

**EARNING OR LEARNING? HOW EXTENDING CLOSING TIME IN THE RETAIL  
SECTOR AFFECTS YOUTH EMPLOYMENT AND EDUCATION**

**Online Appendix**

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## Appendix A: Additional data information and estimations of employment effects

**Table A1.** Share of working individuals aged 16-24 employed in the retail sector in different census years. The unit of measurement is municipalities.<sup>1</sup>

Year	Mean	Standard deviation	Min	Max	# Municipalities
1970	0.124	0.044	0.036	0.236	297
1980	0.130	0.046	0.024	0.246	297
1990	0.141	0.058	0.028	0.361	297

Share of working individuals aged 16-24 employed in the retail sector. Source: The Norwegian Social Science Data Service.

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<sup>1</sup> Due to budget cuts for Statistics Norway, the 1990 census included only random subsamples for most municipalities. Combined with small population sizes, this leads to missing values for employment in one or more sectors in many municipalities. Municipalities with missing observations for employment in the retail sector are excluded from the analysis. In total, this accounts for 157 municipalities.

**Table A2A.** Estimated employment equations: full results corresponding to Table 1A.

	(1) Log(Employment retail) Age 16-24 1980-1990	(2) Log(Employment retail) Age 16-24 1970-1980	(3) Log(Employment industry) Age 16-24 1980-1990	(4) Log(Employment industry) Age 16-24 1970-1980
Year 1990	0.00915 (0.133)		0.189 (0.149)	
Hours treated x 1990	0.0107*** (0.00354)		0.000397 (0.00513)	
Year 1980		0.392*** (0.142)		0.0383 (0.156)
Hours treated x 1980		-0.00294 (0.00363)		-0.00392 (0.00601)
log(population)	0.765*** (0.287)	1.069*** (0.329)	-0.483 (0.350)	0.349 (0.402)
log(Share aged 0-6)	0.191 (0.244)	0.307 (0.311)	0.635** (0.252)	-0.219 (0.333)
log(Share aged 7-15)	0.511* (0.260)	0.480 (0.396)	1.412*** (0.316)	-0.426 (0.534)
log(Share aged 16-20)	0.536** (0.217)	0.213 (0.240)	1.013*** (0.302)	0.257 (0.416)
log(Share aged 21-25)	0.514** (0.210)	0.665*** (0.250)	0.280 (0.226)	1.379*** (0.307)
log(Share aged 26-30)	0.0997 (0.210)	0.0610 (0.231)	0.346 (0.282)	-0.496* (0.280)
log(Share aged 31-35)	-0.410* (0.230)	0.150 (0.248)	0.105 (0.283)	0.480* (0.289)
log(Share aged 36-40)	0.346 (0.233)	0.271 (0.268)	-0.270 (0.260)	0.144 (0.324)
log(Share aged 41-45)	-0.248 (0.222)	-0.0375 (0.238)	0.204 (0.253)	0.0457 (0.312)
log(Share aged 46-50)	0.322 (0.232)	0.658*** (0.206)	-0.0441 (0.279)	-0.0540 (0.318)
log(Share aged 51-55)	0.0424 (0.204)	0.0231 (0.229)	0.487** (0.213)	-0.475* (0.253)
log(Share aged 56-60)	0.200 (0.198)	0.171 (0.229)	0.175 (0.227)	-0.0642 (0.300)
Leftist mayor	-0.0679* (0.0373)	-0.0177 (0.0418)	0.0453 (0.0492)	-0.0410 (0.0639)
Observations	594	594	544	544
R-squared	0.984	0.981	0.969	0.966
# Municipalities	297	297	272	272

Outcome variable is the log of number of employed individuals aged 16-24 in the respective sectors. Regressions include demographic controls (age distribution and population size) and the political orientation of the mayor. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A2B.** Estimated employment equations as in Table 1A, using only municipalities included in the analysis of educational outcomes.

	(1) log(Employment retail) 1980-1990	(2) log(Employment retail) 1970-1980	(3) log(Employment industry) 1980-1990	(4) log(Employment industry) 1970-1980
Year 1990	0.290** (0.140)		0.0471 (0.203)	
Hours treated x 1990	0.00662* (0.00367)		-0.00434 (0.00651)	
Year 1980		0.432*** (0.134)		-0.0343 (0.174)
Hours treated x 1980		0.00388 (0.00393)		-0.00468 (0.00621)
log(population)	0.511 (0.342)	0.746** (0.368)	-0.277 (0.598)	-0.0388 (0.458)
log(Share aged 0-6)	0.676** (0.284)	0.130 (0.343)	-0.316 (0.437)	-0.200 (0.432)
log(Share aged 7-15)	1.009*** (0.287)	0.386 (0.437)	1.130** (0.444)	-0.160 (0.674)
log(Share aged 16-20)	0.812*** (0.235)	0.0662 (0.252)	1.227*** (0.394)	0.676* (0.376)
log(Share aged 21-25)	0.521** (0.233)	0.454** (0.212)	0.237 (0.284)	1.396*** (0.474)
log(Share aged 26-30)	-0.0981 (0.244)	0.123 (0.245)	0.678* (0.392)	0.606* (0.319)
log(Share aged 31-35)	-0.582* (0.307)	0.0374 (0.285)	0.357 (0.423)	0.645 (0.449)
log(Share aged 36-40)	0.0763 (0.254)	0.198 (0.297)	-0.0841 (0.413)	0.508 (0.332)
log(Share aged 41-45)	-0.165 (0.254)	0.0265 (0.267)	0.142 (0.355)	0.723* (0.433)
log(Share aged 46-50)	-0.120 (0.245)	0.913*** (0.300)	0.125 (0.388)	-0.0495 (0.376)
log(Share aged 51-55)	0.0999 (0.183)	-0.100 (0.234)	0.242 (0.284)	-0.0331 (0.344)
log(Share aged 56-60)	0.313 (0.234)	0.0431 (0.216)	0.449 (0.314)	0.389 (0.368)
Leftist mayor	-0.0510 (0.0431)	0.00121 (0.0435)	0.0585 (0.0537)	-0.155* (0.0818)
Observations	302	302	256	256
R-squared	0.991	0.992	0.975	0.975
# Municipalities	151	151	128	128

