

Evaluating Sweden’s 1977 Higher Education Expansion*

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Abstract

In 1977, Sweden established twelve higher education institutions (HEIs) in sixteen municipalities. Using register data on high school graduates from 1973–1987 and matched difference-in-differences, we estimate that local HEI access raised higher education attainment at age 40 by 1.3 percentage points. The attainment differential is largest for students with middle-range grades. We detect no average effects on employment, income, or residence in the high school municipality, but marriage increases by 3.1 percentage points. The modest attainment effect is consistent with limited initial capacity to take on new students.

Keywords: higher education expansion; access to education; policy evaluation; educational attainment

JEL Codes: I23, I24, I28, J24

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1 Introduction

Many countries have expanded higher education by establishing institutions outside major cities (Schofer and Meyer, 2005). Proximity can reduce attendance costs and influence participation (Card, 1993; Spiess and Wrohlich, 2010). Finnish evidence links university expansion to educational attainment across generations (Suhonen and Karhunen, 2019), while Norway’s expansion shifted fields of study without raising overall attainment (Knutsen, Modalsli and Rønning, 2020). In Turkey, expansion increased attainment without significantly narrowing the gender gap (Caner, Derebasoglu and Okten, 2024); in China, gains favored students from advantaged backgrounds (Ou and Hou, 2019). Access can also change institutional choice: US community colleges benefit some students who otherwise would not enroll, but divert others from four-year institutions (Mountjoy, 2022).

Sweden’s 1977 reform established twelve higher education institutions (HEIs) in sixteen municipalities. To our knowledge, we are the first to evaluate its effects on individual attainment and long-run outcomes using register data and matched difference-in-differences. Swedish studies examine regional productivity following decentralization (Andersson, Quigley and Wilhelmson, 2004, 2009) and regional growth following later university-status upgrades (Bonander, Jakobsson, Podestà and Svensson, 2016). Building on the institutional account in Bergh, Hållerfors, Tåg and Åstebro (2024), we follow fifteen graduation cohorts to age 40, examining attainment responses by prior grades and whether improved access translates into adult economic outcomes. Following graduates wherever they subsequently live distinguishes these individual outcomes from changes in the composition of local populations.

We estimate a 1.3 percentage point increase in HEI attainment at age 40, with a larger differential for students with middle-range grades than for those with low grades. We detect no average employment or income effects. These modest effects are consistent with the institutions’ limited initial capacity to take on new students (Bergh et al., 2024).

2 The 1977 reform

Before 1977, the established institutions were concentrated in Stockholm, Gothenburg, Lund, Uppsala, Linköping, Umeå, and Luleå. Following the 1973 government commission (SOU 1973:2), parliament decided in 1975 to expand geographic access. Twelve new HEIs opened in sixteen locations in 1977. A stated aim was to enable students from less-educated and lower-income families to study without relocating (Bergh et al., 2024; Andersson et al., 2004).

The new institutions initially focused on teaching, offering programs of varying lengths with limited resources for expansion (Bergh et al., 2024). Geographic expansion therefore need not imply a large immediate increase in capacity.

3 Data and empirical strategy

We use Swedish register data (the LISA database) on high school graduates from 1973–1987, restricting the analysis to observations with the information required for sample construction. HEI attainment is an indicator derived from registered education at age 40. Other outcomes

are employment, marriage, and residence in the high school municipality at age 40, and mean log real total income over available observations at ages 37–40. Total income combines labor and capital income.

Twelve new HEIs opened in sixteen locations in 1977 (Figure 2). Treatment is graduation from high school in a municipality receiving an HEI in 1977. We exclude the seven established-institution municipalities and municipalities treated in 1983. Controls come from municipalities without an HEI during the study window, including those first treated in 1988 or later and those never treated.

Matching is conducted separately for each treated municipality within cells defined by graduation cohort, gender, GPA decile, and parental HEI attainment. Parental education uses the highest attainment observed in the registers. GPA is standardized by cohort; deciles are constructed within each municipality-specific comparison sample and cohort. Controls are randomly selected without replacement within each cell, up to the number of treated graduates. The samples are then stacked, so controls may appear in several stacks. The reported sample contains 331,551 distinct individuals and 360,166 observations. Table 1 shows close balance, including on distance and the municipal tax-base measure, which are not matching variables.

