

Supplementary Material

Supplementary Table 1. Variables used.

Variable	Operationalization	Time of measurement
Immigrant background	0 = Students and parents born in Germany, 1 = Students immigrated themselves, have at least one foreign-born parent (second-generation migrants) or have at least two grandparents who were born outside of Germany	Grade 9, wave 1
Generational status	0 = Students and parents born in Germany, 1 = one or both parents born abroad = 1 (second-generation); 2 = Students born abroad (first-generation)	Grade 9, wave 1
<i>Social background</i>		
Parents' highest educational level	Parents' highest ISCED level: 0 = ISCED level 0-2, 1 = ISCED level 3-4, 2 = ISCED level 5-6.	Grade 9, wave 1 (if missing, wave 5 or 7) Parents' questionnaire, if missing, information from the student.
Parents' highest socio-economic status	International Socio-Economic Index of Occupational Status (ISEI-08)	See parents' highest educational level
<i>Prior achievement</i>		
GPA in Grade 9 or 10	Average of students' (self-reported) grade in Maths and German on annual report card in Grade 9; scaled from 1 (best) to 6 (worst Grade) If students left the general school system after lower-secondary education, their self-reported average grade on school-leaving report was used (if missing: grade point average in Maths and German from the last report card), scaled from 1 (best) to 6 (worst grade); if students continued school after lower-secondary education, the average of students' self-reported grade on school-leaving report was used	Grade 9 (wave 1) At time of leaving lower-secondary education
Competence score in Maths	Estimated WLE score	Grade 9 (wave 1), Grade 12 (wave 7)
Competence score in Reading	Estimated WLE score	Grade 9 (wave 1), Grade 12 (wave 7)
Competence score in ICT-Literacy	Estimated WLE score	Grade 9 (wave 1), Grade 12 (wave 7)

Supplementary Table 1 (continued)

Variable	Operationalization	Time of measurement
<i>Educational and occupational aspirations</i>		
Students' educational aspirations	Item (Grade 9): <i>If it were up to you: What would you prefer to do after 9th Grade? I would prefer to...</i> 1 = do a company- or school-based vocational training, 2 = continue going to school, 0 = else (attend pre-vocational training programs, go on an internship, work for a while, go abroad, do none of those things). Item (Grade 12/13): <i>If you could do anything you want, what type of vocational training would you most like to do after finishing school?</i> 1 = do a company- or school-based vocational training, 2 = higher education, 0 = else (attend pre-vocational training programs, go on an internship, work for a while, go abroad, do none of those things).	Grade 9, wave 1 (if missing, wave 2) Grade 12 or 13, wave 7 (if missing, wave 8)
Students' occupational aspirations	Item: 'Imagine you had every chance to become whatever you wanted. What would your dream job be?' (ISEI score)	Grade 9, wave 1 (if missing, wave 2); Grade 12 or 13, wave 7 (if missing, wave 8)
Parental educational aspirations as perceived by students	Item: <i>And what kind of education would your parents like you to get after you have left school? My parents would like me to...</i> 1 = do no vocational training at all, 2 = do a vocational training, 3 = study, 0 = my parents have no opinion. Item: <i>What vocational training course do your parents want you to do after you leave school? My parents would like me to...</i> 1 = do a vocational training, 2 = study, 0 = my parents have no opinion.	Grade 9, wave 1 Grade 12 or 13, wave 7 (if missing, wave 8)
<i>Variables used in robustness checks</i>		
<i>Robustness check 1a: Added HOMEPOS scale as an additional indicator for social background</i>		
Index of Home Possessions (HOMEPOS)	Scale including 8 household items (a desk to study, own room, learning software, classic literature, books with poems, works of art, books that are useful for homework, a dictionary)	9 th Grade, wave 1 (if missing, wave 2)
<i>Robustness check 1b: Replaced parents' HISEI by parents' EGP class</i>		
Parents' EGP class	Parents' highest EGP class: 0 = Working class – (IIIb, VI, VIIab); 1 = Mixed class (IIIa, IVabc, V); 2 = Service class (I+II)	See parents' highest educational level
<i>Robustness check 1c: Replaced parents' CASMIN with parents' ISCED</i>		
Parents' ISCED level	0 = low (without any educational certificate, with a low or intermediate secondary school certificate but without VET qualification), 1 = intermediate (lower secondary school certificate and a VET qualification, an intermediate secondary school certificate and a VET qualification or a university entrance qualification but no VET qualification), 2 = high (university degree or university of applied science degree)	See parents' highest educational level