Outcome variable is the log of number of employed individuals aged 16-24 in the respective sectors. Regressions include demographic controls (age distribution and population size) and the political orientation of the mayor. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A2C.** Estimated employment equations as in Table 1A, including year by region dummies.

	(1) Log(Employment retail) Age 16-24 1980-1990	(2) Log(Employment retail) Age 16-24 1970-1980	(3) Log(Employment industry) Age 16-24 1980-1990	(4) Log(Employment industry) Age 16-24 1970-1980
Year 1990	0.116 (0.202)		0.481 (0.659)	
Hours treated x 1990	0.0126** (0.00543)		0.000223 (0.00701)	
log(population)	0.382 (0.391)	1.324*** (0.494)	-0.202 (0.525)	0.700 (0.492)
log(Share aged 0-6)	0.189 (0.297)	0.405 (0.359)	0.394 (0.334)	-0.126 (0.412)
log(Share aged 7-15)	0.738** (0.340)	0.355 (0.528)	0.733 (0.457)	-0.154 (0.592)
log(Share aged 16-20)	0.698** (0.273)	0.384 (0.308)	0.766** (0.364)	0.0217 (0.454)
log(Share aged 21-25)	0.615** (0.244)	0.449 (0.305)	0.0691 (0.326)	1.280*** (0.408)
log(Share aged 26-30)	0.113 (0.295)	0.191 (0.278)	0.0560 (0.352)	-0.422 (0.330)
log(Share aged 31-35)	-0.415 (0.286)	0.236 (0.300)	-0.274 (0.393)	0.423 (0.321)
log(Share aged 36-40)	0.309 (0.333)	0.293 (0.305)	-0.287 (0.333)	-0.162 (0.374)
log(Share aged 41-45)	-0.300 (0.278)	0.165 (0.340)	0.0936 (0.320)	0.0770 (0.407)
log(Share aged 46-50)	0.370 (0.293)	0.588** (0.290)	-0.201 (0.378)	-0.319 (0.369)
log(Share aged 51-55)	0.0352 (0.240)	0.434 (0.305)	0.308 (0.271)	-0.192 (0.383)
log(Share aged 56-60)	0.221 (0.256)	0.261 (0.261)	-0.0886 (0.299)	-0.124 (0.331)
Leftist mayor	-0.0465 (0.0503)	0.0267 (0.0610)	0.0498 (0.0660)	0.0274 (0.0873)
Year 1980		0.554*** (0.209)		-0.646*** (0.217)
Hours treated x 1980		-0.00283 (0.00541)		-0.00137 (0.00808)
Observations	594	594	544	544
R-squared	0.989	0.986	0.980	0.978
# Municipalities	297	297	272	272
Region-year dummies	Yes	Yes	Yes	Yes

Outcome variable is the log of number of employed individuals aged 16-24 in the respective sectors. Regressions include demographic controls (age distribution and population size) and the political orientation of the mayor. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A2D.** Estimated employment equations as in Table 1A, for the rest of the population

	(1)	(2)	(3)	(4)
	Log(Employment retail)	Log(Employment retail)	Share	Share
	Age 25-plus 1980-1990	Age 25-pluss 1970-1980	Age 25-pluss 1980-1990	Age 25-pluss 1970-1980
Year 1990	0.179** (0.0801)		-0.0327 (0.0298)	
Hours treated x 1990	0.00503** (0.00224)		0.00123 (0.000763)	
Year 1980		0.351*** (0.102)		-3.26e-05 (0.0296)
Hours treated x 1980		-0.00366 (0.00262)		0.000100 (0.000948)
log(population)	1.583*** (0.170)	1.254*** (0.225)	-0.0703 (0.0592)	-0.0224 (0.0746)
log(Share age 0-6)	0.0431 (0.126)	-0.157 (0.187)	-0.00437 (0.0527)	0.0586 (0.0664)
log(Share age 7-15)	0.270* (0.164)	0.0727 (0.222)	-0.00523 (0.0572)	0.0250 (0.0863)
log(Share age 16-20)	0.253* (0.147)	0.0607 (0.170)	0.0396 (0.0453)	0.00843 (0.0600)
log(Share age 21-25)	0.0779 (0.111)	0.0839 (0.143)	0.0619 (0.0378)	0.138** (0.0603)
log(Share age 26-30)	0.105 (0.114)	0.0805 (0.165)	-0.0304 (0.0374)	-0.0360 (0.0470)
log(Share age 31-35)	0.0626 (0.130)	0.201 (0.193)	-0.102** (0.0483)	-0.0389 (0.0620)
log(Share age 36-40)	0.190 (0.133)	0.0864 (0.163)	-0.00252 (0.0421)	0.0306 (0.0557)
log(Share age 41-45)	-0.273** (0.121)	0.0746 (0.145)	-0.00978 (0.0468)	-0.0387 (0.0522)
log(Share age 46-50)	0.227* (0.121)	0.105 (0.148)	-0.0105 (0.0458)	0.0936* (0.0500)
log(Share age 51-55)	-0.0646 (0.0929)	0.0887 (0.113)	0.00687 (0.0400)	-0.0669 (0.0482)
log(Share age 56-60)	0.175 (0.110)	-0.166 (0.139)	-0.00909 (0.0382)	0.0677 (0.0503)
Leftist mayor	-0.0354 (0.0227)	0.0172 (0.0284)	-0.00767 (0.00790)	-0.0153 (0.0113)
Year 1980		0.351*** (0.102)		-3.26e-05 (0.0296)
Hours treated x 1980		-0.00366 (0.00262)		0.000100 (0.000948)
Observations	566	566	566	566
R-squared	0.994	0.990	0.712	0.680
# Municipalities	283	283	283	283