The cohort-specific model is

$$y_{icm} = \sum_{k=1974}^{1987} \delta_k \mathbf{1}\{c = k\} D_m + \pi_c + \sigma_m + \epsilon_{icm}, \quad (1)$$

where D_m denotes treatment, c the graduation cohort, and m the high school municipality. Cohort and municipality fixed effects are π_c and σ_m ; 1973 is the reference cohort. The pooled model instead uses a common post-period indicator:

$$y_{icm} = \gamma D_m P_c + \lambda P_c + \sigma_m + \epsilon_{icm}, \quad P_c = \mathbf{1}\{c \geq 1976\}. \quad (2)$$

Thus, the pooled model includes a post indicator and municipality fixed effects, rather than separate cohort fixed effects. Standard errors are clustered by municipality. Starting the post period in 1976 allows for anticipation after the announcement. The design compares changes across graduation cohorts in treated municipalities with changes among matched graduates elsewhere. Municipality effects absorb persistent local differences; matching balances observed graduate characteristics. Identification requires parallel untreated trends conditional on this sample construction. Differential local shocks or changing selection into high school municipalities could still violate that assumption; the two non-reference pre-period coefficients provide only a limited check. Exposure is assigned by high school location, not subsequent enrollment or residence, so the estimates capture the effect of local access rather than the return to attending a new HEI.

4 Results

Figure 1 reports cohort-specific attainment effects. Table 2, Panel A, gives a pooled effect of 1.26 percentage points (s.e. 0.55; $p < 0.05$), compared with a matched-sample outcome mean of

34.4 percent.

Panel B interacts treatment and post status with GPA group, including all lower-order terms. Relative to the low-GPA group (deciles 1–3), the medium group (4–7) has an attainment differential of 2.39 percentage points (s.e. 0.97); the high group (8–10) has a differential of 1.39 points (s.e. 1.10). These are differences in treatment effects, not the groups’ total effects. The figure suggests more persistent gains in the medium group, without establishing that other groups are unaffected.

The average employment effect is 0.33 percentage points (s.e. 0.35). The log-income effect is 0.00944 (s.e. 0.0126), giving an approximate normal-based 95 percent interval of $[-0.0153, 0.0341]$: roughly -1.5 to 3.5 percent after exponentiation. Economically meaningful income gains remain within this interval. There is also a positive high-versus-low-GPA income differential of 0.0656 (s.e. 0.0258), so the average income result does not imply no heterogeneity. Residence in the high school municipality shows no detectable average response; this outcome does not capture all residential moves. Marriage increases by 3.09 percentage points (s.e. 0.97).

5 Additional analyses

5.1 Parental education

Table 3 reports the treatment-effect differential associated with having a parent with HEI attainment. The estimate is 0.000640 (s.e. 0.0142), with an approximate normal-based 95 percent interval of $[-0.0272, 0.0285]$. This is too imprecise to establish equal effects across parental backgrounds. Table 4 reports how GPA-group differentials vary by parental education. Neither reported interaction is statistically significant, but their uncertainty likewise precludes a strong conclusion about equality of effects. These are interaction coefficients, not regressions estimated separately by parental education.

5.2 Alternative comparison groups

Including established-institution municipalities among the controls raises the pooled attainment estimate from 1.26 to 1.99 percentage points (Table 5). Restricting controls to those municipalities yields 3.72 percentage points (Table 6). Thus, the estimated magnitude is sensitive to the comparison group. The medium- and high-GPA attainment differentials in Table 5 are 2.05 and 1.11 points, respectively, slightly smaller than the main estimates.

Excluding neighboring municipalities from the controls gives a pooled attainment effect of 1.42 percentage points (Table 7), close to the main estimate. Treating neighboring municipalities as the exposed group instead gives 1.39 points (s.e. 0.75; $p < 0.10$; Table 8). This positive estimate does not support a claim that effects were confined to municipalities receiving HEIs. The neighboring-municipality GPA differentials are negative and imprecise; they should not be confused with the pooled effect.