Supplementary Table 1 (continued)

Variable	Operationalization	Time of measurement
<i>Robustness check 2: Added measures for anticipated discrimination and information deficits as additional control variables</i>		
Anticipated discrimination	Four-item scale about the probability of discrimination if one 1) has a name that sounds foreign, 2) has a foreign look, 3) wears a headscarf or 4) does not speak German so well when applying for vocational education, answers ranged from 1 = no, 2 = rather no, 3 = rather yes, 4 = yes)	Wave 2
Social resources: Receive information on interesting vocational training positions	Item: <i>How likely is it that people in your life would let you know about interesting open vocational training positions?</i> , 1 = very unlikely, → 4 = very likely	Wave 2 (if missing, wave 3)
Social resources: Receive help to get a vocational training position	Item: <i>'How likely is it that someone in your life would get involved in helping you get a vocational training position?'</i> , 1 = very unlikely, → 4 = very likely	Wave 2 (if missing, wave 3)
<i>Robustness check 3: Restricted immigrant background to (children of) immigrants up to the third generation</i>		
Immigrant background	0 = Students and parents born in Germany, 1 = Students immigrated themselves or have at least one foreign-born parent or have at least two grandparents who were born outside of Germany	Grade 9, wave 1
<i>Controls</i>		
Gender	0 = male, 1 = female	Grade 9, wave 1
School track in Grade 9	0 = special school (<i>Förderschule</i>), 1 = <i>Hauptschule</i> , 2 = <i>Realschule</i> , 3 = cominbed school with missing information on branch, 4 = comprehensive school (<i>Gesamtschule</i>), 5 = free Waldorf school, 6 = <i>Gymnasium</i> , 7 = other schools.	Grade 9, wave 1

Supplementary Table 2. Descriptive statistics of the sample in Grade 9.

	Natives	Immigrants	All	% Missing
Generational status (%)				0.0%
No immigrant background	100.0%	–	76.5%	
Second-generation immigrants	–	78.0%	18.3%	
First-generation immigrants	–	22.0%	5.2%	
Ethnic origin (%)				0.0%
Germany	100.0%	–	76.5%	
Turkey	–	19.8%	4.7%	
Other labor immigrants	–	10.3%	2.4%	
Poland	–	10.5%	2.5%	
Former Soviet Union	–	18.8%	4.4%	
Other	–	40.5%	9.5%	
<i>Prior achievement</i> <small>Grade 9/10</small>				
Competence score in Maths	0.23	-0.26	0.11	8.7%
Competence score in Reading	0.19	-0.35	0.06	11.9%
Competence score in ICT-Literacy	0.17	-0.22	0.08	8.9%
GPA in Maths and German on annual report card in Grade 8	2.87	3.04	2.91	7.6%
GPA in Grade 9 or 10	2.66	2.79	2.69	5.8%
<i>Aspirations</i>				
Occupational aspirations (ISEI) <small>Grade 9</small>	60.88	63.48	61.49	25.6%
Educational aspirations (%) <small>Grade 9</small>				14.0%
Do something different	23.2%	19.6%	22.4%	
VET	20.3%	20.7%	20.4%	
Continue school	56.5%	59.7%	57.2%	
Parents' educational aspirations as perceived by students (%) <small>Grade 9/10</small>				15.2%
No opinion	12.1%	7.0%	10.9%	
No vocational training	0.6%	1.0%	0.7%	
VET	46.8%	37.7%	44.6%	
University	40.6%	54.3%	43.0%	
<i>Control variables</i>				
Sex (% Female)	49.0%	50.9%	49.5%	0.0%
Parents' highest ISEI	54.74	44.42	52.32	9.8%
Parents' highest ISCED (%)				15.5%
ISCED 0-2	3.1%	21.4%	7.4%	
ISCED 3-4	37.4%	47.4%	39.8%	
ISCED 5-6	59.5%	31.2%	52.8%	
Number of observations (row per cent)	76.0%	24.0%	100.0%	0.0%
Number of observations (unweighted)	8,767	2,769	11,536	

Notes. Imputed data ($m = 25$). Unweighted number of cases, weighted and imputed percentages and means.