Outcome variable is the log of number of employed individuals aged 25+ in the respective sectors.

Regressions include demographic controls (age distribution and population size) and the political orientation of the mayor. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Appendix B: Additional estimations of graduation effects and robustness tests

**Table B1A.** High school graduation. Complete results corresponding to Table 3A.

	(1) With Controls	(2) Regional Trends	(3) With Controls	(4) Regional Trends
Hours treated, cohort > 1983	-0.000897** (0.000427)	-0.00153*** (0.000472)		
Hours treated x cohort 1982			0.000236 (0.000516)	0.000161 (0.000538)
Hours treated x cohort 1983			0.000430 (0.000632)	0.000263 (0.000697)
Hours treated x cohort 1984			-0.00118* (0.000706)	-0.00144* (0.000768)
Hours treated x cohort 1985			-0.000932 (0.000621)	-0.00124* (0.000731)
Hours treated x cohort 1986			-0.000532 (0.000671)	-0.000892 (0.000782)
Hours treated x cohort 1987			-5.46e-05 (0.000703)	-0.000453 (0.000921)
Parents' highest education: High school or less	0.215*** (0.00348)	0.215*** (0.00347)	0.215*** (0.00348)	0.215*** (0.00347)
Parents' highest education: Bachelor's or similar	0.419*** (0.00416)	0.419*** (0.00417)	0.419*** (0.00416)	0.419*** (0.00417)
Parents' highest education: Master's or similar	0.501*** (0.00557)	0.501*** (0.00557)	0.501*** (0.00557)	0.501*** (0.00557)
Female	0.0473*** (0.00323)	0.0472*** (0.00323)	0.0473*** (0.00323)	0.0472*** (0.00323)
Share of pop. between 16 and 20	1.071** (0.497)	0.327 (0.441)	1.030** (0.493)	0.378 (0.440)
Share of pop. above 60	-0.591 (0.366)	-0.861** (0.390)	-0.626* (0.365)	-0.839** (0.389)
Leftist mayor	0.00754 (0.00549)	0.0129** (0.00535)	0.00759 (0.00548)	0.0133** (0.00544)
First generation immigrant	-0.0532*** (0.0151)	-0.0518*** (0.0150)	-0.0532*** (0.0151)	-0.0518*** (0.0150)
Second generation immigrant	-0.000765 (0.0239)	-2.64e-05 (0.0239)	-0.000753 (0.0239)	-2.61e-05 (0.0239)
Regional unemp. last year	0.944* (0.571)	1.018* (0.587)	1.039* (0.574)	1.167* (0.594)
Observations	392,521	392,521	392,521	392,521
R-squared	0.101	0.101	0.101	0.101
Individual-level controls	Yes	Yes	Yes	Yes
Municipality-level controls	Yes	Yes	Yes	Yes
Region trend	No	Yes	No	Yes
p-value, F-test of no effect, cohorts 82-83			0.793	0.929
p-value, F-test of same effect, cohorts 84-87			0.248	0.477
# Municipalities	293	293	293	293

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table B1B.** Estimation results. High school graduation. No requirement on cohort sizes.