The additional tables also show sensitivity in other outcomes. The pooled marriage coefficient is 1.38 percentage points and insignificant when established-institution municipalities are added to controls, versus 3.09 points in the main specification. The positive high-versus-low-GPA income differential in the main table is not stable across all comparison groups. The

additional analyses therefore support a modest attainment response while qualifying claims of broad robustness.

6 Concluding remarks

Sweden's 1977 geographic expansion raised HEI attainment modestly, with the clearest differential among students with middle-range grades. We find no statistically detectable average employment or income effects. Limited initial capacity is one possible explanation, but the design does not isolate capacity, program returns, or admissions mechanisms.

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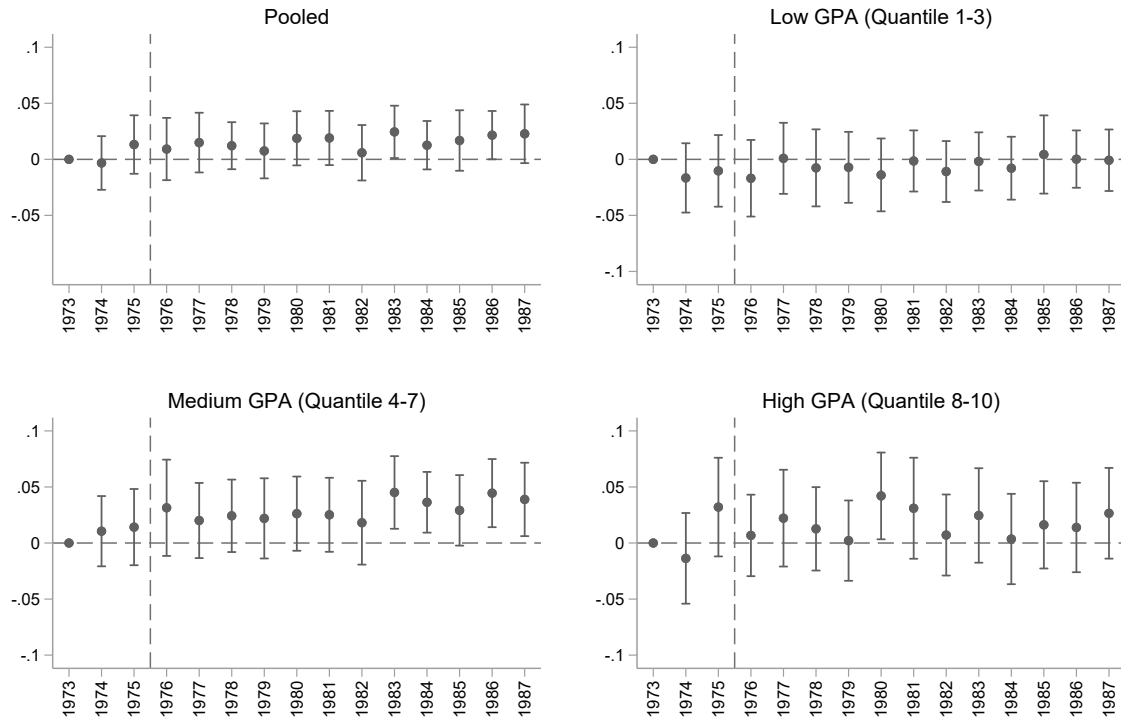


Figure 1: Effects on HEI attainment, by cohort and GPA group

Estimates of Equation (1), relative to 1973, with municipality-clustered 95 percent confidence intervals. The first panel uses all GPA groups; the others use deciles 1–3, 4–7, and 8–10. The dashed line separates 1975 and 1976, marking the pooled specification’s post-period cutoff.

Table 1: Descriptive statistics and balance

	Treated			Controls			Diff. (%)	Norm. diff.
	Mean	SD	N	Mean	SD	N		
High school GPA	-0.04	0.96	180,083	-0.04	0.97	180,083	-0.68	0.000
Parent HEI attainment	0.22	0.41	180,083	0.22	0.41	180,083	0.00	0.000
Municipal tax-base measure	1079.76	96.81	180,083	1055.07	177.90	180,083	2.34	0.122
Female	0.47	0.50	180,083	0.47	0.50	180,083	0.00	0.000
Distance to old HEI (km)	158.22	92.69	180,083	150.36	182.15	180,083	5.23	0.038

Means, standard deviations, and counts refer to stacked observations. Female and parental HEI attainment are proportions. GPA is cohort-standardized. Matching also conditions on cohort. Distance and the municipal tax-base measure are not matching variables. Normalized differences equal the mean difference divided by the square root of the sum of group variances (Imbens and Wooldridge, 2009); percentage differences use the control mean as denominator.

