced School

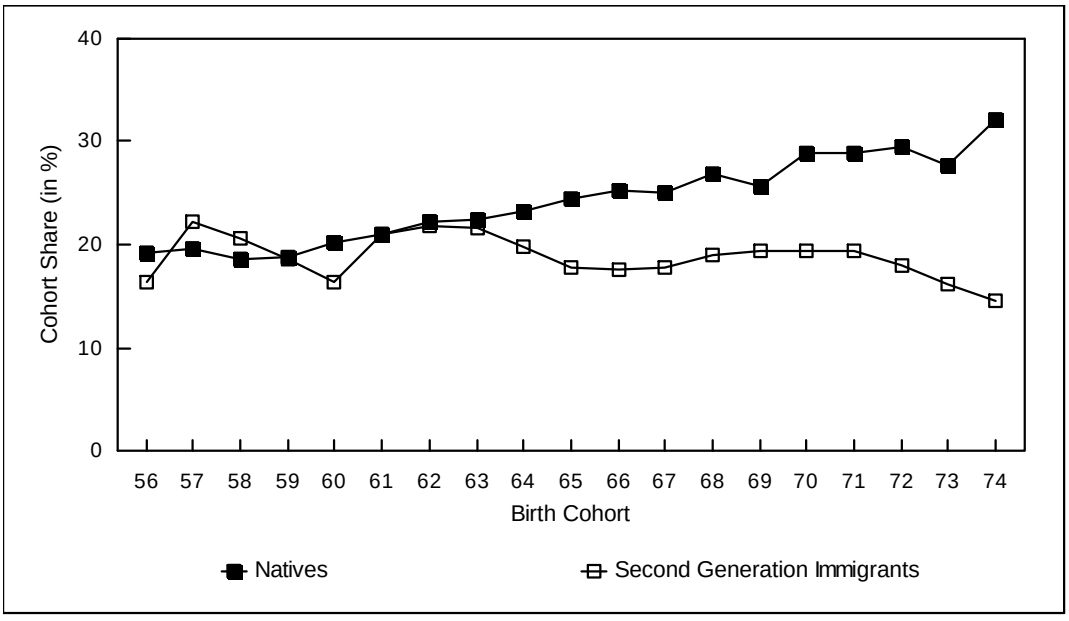
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
Constant	1.811 **	0.415	1.423**	0.437	11.010**	0.994	11.079**	0.999	5.922**	0.609	5.768**	0.629	11.159**	0.996	7.918**	0.684
Second Gen.	1.042	0.847	1.415	0.854	1.883*	0.848	0.966	0.870	0.863	0.847	1.127	0.851	1.328	0.858	-0.417	0.882
Cohort	-0.033 **	0.006	-0.026**	0.006	-0.147**	0.013	-0.148**	0.013	-0.089**	0.008	-0.086**	0.008	-0.148**	0.013	-0.118**	0.009
Cohort*Sec.Gen.	-0.018**R**	0.011	-0.024*	0.011	-0.030**	0.011	-0.020**R**	0.012	-0.017	0.011	-0.020*	0.011	-0.023*	0.011	0.003	0.012
Demographic Variables																
Male	-	-	-	-	-	-	-	-	-0.009	0.028	-0.012	0.028	-0.067*	0.030	-0.005	0.029
East	-	-	-	-	-	-	-	-	-0.159**	0.039	-0.505	0.196	-0.257**R**	0.155	-0.464**	0.043
Smallcity	-	-	-	-	-	-	-	-	-0.088*	0.036	-0.061**R**	0.037	-0.059	0.038	-0.054	0.037
Bigcity	-	-	-	-	-	-	-	-	0.276**	0.045	0.204**	0.052	0.201**	0.052	0.304**	0.047
City missg.	-	-	-	-	-	-	-	-	0.495**	0.053	0.489**	0.054	-	-	0.548**	0.055
Parent Variables																
indep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.184	0.205
f school0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.258**	0.091
f school1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.276**	0.044
f vocat0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.134	0.090
f vocat2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.040	0.048
f vocat3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.252**	0.059
m school0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.562**	0.079
m school1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.419**	0.043
m vocat0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.304**	0.078
m vocat2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.140**	0.040
m vocat3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.349**	0.060
f years s. migration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.017*	0.007
f ysm missing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.437*	0.196
m years s. migration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006	0.008
m ysm missing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.047	0.194
Regional FE	-		yes**		yes**		yes**		-		yes**		yes**		-	
Survey FE	-		-		yes**		yes**		-		-		yes**		-	
Country of Origin FE	-		-		-		yes**		-		-		-		-	
Log Likelihood	-5687.65		5634.14		-5554.93		-5508.08		-5599.51		-5574.86		-5541.09		-5189.42	