Supplementary Table 3. Descriptive statistics on the sample in the final year (Grade 12 or 13).

	Natives	Immigrants	All	% Missing
Generational status (%)				0.0%
No immigrant background	100.0%	–	79.7%	
Second-generation immigrants	–	83.0%	16.9%	
First-generation immigrants	–	17.0%	3.4%	
Ethnic origin (%)				0.0%
Germany	100.0%	–	79.7%	
Turkey	–	15.1%	3.1%	
Other labor immigrants	–	9.6%	1.9%	
Poland	–	11.4%	2.3%	
Former Soviet Union	–	14.9%	3.0%	
Other	–	49.1%	10.0%	
<i>Prior achievement</i> <small>Grade 12/13</small>				
Competence score in Maths	0.31	-0.10	0.23	28.1%
Competence score in Reading	0.34	0.02	0.27	27.3%
Competence score in ICT-Literacy	0.94	0.68	0.89	27.3%
GPA on school-leaving certificate	2.37	2.48	2.39	0.6%
<i>Aspirations</i>				
Occupational aspirations (ISEI) <small>Grade 12/13</small>	70.30	72.81	70.77	24.7%
Educational aspirations (%) <small>Grade 12/13</small>				16.1%
Do something different	3.4%	7.2%	4.2%	
VET	18.6%	15.8%	18.0%	
University	78.0%	77.0%	77.8%	
Parents' educational expectations as perceived by students (%) <small>Grade 11</small>				8.6%
No opinion	23.7%	18.7%	22.7%	
VET	4.2%	3.5%	4.1%	
University	72.1%	77.8%	73.2%	
<i>Control variables</i>				
Sex (% Female)	53.8%	56.4%	54.4%	0.0%
Parents' highest ISEI	62.97	54.87	60.92	2.3%
Parents' highest ISCED (%)				4.8%
ISCED 0-2	0.7%	12.3%	3.1%	
ISCED 3-4	23.4%	42.0%	27.2%	
ISCED 5-6	75.9%	45.7%	69.7%	
Number of observations (row per cent)	79.7%	20.3%	100.0%	0.0%
Number of observations (unweighted)	3,919	941	4,860	

Notes. Includes only respondents enrolled in an academic track until Grade 12 or 13 and successfully completed this track with an upper-secondary degree. Imputed data ($m = 25$). Unweighted number of cases, weighted and imputed percentages and means.

Supplementary Table 4. Full version of the regression models.

	ER1: Enrollment in Grade 9	ER2: Enrollment after lower-secondary education			ER3: Enrollment after upper-secondary education⁴	
	Academic track	Academic track ¹	Upper- secondary vocational school ²	VET ³	Higher education	VET ³
Immigrant background (Ref.: natives)	0.000	0.012	0.029***	-0.050***	0.049**	-0.037**
<i>Social background</i>						
Parents' highest ISEI ^a	0.031***	0.019*	0.004	-0.020**	-0.017*	-0.028**
Parents' highest ISCED (Ref.: ISCED 0-2)						
ISCED 3-4	0.036	0.007	0.002	0.016	-0.058	0.033
ISCED 5-6	0.088***	0.031*	-0.001	0.012	-0.053	0.047
<i>Prior achievement</i>						
GPA in Grade 9 or 10 ^a	0.054***	0.023***	-0.026***	-0.031***	/	/
GPA in Grade 12 or 13 ^a	/	/	/	/	-0.078***	0.025***
Competence score in Maths ^a	0.127***	0.054***	-0.015**	-0.002	0.021* ^b	-0.023** ^b
Competence score in Reading ^a	0.041***	0.034***	0.001	-0.032***	0.000 ^b	-0.012 ^b
Competence score in ICT-literacy ^b	0.043***	0.020***	0.001	-0.008	0.007 ^b	0.002 ^b
<i>Educational and occupational aspirations</i>						
Occupational aspirations (ISEI) ^a	0.041***	0.033***	0.010**	-0.031***	0.021* ^b	-0.001 ^b
Educational aspiration (Ref.: VET)						
Something different	0.148***	0.061***	0.017	-0.089***	0.217*** ^b	-0.337*** ^b
School	0.104***	0.089***	0.017**	-0.103***		
University	/	/	/	/	0.317*** ^b	-0.342*** ^b