Table 2: Effects on adult outcomes, overall and by GPA group

	HEI	Married	Employed	Same municipality	Log income
Panel A					
Treated $\times$ Post	0.0126** (0.00551)	0.0309*** (0.00969)	0.00325 (0.00352)	0.00455 (0.0354)	0.00944 (0.0126)
Panel B					
Medium vs. low GPA	0.0239** (0.00972)	-0.0160 (0.0111)	0.00690 (0.00791)	-0.00771 (0.0129)	0.00684 (0.0265)
High vs. low GPA	0.0139 (0.0110)	-0.0130 (0.0129)	0.0118 (0.00748)	-0.0113 (0.0174)	0.0656** (0.0258)
Mean	0.344	0.207	0.930	0.435	7.586
Standard deviation	0.475	0.405	0.255	0.496	1.023
Cluster	Municipality	Municipality	Municipality	Municipality	Municipality
Individuals	331,551	331,551	331,551	331,551	331,551
Observations	360,166	360,166	360,166	360,166	360,166

Panel A estimates Equation (2). Panel B adds GPA-group interactions and all lower-order terms; reported coefficients are differentials relative to deciles 1–3. Medium GPA: deciles 4–7; high GPA: 8–10. HEI attainment, marriage, employment, and residence in the high school municipality are measured at 40; income is mean log real labor plus capital income at ages 37–40. Controls include never-treated and later-treated municipalities. Controls can recur across stacks. Means and counts are reported with Panel B. Municipality-clustered standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