Note: 1. **,*, and **R** indicate statistical significance and the 1,5, and 10 percent level. 2. The “city missing” indicator was dropped from Model 7 due to collinearity.

Figure 1 (a) Cohort Shares with Low or No Completed Educational Degree

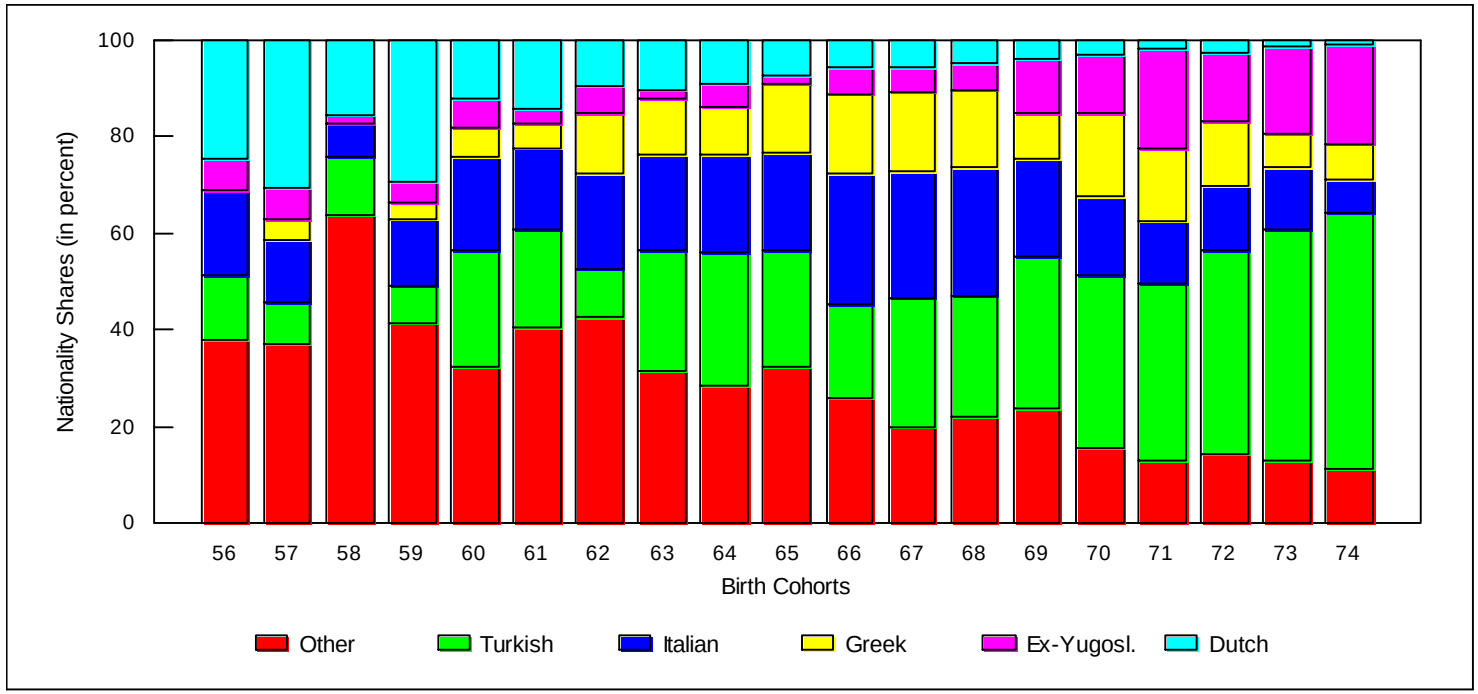


(b) Cohort Shares with Advanced Educational Degree (*Abitur*)