Supplementary Table 4 (continued)

	ER1:	ER2:			ER3: Enrollment after	
	Enrollment in Grade 9	Enrollment after lower-secondary education			upper-secondary education⁴	
	Academic track	Academic track ¹	Upper- secondary vocational school ²	VET ³	Higher education	VET ³
Parents' educational aspirations as perceived by students (Ref.: no opinion)						
No vocational training	-0.107	-0.076	-0.021	0.040	/	/
VET	-0.141***	-0.057***	-0.029**	0.058***	-0.052 ^b	0.001 ^b
University	0.076***	0.027*	-0.007	-0.048**	0.060*** ^b	-0.022 ^b
Pseudo-R ²	0.517 (ER1)	0.388 (ER2)			0.160 (ER3)	

Notes. ^a z-standardised. ^b Measured in Grade 11 or 12. ¹ Attending upper-secondary school of the general school system until Grade 12 or 13. ² Attending full-time vocational schools at upper-secondary level (e.g., *Fachoberschule*, *Berufliches Gymnasium*, etc.). ³ Entering company- or school-based vocational education and training (VET). ⁴ Includes only respondents who achieved an upper-secondary degree in an academic track. KHB corrected estimates. Robust standard errors on school level. Level of significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Imputed data ($m = 25$).

Supplementary Table 5. Robustness checks on the mediation of the effect of immigrant background on enrollment rates.

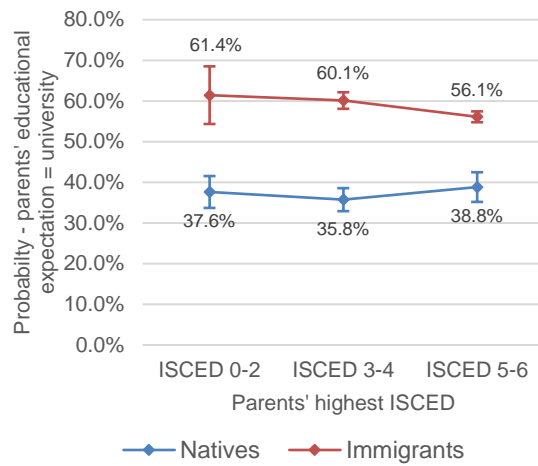
	ER1:	ER2:			ER3:	
	Enrollment in Grade 9	Enrollment after lower- secondary education			Enrollment after upper-secondary education⁴	
	Academic track	Academic track ¹	Upper- secondary vocational school ²	VET ³	Higher education	VET ³
Final mediation model (Table 1)						
AME in baseline model	.059***	.039***	.036***	-.082***	.076***	-.052***
AME in mediation model (+ Aspirations)	.000	.012	.029***	-.050***	.049**	-.037**
Mediation in %	100.0%	69.2%	19.4%	39.0%	35.5%	28.8%
Robustness check 1a: Added HOMEPOS scale as an additional indicator for social background						
AME in baseline model	.059***	.040***	.036***	-.083***	.077***	-.052***
AME in mediation model (+ Aspirations)	.000	.013	.029***	-.050***	.049**	-.037**
Mediation in %	100.0%	67.5%	19.4%	39.8%	36.4%	28.8%
Robustness check 1b: Replaced parents' HISEI with parents' EGP class						
AME in baseline model	.059***	.037***	.036***	-.079***	.075***	-.049***
AME in mediation model (+ Aspirations)	-.001	.008	.029***	-.046***	.048**	-.034**
Mediation in %	101.7%	78.4%	19.4%	41.8%	36.0%	30.6%
Robustness check 1c: Replaced parents' ISCED with parents' CASMIN						
AME in baseline model	.045***	.034***	.038***	-.079***	.067***	-.060***
AME in mediation model (+ Aspirations)	-.010	.007	.031***	-.047***	.050**	-.046***
Mediation in %	122.2%	79.4%	18.4%	40.5%	34.2%	23.3%
Robustness check 2: Added measures for anticipated discrimination and information deficits as additional control variables						
AME in baseline model	.054***	.038***	.036***	-.079***	.074***	-.051***
AME in mediation model (+ Aspirations)	-.002	.010	.029***	-.046***	.048**	-.037**
Mediation in %	103.7%	73.7%	19.4%	41.8%	35.1%	27.5%