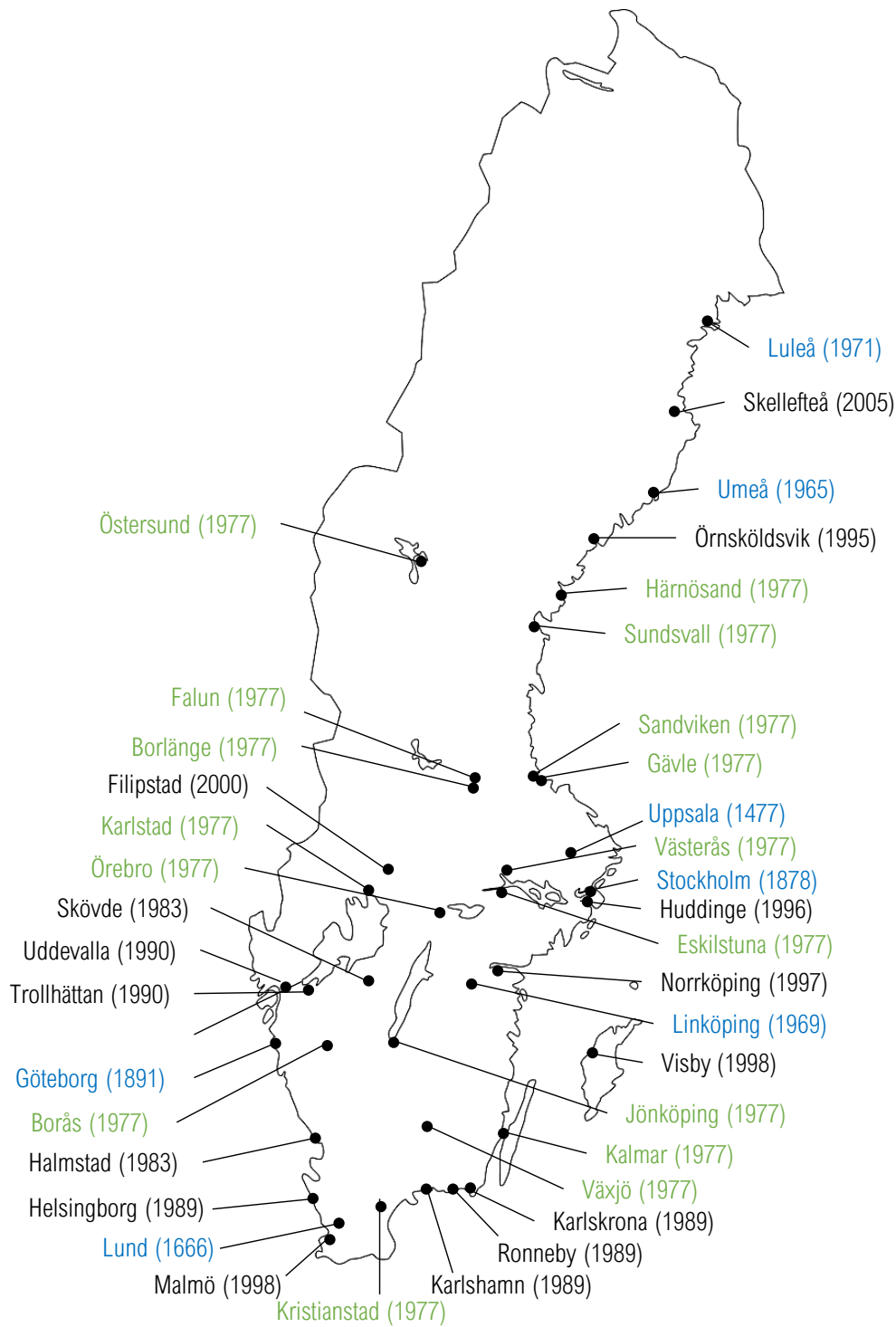


Figure 2: Locations and establishment years of HEIs
Blue labels identify pre-1977 locations, green labels identify the sixteen 1977 locations, and black labels identify later establishments. Classification based on Bergh et al. (2024).

Table 3: HEI attainment: differential by parental education

	HEI attainment
Treated $\times$ Post $\times$ Parent HEI	0.000640 (0.0142)
Mean	0.344
Standard deviation	0.475
Cluster	Municipality
Individuals	331,551
Observations	360,166
Standard errors in parentheses	
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$	

The reported triple interaction is the treatment-effect differential for parental HEI attainment. The reference category has neither parent with HEI attainment. The outcome is HEI attainment at 40; the comparison group follows the main specification. This coefficient is not either parental group's total treatment effect.

Table 4: HEI attainment: GPA differentials by parental education

	HEI attainment
Post $\times$ Treated $\times$ Medium GPA $\times$ Parent HEI	0.0279 (0.0323)
Post $\times$ Treated $\times$ High GPA $\times$ Parent HEI	-0.00647 (0.0291)
Mean	0.344
Standard deviation	0.475
Cluster	Municipality
Individuals	331,551
Observations	360,166

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Reported four-way interactions compare GPA-group treatment-effect differentials across parental HEI backgrounds. Medium and high GPA correspond to deciles 4–7 and 8–10; the reference GPA group is 1–3. The outcome is HEI attainment at 40; the comparison group follows the main specification.

Table 5: Including established-institution municipalities as controls

	HEI	Married	Employed	Same municipality	Log income
Panel A					
Treated $\times$ Post	0.0199*** (0.00679)	0.0138 (0.0152)	0.000273 (0.00358)	0.0211 (0.0353)	-0.00510 (0.0115)
Panel B					
Medium vs. low GPA	0.0205** (0.00952)	-0.0129 (0.0103)	0.0151** (0.00744)	-0.0106 (0.0133)	0.0285 (0.0259)
High vs. low GPA	0.0111 (0.0119)	-0.00381 (0.0121)	0.0176*** (0.00637)	-0.0216 (0.0167)	0.0670*** (0.0239)
Mean	0.345	0.207	0.930	0.440	7.593
Standard deviation	0.475	0.405	0.256	0.496	1.026
Cluster	Municipality	Municipality	Municipality	Municipality	Municipality
Individuals	337,847	337,847	337,847	337,847	337,847
Observations	360,166	360,166	360,166	360,166	360,166

Panel A reports pooled effects; Panel B reports GPA-group differentials relative to deciles 1–3. Medium and high GPA correspond to deciles 4–7 and 8–10. Outcomes, stacking, and significance notation follow Table 2; standard errors are clustered by municipality. The control pool adds pre-1977 institution municipalities to the main control pool; 1983 establishments remain excluded.