	(1)	(2)	(3)	(4)
	With Controls	Regional Trends	With Controls	Regional Trends
Hours treated, cohort > 1983	-0.000974** (0.000425)	-0.00125*** (0.000427)		
Hours treated x Cohort 1982			0.000226 (0.000495)	0.000257 (0.000509)
Hours treated x Cohort 1983			0.000541 (0.000601)	0.000582 (0.000647)
Hours treated x Cohort 1984			-0.00125* (0.000672)	-0.00116* (0.000702)
Hours treated x Cohort 1985			-0.000816 (0.000613)	-0.000687 (0.000664)
Hours treated x Cohort 1986			-0.000636 (0.000651)	-0.000481 (0.000694)
Hours treated x Cohort 1987			-0.000166 (0.000705)	2.84e-05 (0.000807)
Parents' highest education: High school or less	0.210*** (0.00339)	0.210*** (0.00338)	0.210*** (0.00339)	0.210*** (0.00338)
Parents' highest education: Bachelor's or similar	0.415*** (0.00396)	0.415*** (0.00396)	0.415*** (0.00396)	0.415*** (0.00396)
Parents' highest education: Master's or similar	0.498*** (0.00540)	0.498*** (0.00541)	0.498*** (0.00540)	0.498*** (0.00541)
Female	0.0500*** (0.00311)	0.0499*** (0.00311)	0.0500*** (0.00311)	0.0499*** (0.00311)
Share of pop. between 16 and 20	0.617 (0.454)	0.0176 (0.365)	0.582 (0.451)	0.0387 (0.364)
Share of pop. above 60	-0.622* (0.357)	-0.949*** (0.324)	-0.647* (0.356)	-0.928*** (0.324)
Leftist mayor	0.00759 (0.00515)	0.00927* (0.00501)	0.00764 (0.00515)	0.00955* (0.00508)
First gen. immigrant	-0.0548*** (0.0149)	-0.0530*** (0.0148)	-0.0547*** (0.0149)	-0.0530*** (0.0148)
Second gen. immigrant	-0.00419 (0.0240)	-0.00344 (0.0241)	-0.00416 (0.0240)	-0.00339 (0.0241)
Regional unemp. last year	1.110* (0.569)	1.039* (0.544)	1.165** (0.573)	1.157** (0.548)
Observations	427,353	427,353	427,353	427,353
R-squared	0.102	0.103	0.102	0.103
Individual-level controls	Yes	Yes	Yes	Yes
Municipality-level controls	Yes	Yes	Yes	Yes
Region trend	No	Yes	No	Yes
p-value, F-test of no effect, cohorts 82-83			0.661	0.664
p-value, F-test of same effect, cohorts 84-87			0.324	0.308
# Municipalities	449	449	449	449

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



**Table B1C.** Estimation results. High school graduation. Spatially clustered standard errors.

	(1)	(2)	(3)	(4)
	50 km cut-off	100 km cut-off	50 km cut-off	100 km cut-off
Hours treated, cohort > 1983	-0.00153*** (0.000460)	-0.00153*** (0.000463)		
Hours treated x Cohort 1982			0.000161 (0.000578)	0.000161 (0.000581)
Hours treated x Cohort 1983			0.000263 (0.000659)	0.000263 (0.000682)
Hours treated x Cohort 1984			-0.00144** (0.000716)	-0.00144** (0.000713)
Hours treated x Cohort 1985			-0.00124* (0.000748)	-0.00124 (0.000769)
Hours treated x Cohort 1986			-0.000892 (0.000845)	-0.000892 (0.000875)
Hours treated x Cohort 1987			-0.000453 (0.000936)	-0.000453 (0.000972)
Observations	392,521	392,521	392,521	392,521
R-squared	0.085	0.085	0.085	0.085
Individual level controls	Yes	Yes	Yes	Yes
Municipality level controls	Yes	Yes	Yes	Yes
Region trend	Yes	Yes	Yes	Yes
p-value, F-test of no effect, cohorts 82-83			0.922	0.926
p-value, F-test of same effect, cohorts 84-87			0.481	0.465

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Spatially clustered Conley standard errors in parentheses. Columns (1) and (3) use a cut-off at 50 km from the population center in the municipality. Columns (2) and (4) use a 100 km cut-off. \*\*\* p<0.01, \*\* p<0.05, \*\*\* p<0.1.

**Table B2A.** Estimation results. High school graduation. Dichotomous treatment variables.

	(1)	(2)	(3)	(4)
	With Controls	Region Trends	With Controls	Region Trends
Expanded opening hours x cohort > 1983	-0.0125*	-0.0136**		
	(0.00688)	(0.00610)		
Expanded opening hours x cohort 1982			0.00425	0.00513
			(0.00830)	(0.00879)
Expanded opening hours x cohort 1983			-9.47e-05	0.00135
			(0.0107)	(0.0115)
Expanded opening hours x cohort 1984			-0.0148	-0.0128
			(0.0104)	(0.0111)
Expanded opening hours x cohort 1985			-0.0167*	-0.0137
			(0.00983)	(0.0104)
Expanded opening hours x cohort 1986			-0.00989	-0.00593
			(0.0113)	(0.0108)
Expanded opening hours x cohort 1987			-0.00307	0.00198
			(0.0107)	(0.0125)
First generation immigrant	-0.0532***	-0.0519***	-0.0532***	-0.0519***
	(0.0151)	(0.0150)	(0.0151)	(0.0150)
Second generation immigrant	-0.000717	-6.83e-05	-0.000784	-0.000104
	(0.0239)	(0.0239)	(0.0239)	(0.0239)
Parents' highest education: High school or less	0.215***	0.215***	0.215***	0.215***
	(0.00348)	(0.00347)	(0.00348)	(0.00347)
Parents' highest education: Bachelor's or similar	0.419***	0.419***	0.419***	0.419***
	(0.00416)	(0.00417)	(0.00416)	(0.00417)
Parents' highest education: Master's or similar	0.501***	0.501***	0.501***	0.501***
	(0.00557)	(0.00557)	(0.00557)	(0.00557)
Female	0.0473***	0.0472***	0.0473***	0.0472***
	(0.00323)	(0.00323)	(0.00323)	(0.00323)
Share of pop. between 16 and 20	1.032**	0.483	1.016**	0.459
	(0.474)	(0.433)	(0.475)	(0.431)
Share of pop. above 60	-0.623*	-0.853**	-0.627*	-0.808**
	(0.346)	(0.387)	(0.356)	(0.385)
Leftist mayor	0.00759	0.0134**	0.00760	0.0134**
	(0.00572)	(0.00544)	(0.00572)	(0.00546)
Regional unemp. last year	0.795	0.869	0.872	0.992*
	(0.557)	(0.573)	(0.558)	(0.580)
Observations	392,521	392,521	392,521	392,521
R-squared	0.101	0.101	0.101	0.101
Individual-level controls	Yes	Yes	Yes	Yes
Municipality-level controls	Yes	Yes	Yes	Yes
Region trends	No	Yes	No	Yes
p-value of equality 1982-1983			0.776	0.761
p-value of equality 1984-1987			0.377	0.267
# Municipalities	293	293	293	293

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table B2B.** High school graduation, multiple treatment levels.