Supplementary Table 5 (continued)

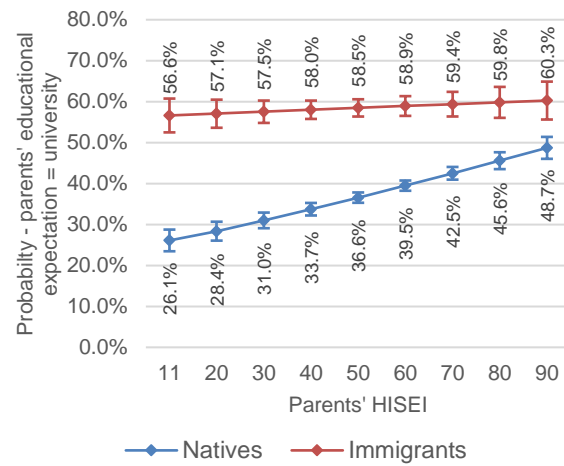
	ER1:	ER2:			ER3:	
	Enrollment in Grade 9	Enrollment after lower- secondary education			Enrollment after upper-secondary education⁴	
	Academic track	Academic track ¹	Upper- secondary vocational school ²	VET ³	Higher education	VET ³
Robustness check 3: Expanded immigrant background up to the third generation						
AME in baseline model	.058***	.040***	.034***	- .081***	.078***	-.051***
AME in mediation model (+ Aspirations)	-.001	.012	.027***	- .048***	.050**	-.036**
Mediation in %	101.7% ⁵	70.0%	20.6%	40.7%	35.9%	29.4%

Notes. ¹ Attending upper-secondary school of the general school system until Grade 12 or 13. ² Attending full-time vocational schools at upper-secondary level (e.g., *Fachoberschule*, *Berufliches Gymnasium*, etc.). ³ Entering company- or school-based vocational education and training (VET). ⁴ Includes only respondents who achieved an upper-secondary degree in an academic track. ⁵ The sum of the proportion mediated can exceed 100% (Vanderweele, 2015, pp. 121–22) when in the baseline model the AME is > 0 and in the full model the AME is < 0. Average estimates pooled over 25 imputed data sets. The mediation model estimates the mediation of educational and occupational aspirations on the ethnic choice effects to examine the immigrant optimism hypothesis. Reference category for all significance tests are respondents without

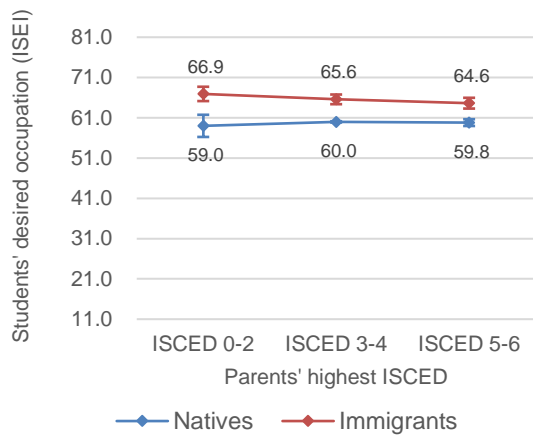
(A) Parents' educational expectation (=university) in Grade 9 by immigrant background and parents' ISCED



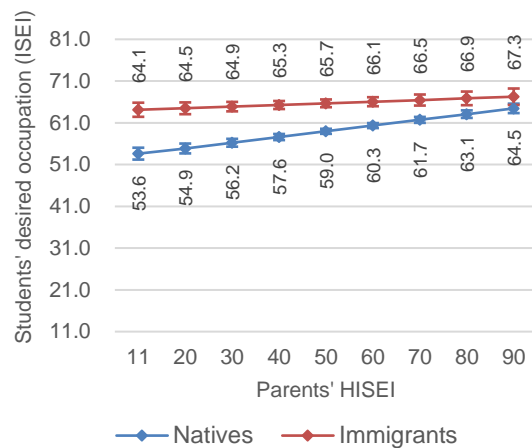
(B) Parents' educational expectation (=university) in Grade 9 by immigrant background and parents' highest ISEI