Table 6: Only established-institution municipalities as controls

	HEI	Married	Employed	Same municipality	Log income
Panel A					
Treated $\times$ Post	0.0372*** (0.0113)	-0.0124 (0.0244)	0.00190 (0.00431)	0.0712* (0.0361)	0.00569 (0.0149)
Panel B					
Medium vs. low GPA	0.0273* (0.0155)	0.00190 (0.0129)	0.0139* (0.00802)	-0.0342** (0.0137)	0.000412 (0.0254)
High vs. low GPA	-0.000470 (0.0180)	0.0215* (0.0108)	0.0194** (0.00884)	-0.0440** (0.0177)	0.0296 (0.0202)
Mean	0.351	0.207	0.927	0.459	7.604
Standard deviation	0.477	0.405	0.259	0.498	1.043
Cluster	Municipality	Municipality	Municipality	Municipality	Municipality
Individuals	295,614	295,614	295,614	295,614	295,614
Observations	360,166	360,166	360,166	360,166	360,166

Panel A reports pooled effects; Panel B reports GPA-group differentials relative to deciles 1–3. Medium and high GPA correspond to deciles 4–7 and 8–10. Outcomes, stacking, and significance notation follow Table 2; standard errors are clustered by municipality. Controls are restricted to municipalities with institutions before 1977.

Table 7: Excluding neighboring municipalities from controls

	HEI	Married	Employed	Same municipality	Log income
Panel A					
Treated $\times$ Post	0.0142*** (0.00507)	0.0370*** (0.00956)	0.00345 (0.00334)	0.00394 (0.0356)	0.00729 (0.0127)
Panel B					
Medium vs. low GPA	0.0255*** (0.00878)	-0.0176 (0.0119)	0.00322 (0.00709)	-0.0293** (0.0134)	-0.0150 (0.0234)
High vs. low GPA	0.0120 (0.0114)	-0.0260** (0.0132)	-0.00549 (0.00676)	-0.0193 (0.0184)	-0.00813 (0.0237)
Mean	0.345	0.207	0.930	0.436	7.587
Standard deviation	0.475	0.405	0.255	0.496	1.021
Cluster	Municipality	Municipality	Municipality	Municipality	Municipality
Individuals	331,491	331,491	331,491	331,491	331,491
Observations	360,165	360,165	360,165	360,165	360,165

Panel A reports pooled effects; Panel B reports GPA-group differentials relative to deciles 1–3. Medium and high GPA correspond to deciles 4–7 and 8–10. Outcomes, stacking, and significance notation follow Table 2; standard errors are clustered by municipality. The control group excludes municipalities neighboring the 1977 treated municipalities, as well as pre-1977 and 1983 institution municipalities.

Table 8: Neighboring municipalities as the exposed group

	HEI	Married	Employed	Same municipality	Log income
Panel A					
Treated $\times$ Post	0.0139* (0.00750)	-0.00443 (0.0107)	-0.00396 (0.00412)	0.00444 (0.0254)	-0.000435 (0.0136)
Panel B					
Medium vs. low GPA	-0.00276 (0.0108)	-0.00150 (0.0185)	-0.00763 (0.00832)	0.000104 (0.0155)	0.00565 (0.0281)
High vs. low GPA	-0.0133 (0.0163)	-0.00881 (0.0189)	-0.00995 (0.00995)	0.00822 (0.0166)	0.0170 (0.0373)
Mean	0.313	0.198	0.929	0.415	7.549
Standard deviation	0.464	0.399	0.257	0.493	1.014
Cluster	Municipality	Municipality	Municipality	Municipality	Municipality
Individuals	210,982	210,982	210,982	210,982	210,982
Observations	247,943	247,943	247,943	247,943	247,943

Panel A reports pooled effects; Panel B reports GPA-group differentials relative to deciles 1–3. Medium and high GPA correspond to deciles 4–7 and 8–10. Outcomes, stacking, and significance notation follow Table 2; standard errors are clustered by municipality. The exposed group consists of municipalities neighboring the 1977 HEI municipalities. Controls exclude pre-1977, 1977, and 1983 institution municipalities and neighbors of the 1977 and 1983 establishments.