	(1) With Controls	(2) Regional Trends	(3) With Controls	(4) Regional Trends
Treated above median, cohort > 1983	-0.0193** (0.00748)	-0.0269*** (0.00735)		
Treated median and below, cohort > 1983	-0.00855 (0.00729)	-0.00907 (0.00618)		
Treated above median x cohort 1982			-0.00178 (0.00853)	-0.00235 (0.00900)
Treated above median x cohort 1983			0.00200 (0.0106)	0.000393 (0.0117)
Treated above median x cohort 1984			-0.0268** (0.0109)	-0.0293** (0.0122)
Treated above median x cohort 1985			-0.0246** (0.0105)	-0.0272** (0.0118)
Treated above median x cohort 1986			-0.0179 (0.0120)	-0.0209 (0.0129)
Treated above median x cohort 1987			-0.00747 (0.0118)	-0.0105 (0.0148)
Treated median and below x cohort 1982			0.00780 (0.00916)	0.00860 (0.00963)
Treated median and below x cohort 1983			-0.00165 (0.0118)	-0.000266 (0.0123)
Treated median and below x cohort 1984			-0.00780 (0.0112)	-0.00598 (0.0115)
Treated median and below x cohort 1985			-0.0123 (0.0107)	-0.00964 (0.0109)
Treated median and below x cohort 1986			-0.00528 (0.0122)	-0.00189 (0.0111)
Treated median and below x cohort 1987			-0.000448 (0.0114)	0.00370 (0.0129)
Parents' highest education: High school or less	0.215*** (0.00348)	0.215*** (0.00347)	0.215*** (0.00348)	0.215*** (0.00347)
Parents' highest education: Bachelor's or similar	0.419*** (0.00417)	0.419*** (0.00417)	0.419*** (0.00417)	0.419*** (0.00417)
Parents' highest education: Master's or similar	0.501*** (0.00557)	0.501*** (0.00557)	0.501*** (0.00557)	0.501*** (0.00557)
Female	0.0473*** (0.00323)	0.0472*** (0.00323)	0.0473*** (0.00323)	0.0472*** (0.00323)
Share of pop. between 16 and 20	1.071** (0.488)	0.351 (0.437)	1.040** (0.482)	0.364 (0.435)
Share of pop. above 60	-0.575 (0.360)	-0.930** (0.387)	-0.606* (0.360)	-0.886** (0.388)
Leftist mayor	0.00730 (0.00542)	0.0121** (0.00530)	0.00734 (0.00542)	0.0124** (0.00540)
First generation immigrant	-0.0533*** (0.0151)	-0.0518*** (0.0150)	-0.0532*** (0.0150)	-0.0518*** (0.0150)
Second generation immigrant	-0.000674 (0.0239)	2.71e-05 (0.0239)	-0.000738 (0.0240)	-5.29e-05 (0.0240)
Regional unemp. last year	0.895 (0.555)	0.995* (0.589)	1.009* (0.556)	1.151* (0.594)
Observations	392,521	392,521	392,521	392,521
R-squared	0.101	0.101	0.101	0.101
Individual-level controls	Yes	Yes	Yes	Yes
Municipality-level controls	Yes	Yes	Yes	Yes

**Table B2B. CONT.** High school graduation, multiple treatment levels.

	(1)	(2)	(3)	(4)
	With	Regional	With	Regional
	Controls	Trends	Controls	Trends
	No	Yes	No	Yes
Region trend				
p-value, F-test of no effect treated above median, cohorts 82-83			0.891	0.923
p-value, F-test of same effect treated above median, cohorts 84-87			0.219	0.322
p-value, F-test of no effect treated median and below, cohorts 82-83			0.428	0.423
p-value, F-test of same effect treated median and below, cohorts 84-87			0.595	0.505
# Municipalities	293	293	293	293

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table B2C. High school graduation. Excluding municipalities without regulations in 1982.**