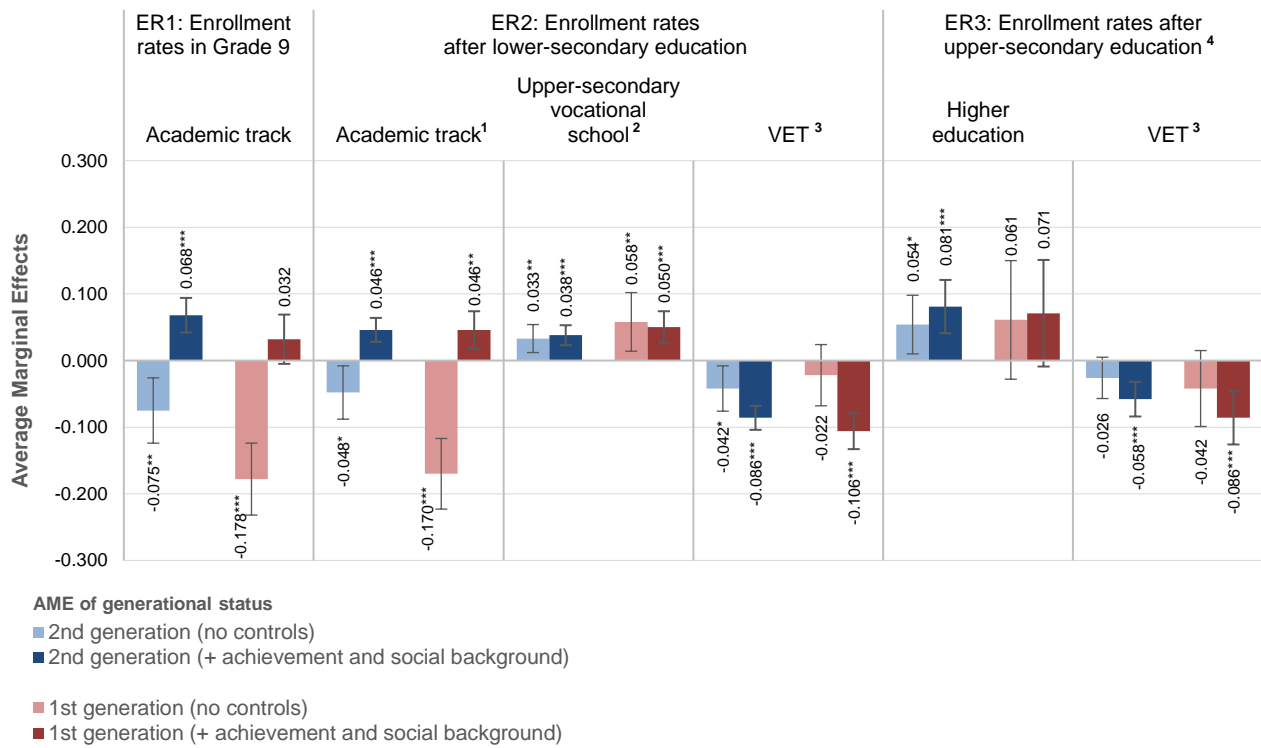
(C) Students' desired occupation in Grade 9 by immigrant background and parents' ISCED



