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Local High School Closures and Voter Turnout: Evidence from East German Municipalities*

Mona Foertsch†

Abstract

Do changes in public infrastructure impact voter turnout? After reunification numerous high schools have been closed in East Germany. Difference-in-differences estimations show that high school closures between 1992 and 2010 triggered a decline in voter turnout in the following state election, suggesting a sense of resignation among voters. However, this effect is not mirrored in national elections, indicating that voters do not extend their frustration to a higher level. The decline in voter turnout in state elections is rather short-living. This suggests that while voters may initially react to changes in local public infrastructure, they demonstrate resilience, at least in the medium term.

JEL-Classification: D72, H40, R10

Keywords: Local schools, Elections, Voter turnout, Resilience, Germany

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1 Introduction

Public infrastructure plays a fundamental role in shaping economic, social and political dynamics. The continuous adjustment and maintenance of public infrastructure such as transport networks, healthcare facilities, or educational institutions is not only crucial for driving economic development but also for enhancing social well-being and overall quality of life. Among these infrastructure components, educational institutions, particularly high schools, are unique in that they not only impart knowledge but also foster community cohesion and civic engagement.

Given the significant role high schools play in communities, I look at the impact of high school closures on voter turnout. Adjustments to public infrastructure like school closures have profound impact on regional development, influencing population dynamics (Barakat, 2015; Di Cataldo and Romani, 2023; Freier *et al.*, 2021; Lehtonen, 2021), crime (Steinberg *et al.*, 2019; Brazil, 2020; Borbely *et al.*, 2023), income (Di Cataldo and Romani, 2023), and employment (Freier *et al.*, 2021). School closures are also accompanied by a loss of human capital (Egelund and Laustsen, 2006) and social capital (Kłoczko-Gajewska, 2020), and they impact educational outcomes (Brummet, 2014; Engberg *et al.*, 2012). Given these impacts, local communities are expected to react strongly to such adjustments, including at the political level. Surprisingly, so far, the relationship between public infrastructure changes and political participation at the regional level has not been extensively studied.

High school closures have occurred in both urban (Steinberg and MacDonald, 2019) and rural (Lehtonen, 2021) areas. Especially in East Germany, a notable number of high schools have been shut down during the 1990s due to a population decline.[1] Reasons for school closures include decreasing enrollment rates, budget constraints, cost-cutting measures, and the concentration of schools in rural areas (Billger, 2010). Opponents of school closures argue that they are spatially unevenly distributed and have varying impacts on communities, while supporters argue that closures improve academic opportunities and efficiency (Tieken and Auldridge-Reveles, 2019).

[1]East Germany experienced a population decline during the German reunification, driven by several factors. Firstly, many individuals relocated from the East federal states to West Germany. Secondly, many people, particularly young families, migrated from rural to urban areas. Thirdly, birth rates experienced a considerable decrease.

Despite the recognized importance of robust infrastructure to the local community and for economic growth, the precise impact of infrastructure changes, especially school closures, on civic engagement, like voting behavior remains unclear and deserves further investigation. Focusing on voter turnout has advantages and can provide important insights compared to analyzing vote shares for different parties. Voter turnout is a key indicator of democratic participation and political engagement of citizens. If school closures affect voter turnout, this directly affects the legitimacy and representativeness of the democratic process. Voter turnout reflects a broader measure of political engagement than the share of votes cast for a particular party. Changes in turnout can indicate whether citizens are generally turning away from politics or becoming more mobilized and engaged, regardless of which party they support.

I aim to examine the potential impact of local high school closures on voter turnout. Voter reactions to school closures can vary based on numerous factors. The policy consequences of school closures might depend on public perception, the specific circumstances of the closure, or how the situation was communicated. If voters feel the school closure was poorly communicated or believe it was wrong, they can blame either the state or federal government. However, if voters believe that school closures are a necessary and well-managed response to an irreversible development, they will not necessarily punish the government or whoever they think is responsible for the decision.