	(1)	(2)	(3)	(4)
	With Controls	Regional Trends	With Controls	Regional Trends
Hours treated, cohort > 1983	-0.000798* (0.000437)	-0.00148*** (0.000495)		
Hours treated x cohort 1982			0.000354 (0.000532)	0.000298 (0.000560)
Hours treated x cohort 1983			0.000507 (0.000656)	0.000377 (0.000729)
Hours treated x cohort 1984			-0.00112 (0.000726)	-0.00133* (0.000800)
Hours treated x cohort 1985			-0.000753 (0.000632)	-0.000986 (0.000766)
Hours treated x cohort 1986			-0.000315 (0.000688)	-0.000562 (0.000821)
Hours treated x cohort 1987			0.000141 (0.000718)	-8.39e-05 (0.000976)
Parents' highest education: High school or less	0.215*** (0.00353)	0.215*** (0.00353)	0.215*** (0.00353)	0.215*** (0.00353)
Parents' highest education: Bachelor's or similar	0.419*** (0.00423)	0.419*** (0.00424)	0.419*** (0.00424)	0.419*** (0.00424)
Parents' highest education: Master's or similar	0.501*** (0.00564)	0.501*** (0.00563)	0.501*** (0.00564)	0.501*** (0.00563)
Female	0.0469*** (0.00328)	0.0468*** (0.00328)	0.0469*** (0.00328)	0.0468*** (0.00328)
First generation immigrant	-0.0519*** (0.0154)	-0.0505*** (0.0154)	-0.0518*** (0.0155)	-0.0505*** (0.0154)
Second generation immigrant	-0.00228 (0.0245)	-0.00152 (0.0245)	-0.00225 (0.0245)	-0.00151 (0.0245)
Share of pop. between 16 and 20	1.135** (0.499)	0.470 (0.443)	1.087** (0.496)	0.542 (0.437)
Share of pop. above 60	-0.555 (0.369)	-0.796* (0.406)	-0.595 (0.367)	-0.762* (0.405)
Leftist mayor	0.00754 (0.00564)	0.0132** (0.00551)	0.00761 (0.00563)	0.0136** (0.00561)
Regional unemp. last year	0.923 (0.564)	1.161** (0.588)	1.020* (0.564)	1.333** (0.593)
Observations	383,462	383,462	383,462	383,462
R-squared	0.101	0.101	0.101	0.101
Individual-level controls	Yes	Yes	Yes	Yes
Municipality-level controls	Yes	Yes	Yes	Yes
Region trend	No	Yes	No	Yes
p-value, F-test of no effect, cohorts 82-83			0.724	0.849
p-value, F-test of same effect, cohorts 84-87			0.206	0.333
# Municipalities	273	273	273	273

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60,) are included in all specifications. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table B2D.** Estimation results. High school graduation. Separate trends before and after treatment.

	(1) Separate Regional Trends before and after treatment	(2) Separate Regional Trends before and after treatment
Hours treated, cohort > 1983		-0.000926* (0.000512)
Hours treated x Cohort 1982	-3.90e-05 (0.000558)	
Hours treated x Cohort 1983	-0.000148 (0.000749)	
Hours treated x Cohort 1984	-0.00117 (0.000770)	
Hours treated x Cohort 1985	-0.00115 (0.000732)	
Hours treated x Cohort 1986	-0.000966 (0.000790)	
Hours treated x Cohort 1987	-0.000657 (0.000935)	
Observations	392,521	392,521
R-squared	0.102	0.102
Individual level controls	Yes	Yes
Municipality level controls	Yes	Yes
Region trend	Yes	Yes
p-value, F-test of no effect, cohorts 82-83	0.976	
p-value, F-test of same effect, cohorts 84-87	0.868	
# Municipalities	293	293

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (gender, immigration status, and parental education level) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

## Appendix C: Additional estimations heterogeneous effects

**Table C1.** Heterogeneous effects by parental education (Columns (2)-(3)) and gender (Columns (4)-(5)). Complete results corresponding to Table 4.

	(1) Graduated	(2) Graduated Parents have high school or less	(3) Graduated Parents have more than high school	(4) Graduated Girls	(5) Graduated Boys
Hours treated x cohort > 1983	-0.00153*** (0.000472)	-0.00163*** (0.000534)	-0.00150* (0.000767)	-0.00181*** (0.000585)	-0.00121* (0.000627)
First generation immigrant	-0.0518*** (0.0150)	-0.0302 (0.0192)	-0.113*** (0.0173)	-0.0630*** (0.0176)	-0.0443** (0.0178)
Second generation immigrant	-2.64e-05 (0.0239)	0.0162 (0.0351)	-0.0332 (0.0221)	0.00915 (0.0386)	-0.00712 (0.0218)
Parents' highest education: more than high school	0.419*** (0.00417)			0.433*** (0.00477)	0.404*** (0.00500)
Female	0.0472*** (0.00323)	0.0481*** (0.00374)	0.0444*** (0.00365)		
Share of pop. between 16 and 20	0.327 (0.441)	0.269 (0.478)	-0.172 (0.801)	0.117 (0.583)	0.525 (0.626)
Share of pop. above 60	-0.861** (0.390)	-0.817* (0.432)	-0.781 (0.594)	-0.888* (0.532)	-0.778 (0.487)
Leftist mayor	0.0129** (0.00535)	0.0107* (0.00583)	0.0195** (0.00978)	0.0160** (0.00723)	0.00852 (0.00695)
Regional unemp. last year	1.018* (0.587)	0.726 (0.655)	1.951** (0.991)	0.733 (0.774)	1.315 (0.819)
Parents' highest education: High school or less		0.214*** (0.00353)		0.228*** (0.00388)	0.202*** (0.00392)
Parents' highest education: Master's or similar			0.0846*** (0.00377)	0.0653*** (0.00445)	0.0980*** (0.00614)
Observations	392,521	305,253	87,268	192,973	199,548
R-squared	0.101	0.051	0.024	0.105	0.099
# Municipalities	293	293	293	293	293

Outcome variable is a dummy for completing upper secondary education within five years of completing lower secondary education. Municipality and cohort fixed effects, as well as individual-level controls (immigration) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Regressions by parental education also include a gender dummy, and the model in Column (2) controls for highest parental education being high school, while Column (3) controls for highest parental education being a master's degree or similar. Regressions by gender include parental controls for parental education level. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Appendix D: Additional estimations of longer-run effects