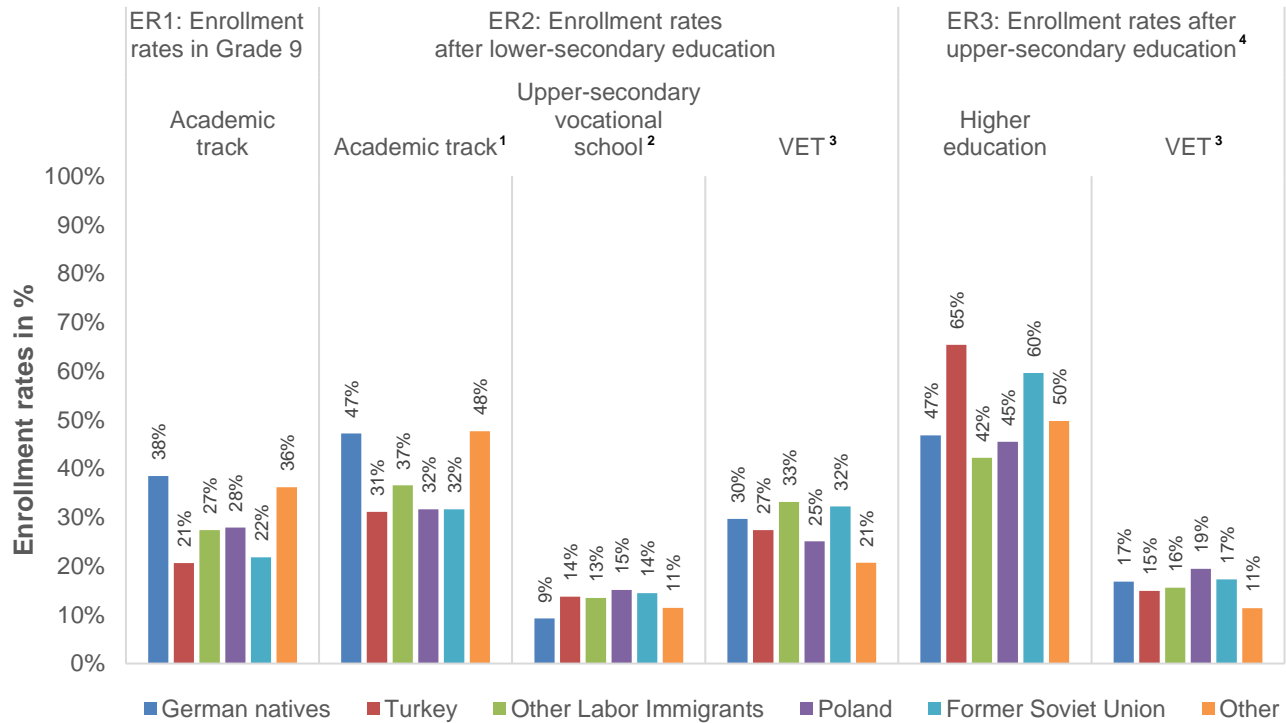
(D) Students' desired occupation in Grade 9 by immigrant background and parents' highest ISEI



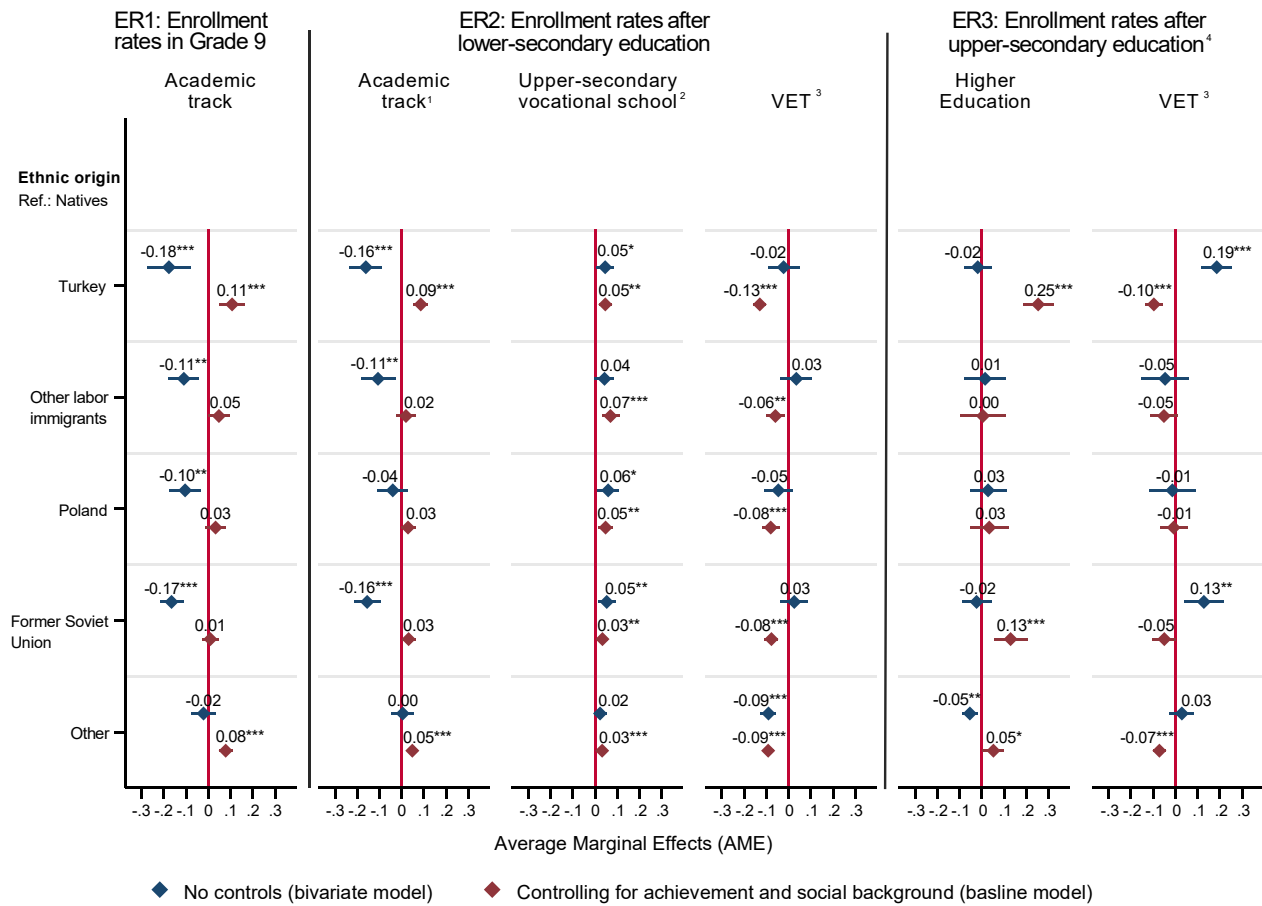
Supplementary Figure 1. Predictive Margins of educational and occupational aspirations by immigrant background and social background (2-way interactions). *Notes.* Robust standard errors on school level. Significant differences ($p < 0.05$) unless otherwise indicated. Estimates adjusted for gender, school track in Grade 9, federal state of residency, school grades, competence score in Maths, Reading, and ICT-Literacy, highest parental socio-economic status, and educational level. Imputed data ($m = 25$).