I investigate how local high school closures affect voter turnout.[2] Focusing on high schools is reasonable, given that high schools might receive a greater share of public attention than other types of schools when facing closure. This attention may increase the likelihood of high schools remaining open. The concentration on East Germany post-reunification is justified, as West Germany did not undergo similar migration patterns. Moreover, I concentrate on state elections, as the host state determines which schools exactly are being closed. Additionally, I specifically examine permanent high school closures, distinct from temporary closures observed during the Covid-19 pandemic (see, e.g., Danzer *et al.*, 2023; Fuchs-Schündeln *et al.*, 2022). Barakat (2015) and Freier *et al.* (2021) offer relevant contextual studies. Barakat (2015) looks at primary school closures in Saxony and finds

[2]Throughout the paper, I refer to German "Gymnasien" as high schools.

little evidence of these closures on population decline. Freier *et al.* (2021) use the same high school closures in East Germany as I do but focus on the impact on regional employment.

Using a difference-in-differences approach, I compare voter turnout in East German municipalities with and without a local high school closure between 1992 and 2010. I employ propensity score matching and entropy balancing using 1985 municipality characteristics to balance between municipalities with and without a high school closure. This allows me to compare municipalities with a similar probability of experiencing a high school closure at the beginning of the observation period.

The results show that a local high school closure leads to a decline in voter turnout in the following state election. The effect is statistically significant and substantial. A local high school closure comes with a 1.8 to 1.9 percentage points decline in voter turnout in the subsequent state election. I find no comparable effects for national elections. The reaction is also rather short-living since the election after the next is not affected, indicating rather resilient local communities.

This paper contributes to the literature by addressing the gap in understanding the impact of public infrastructure changes, particularly school closures, on political participation. Previous research has shown that rural school closures reduce support for incumbent parties, decrease trust in local politicians (Isaksson, 2023), and lead to a decline in citizens' trust in policy decisions (Nuamah, 2021). Closed schools are also associated with less support for incumbents while far-right populists gain votes (Nyholt, 2023). Additionally, the quality of public goods influences voting behavior, with areas having lower-quality schools experiencing lower voter turnout (Minkoff, 2014).

2 German school system

Education in Germany is primarily the responsibility of the federal states. In most federal states, pupils typically attend primary school for four years, although in some states this period extends to six years, before progressing to secondary school. Subsequently, pupils enroll in high schools for an additional eight to nine years, again depending on the specific state regulations. Completion of high school qualifies the pupils to attend university.

A crucial aspect of transitioning to secondary school is the recommendation provided by the primary school teacher. Pupils who have demonstrated satisfactory academic performance are typically recommended for admission to secondary school. However, parents have the option to request their child's enrollment in high school even if they have not met the required academic standards.

Public schooling in Germany is tuition-free. Funding for public education is provided by the national government, the federal states, and the hosting municipalities, with the latter two bearing the largest share of the financial burden. Municipalities cover expenses related to school materials and non-teaching personnel, while districts and cities are responsible for school transportation. Personnel costs for teaching staff are primarily covered by the federal states. Municipalities may receive reimbursements, fixed allocations, or one-time grants from the state to help offset the costs of operating schools.[3] As a result of this funding structure, local economic conditions are unlikely to impact the quality of schools to a large extent.

Distance plays a different role in the choice of primary and secondary school. Children tend to go to the nearest primary school. However, proximity plays a less critical role in the selection of secondary schools, as pupils have the freedom to choose which institution they wish to attend (Freier *et al.*, 2021).

Local high schools in East Germany were closed mainly due to the population decline following German reunification. This contradicts fears that mainly low-performing high schools were shut down. The final decision on exactly which high school was closed was made by the state and not the respective municipality, presumably based on the expected future population. However, school closures due to future demographic trends are not purely exogenous events. While demographic changes, such as a decline in the birth rate or an ageing population, can be considered exogenous factors, the decisions to close high schools due to these changes are usually endogenous. These decisions are made by policy makers and school administrators reacting to demographic trends. Section 3 explains in detail how I deal with this identification problem.