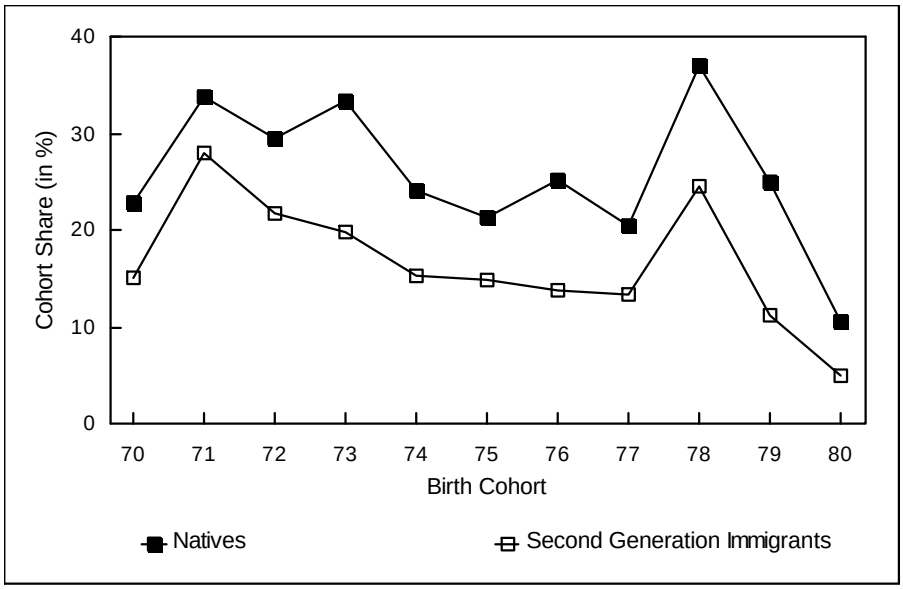
Source: Own calculations based on Mikrozensus 1989, 1991, 1993, 1995, and 1996
Note: To reduce fluctuations due to the small number of second generation immigrants for some cohorts, three year moving averages are presented for this group.

Figure 2 Country of Origin of Second Generation Immigrants by Cohort



Source: Own calculations based on Mikrozensus 1989, 1991, 1993, 1995, and 1996 using the "completed degree sample."

Figure 3 Cohort Shares in Advanced School by Group



Source: Own calculations based on Mikrozensus 1989, 1991, 1993, 1996

Appendix

	Coef.	Std.Err.
Constant	7.745**	0.693
Second Gen.	-0.133	0.909
Cohort	-0.120**	0.009
Cohort*Sec.G.	0.005	0.012
Demographics		
Male	-0.008	0.029
East	-0.476**	0.043
Smallcity	-0.049	0.038
Bigcity	0.314**	0.047
City missg.	0.561**	0.056
Parent Variables		
indep	-0.027	0.229
f school0	-0.058	0.154
f school1	-0.329**	0.049
f vocat0	0.057	0.157
f vocat2	0.074	0.070
f vocat3	0.347**	0.077
m school0	-0.695**	0.131
m school1	-0.392**	0.046
m vocat0	0.552**	0.123
m vocat2	0.172**	0.046
m vocat3	0.394**	0.065
Parent Variables Interacted for Immigrants		
indep * second gen.	0.014**R**	0.243
f school0 * second gen.	-0.170	0.209
f school1 * second gen.	0.279*	0.117
f vocat0 * second gen.	-0.087	0.210
f vocat2 * second gen.	-0.170**R**	0.098
f vocat3 * second gen.	-0.044	0.166
m school0 * second gen.	0.056	0.186
m school1 * second gen.	-0.185	0.121
m vocat0 * second gen.	-0.464**	0.177
m vocat2 * second gen.	-0.049	0.098
m vocat3 * second gen.	-0.249	0.208
Parent Assimilation Measures		
f years since migration	0.016*	0.008
f years since migration missing	0.006	0.008
m years since migration	0.618**	0.211
m years since migration missing	-0.013	0.198
Log Likelihood		-5169.69

Note: 1. **,*, and **R** indicate statistical significance and the 1,5, and 10 percent level.

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