Supplementary Figure 2. Effect of generational status on enrollment rates in lower-secondary education (ER1), after lower-secondary education (ER2) and after upper-secondary education (ER3). *Notes.* ¹ Attending upper-secondary education of the general education system until Grade 12 or 13. ² Attending full-time vocational schools at upper-secondary level (e.g., *Fachoberschule*, *Berufliches Gymnasium*, etc.). ³ Entering company- or school-based vocational education and training (VET). ⁴ Includes only respondents who achieved an upper-secondary degree in an academic track. *Notes.* Baseline model adjusted for gender, school track in Grade 9 (not used for ER1), federal state of residency, school grades, competence score in Maths, Reading, and ICT-Literacy, highest parental socio-economic status, and educational level. KHB corrected estimates. Reference category for all significance tests are German natives. Robust standard errors on school level. Level of significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Imputed data ($m = 25$).



Supplementary Figure 3. Descriptive findings on students’ enrollment rates in lower-secondary education (ER1), after lower-secondary education (ER2) and after upper-secondary education (ER3) by students’ ethnic origin. *Notes.* ¹ Attending upper-secondary education of the general education system until Grade 12 or 13. ² Attending full-time vocational schools at upper-secondary level (e.g., *Fachoberschule*, *Berufliches Gymnasium*, etc.). ³ Entering company- or school-based vocational education and training (VET). ⁴ Includes only respondents who achieved an upper-secondary degree in an academic track. *Notes.* Imputed data ($m = 25$).



Supplementary Figure 4. Effect of ethnic origin on enrollment rates in lower-secondary education (ER1), after lower-secondary education (ER2) and after upper-secondary education (ER3). *Notes.* ¹ Attending upper-secondary education of the general education system until Grade 12 or 13. ² Attending full-time vocational schools at upper-secondary level (e.g., *Fachoberschule*, *Berufliches Gymnasium*, etc.). ³ Entering company- or school-based vocational education and training (VET). ⁴ Includes only respondents who achieved an upper-secondary degree in an academic track. *Notes.* Baseline model adjusted for gender, school track in Grade 9 (not used for ER1), federal state of residency, school grades, competence score in Maths, Reading, and ICT-Literacy, highest parental socio-economic status, and educational level. KHB corrected estimates. Reference category for all significance tests are German natives. Robust standard errors on school level. Imputed data ($m = 25$).