**Table D1.** Completed years of education. Complete results corresponding to Table 5.

	(1) Years of education	(2) Years of education Parents have high school or less	(3) Years of education Parents have more than high school	(4) Years of education Girls	(5) Years of education Boys
Hours treated x cohort > 1983	-0.00479*** (0.00181)	-0.00465** (0.00189)	-0.00572 (0.00397)	-0.00606** (0.00264)	-0.00333 (0.00241)
First generation immigrant	-0.350*** (0.0932)	-0.0898 (0.104)	-1.007*** (0.136)	-0.310** (0.128)	-0.390*** (0.102)
Second generation immigrant	0.0216 (0.134)	0.199 (0.189)	-0.333** (0.134)	-0.0292 (0.239)	0.0726 (0.107)
Parents' highest education: more than high school	2.601*** (0.0210)			2.655*** (0.0236)	2.548*** (0.0247)
Parents' highest education: High school or less	1.128*** (0.0131)	1.127*** (0.0135)		1.176*** (0.0153)	1.081*** (0.0162)
Parents' highest education: Master's or similar	1.039*** (0.0287)		1.033*** (0.0258)	0.947*** (0.0370)	1.124*** (0.0304)
Female	0.120*** (0.0149)	0.127*** (0.0169)	0.0980*** (0.0166)		
Share of pop. between 16 and 20	0.333 (1.791)	-1.214 (1.969)	4.430 (3.959)	0.716 (2.842)	0.0829 (2.124)
Share of pop. above 60	-2.866** (1.337)	-3.183** (1.580)	-1.938 (2.917)	-1.865 (2.056)	-3.798** (1.677)
Leftist mayor	0.0497** (0.0196)	0.0597*** (0.0205)	-0.0190 (0.0587)	0.0639** (0.0309)	0.0356 (0.0242)
Regional unemp. last year	3.036 (2.163)	3.180 (2.440)	2.541 (4.309)	4.661 (3.024)	1.685 (3.046)
Observations	392,313	305,079	87,234	192,874	199,439
R-squared	0.177	0.066	0.052	0.180	0.178
# Municipalities	293	293	293	293	293

Outcome variable is completed years of education at age 40. Municipality and cohort fixed effects, as well as individual-level controls (immigration status) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population of high school age and above 60), are included in all specifications. Regressions by parental education also include a gender dummy. Regressions by gender include parental controls for parental education level. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \*\*\* p<0.1



**Table D2.** Earnings at age 39. Separate interaction effects for each cohort

	(1)	(2)	(3)	(4)	(5)
	ln(Earnings at age 39)	ln(Earnings at age 39) Parents have high school or less	ln(Earnings at age 39) Parents have more than high school	ln(Earnings at age 39) Boys	ln(Earnings at age 39) Girls
Hours treated x Cohort 1982	0.00131* (0.000708)	0.00149* (0.000788)	0.000610 (0.00176)	0.00119 (0.00101)	0.00133 (0.00103)
Hours treated x Cohort 1983	0.000925 (0.000846)	0.000876 (0.000825)	0.00122 (0.00205)	0.000715 (0.00105)	0.00112 (0.00126)
Hours treated x Cohort 1984	0.000763 (0.000853)	0.00107 (0.000928)	-0.000250 (0.00176)	0.000695 (0.00105)	0.000762 (0.00118)
Hours treated x Cohort 1985	0.000437 (0.000947)	0.000410 (0.000993)	0.000601 (0.00207)	0.000892 (0.00112)	-0.000154 (0.00140)
Hours treated x Cohort 1986	0.00133 (0.00106)	0.00153 (0.00109)	0.000786 (0.00233)	0.000809 (0.00130)	0.00174 (0.00142)
Hours treated x Cohort 1987	0.00111 (0.00115)	0.000832 (0.00123)	0.00180 (0.00244)	0.00107 (0.00146)	0.000979 (0.00154)
First generation immigrant	-0.0813*** (0.0236)	-0.0488 (0.0304)	-0.162*** (0.0401)	-0.0879*** (0.0244)	-0.0700* (0.0359)
Second generation immigrant	-0.0336 (0.0451)	0.00968 (0.0343)	-0.121 (0.0971)	0.0107 (0.0478)	-0.0778 (0.0609)
Parents' highest education: High school	0.120*** (0.00343)	0.120*** (0.00343)		0.116*** (0.00477)	0.123*** (0.00471)
Parents' highest education: Bachelor's or similar	0.244*** (0.00399)			0.235*** (0.00713)	0.253*** (0.00644)
Parents' highest education: Master's or similar	0.326*** (0.00648)		0.0822*** (0.00694)	0.320*** (0.00957)	0.332*** (0.0132)
Female	-0.420*** (0.00719)	-0.424*** (0.00802)	-0.406*** (0.00841)		
Share of pop. between 16 and 20	0.319 (0.513)	-0.325 (0.596)	2.921** (1.248)	-0.239 (0.685)	0.949 (0.756)
Share of pop. above 60	-0.339 (0.401)	-0.559 (0.451)	0.0805 (0.871)	-0.279 (0.489)	-0.427 (0.565)
Leftist mayor	-0.00879 (0.00696)	-0.00768 (0.00687)	-0.0220 (0.0153)	-0.0107 (0.00979)	-0.00727 (0.00909)
Regional unemp. last year	0.0746 (0.662)	0.149 (0.726)	-0.270 (1.609)	-0.855 (0.803)	1.174 (1.056)
Observations	362,976	282,528	80,448	185,081	177,895
R-squared	0.134	0.128	0.107	0.055	0.060
# Municipalities	293	293	293	293	293

Outcome variable is log of earnings at age 39 in inflation-adjusted Norwegian kroner. Municipality and cohort fixed effects, as well as individual-level controls (immigration status) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population in high school age and above 60), are included in all specifications. Regressions by parental education also include a gender dummy. Regressions by gender include parental controls for parental education level. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table D3. Earnings at age 39. Excluding cohorts 1986-1987**

	(1)	(2)	(3)	(4)	(5)
	ln(earnings at 39)	ln(earnings at 39) Parents have high school or less	ln(earnings at 39) Parents have more than high school	ln(earnings at 39) Boys	ln(earnings at 39) Girls
Hours treated x cohort > 1983 & cohort < 1986	-0.000214 (0.000764)	-1.12e-05 (0.000760)	-0.00106 (0.00163)	-0.000193 (0.000936)	-0.000367 (0.00102)
First generation immigrant	-0.0635** (0.0280)	-0.0406 (0.0335)	-0.117*** (0.0367)	-0.0731** (0.0299)	-0.0466 (0.0489)
Second generation immigrant	-0.0189 (0.0454)	0.0162 (0.0341)	-0.0906 (0.106)	0.0127 (0.0476)	-0.0504 (0.0708)
Parents' highest education: High school	0.115*** (0.00409)	0.1159*** (0.00409)		0.112*** (0.00562)	0.119*** (0.00578)
Parents' highest education: Bachelor's or similar	0.242*** (0.00499)			0.235*** (0.00839)	0.249*** (0.00733)
Parents' highest education: Master's or similar	0.323*** (0.00740)		0.081*** (0.0075)	0.321*** (0.0121)	0.325*** (0.0154)
Female	-0.439*** (0.00727)	-0.442*** (0.00826)	-0.432*** (0.00950)		
Share of pop. between 16 and 20	0.479 (0.840)	0.0207 (0.925)	2.399 (1.977)	0.497 (1.095)	0.458 (1.249)
Share of pop. above 60	-0.945 (0.637)	-0.852 (0.659)	-1.898 (1.468)	-1.361* (0.768)	-0.484 (0.899)
Leftist mayor	-0.0138 (0.00936)	-0.00998 (0.00910)	-0.0389* (0.0198)	-0.0257** (0.0118)	-0.00133 (0.0117)
Regional unemp. last year	-0.335 (1.111)	-0.725 (1.150)	1.017 (2.624)	-1.538 (1.191)	1.205 (1.851)
Observations	258,513	203,878	54,635	132,010	126,503
R-squared	0.128	0.122	0.107	0.048	0.042
# Municipalities	292	292	292	292	292

Outcome variable is log of earnings at age 39 in inflation-adjusted Norwegian kroner. Municipality and cohort fixed effects, as well as individual-level controls (immigration status) and municipality-level controls (dummy for political affiliation of the mayor, lagged unemployment rate, share of population in high school age and above 60), are included in all specifications. Regressions by parental education also include a gender dummy. Regressions by gender include parental controls for parental education level. Standard errors clustered by municipality in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Appendix E: Data definitions and sources

**Table E1.** Data definitions and sources.

Variable	Description	Source
<b>High school graduation</b>	Graduated from high school within five years of graduating from compulsory school	Register data from Statistics Norway
<b>First gen. immigrant</b>	=1 if first generation immigrant	Register data from Statistics Norway
<b>Second gen. immigrant</b>	=1 if second generation immigrant	Register data from Statistics Norway
<b>Female</b>	=1 if female	Register data from Statistics Norway
<b>Parents completed high school</b>	=1 if highest parental education is high school	Register data from Statistics Norway
<b>Parents completed short higher education</b>	=1 if highest parental education is equal to bachelor's degree or equivalent	Register data from Statistics Norway
<b>Parents completed long higher education</b>	=1 if highest parental education is equal to master's degree or PhD	Register data from Statistics Norway
<b>Age younger than 20</b>	Share of population in municipality younger than 20 years	Data from Fiva et al. (2011)
<b>Age older than 60</b>	Share of population in municipality older than 60 years	Data from Fiva et al. (2011)
<b>Population size</b>		Data from Fiva et al. (2011)
<b>Leftist mayor</b>	=1 if mayor is socialist	Data from Fiva et al. (2011)
<b>Regional unemployment (t-1)</b>	Regional unemployment rate previous year	Data from Norwegian Social Data Services
<b>Earnings</b>	All pension qualifying income as registered by the tax authorities.	Register data from Statistics Norway
<b>Years of education</b>		Register data from Statistics Norway
<b>Opening Hours 1982</b>	Maximum allowed opening hours given by municipal law in 1982	NOU 1984
<b>Opening Hours 1985/1990</b>	Survey data from The Norwegian Research Institute of Commerce/Norwegian Competition Authority	Shjøll (2016)
<b>Sectorial employment</b>	Number of individuals employed by sector and age group. Employed defined as 100 or more working hours in the last year.	Norwegian Social Sciences Data Services

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<b>Population density</b>	Inhabitants per square kilometer measured in 1988	Norwegian Social Sciences Data Services
<b>Higher-(lower-) municipalities income</b>	Average taxable personal income being above (below) the median in 1980.	Norwegian Social Sciences Data Services
<b>Low (high) frequency of social benefits</b>	Number of cases of social benefit payments per capita being above (below) the median in 1980	Norwegian Social Sciences Data Services

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