[3] `https://www.kmk.org/fileadmin/Dateien/pdf/Eurydice/Bildungswesen-dt-pdfs/bildungsfinanzierung.pdf`

3 Methods

3.1 Data

For the empirical analysis, I use data for the East German municipalities (see, Online Appendix B for a description of the data and sources). I utilize data on high school closures in the East German federal states (Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, and Thuringia, excluding Berlin) between 1992 and 2010.[4] Focusing on East Germany is reasonable, as West Germany did not experience comparable migration movements accompanied by school closures after reunification.

Figure 1 illustrates the absolute number of high schools in both East (blue markers) and West (red markers) Germany over time. In East Germany, the number of high schools declined from 627 to 537 between 1992 and 2020, with most closures occurring from 2000 to 2010, aligning well with the observation period from 1992 to 2010. Conversely, in West Germany, high school numbers increased from approximately 2,500 in 1992 to about 2,600 in 2020. Beyond this, Figure A1 illustrates how many schools were closed in which year.

[Figure 1 about here]

Additionally, I use data on state elections between 1990 and 2009.[5] Table A1 in Online Appendix A shows the date of each state election. Voter turnout in these state elections is the main dependent variable. In the sample period, voter turnout in state elections is, on average, 61,8%. By examining the relationship between voter turnout and local high school closures, insights into the interactions between education and infrastructure policy and political participation can be gained.

Supplementary data on demographic trends before 1990, including the population growth from 1946 to 1985 (covering almost the entire GDR period), the number of inhabitants 1985, and the population density in 1985, are incorporated as matching variables. This

[4] I am using the information on high school closures from Freier *et al.* (2021) who kindly provided me with this data. Their data cover the years from 1992 to 2010. They do not include information on school size, number of students or teachers, or whether only specific grades were affected. Additionally, details regarding the timing of school closure announcements or closure specifics are unavailable.

[5] Mecklenburg-Western Pomerania and Saxony-Anhalt in 1990, 1994, 1998, 2002 and 2006; Brandenburg, Saxony, and Thuringia held state elections in 1990, 1994, 1999, 2004 and 2009.

pre-observation period data aids in creating comparable groups, considering that school closures are often driven by projected demographic shifts.

The inclusion of control variables proves challenging due to limited availability of data explaining variations in voter turnout across the entire observation period. Given the already small treatment group size, the main analysis is conducted without additional control variables to avoid further sample reduction. However, in robustness tests, control variables such as the population share of women, local jobs per capita, inward commuters per capita, and unemployment per capita are included. Table 1 summarizes the data set.

[Table 1 about here]

The overall sample consists of all municipalities in the East German federal states between 1992 and 2010. The treatment group includes all municipalities with a high school in 1992 that was closed before 2010. As a control group, I use all municipalities that always had one high school over the entire observation period and were, thus, never treated. Only municipalities with exactly one local high school are considered, as the impact of one high school closure within a municipality on other schools is uncertain. This results in 43 municipalities in the treatment group and 208 in the control group.

Figure 2 shows the spatial distribution of the treatment group (red) and control group (blue) across East Germany, illustrating widespread high school closures with no discernible concentration in any specific region. Notably, only one treatment municipality is observed in Thuringia.

[Figure 2 about here]

3.2 Balancing

One concern may be that municipalities with a local high school closure differ from municipalities that have always had one high school. I use two different matching procedures to increase the comparability between the municipalities with and without a local high school closure and to look at the effect of the high school closure in isolation. Columns (1) and (2) in Table 2 show the mean value of demographic variables before the observation period. I use three variables for matching since I aim for the two groups to be as similar

as possible at the beginning of the observation period, in 1992. The population in 1985 and the population density in 1985 differ significantly between the two groups, while the difference in population growth from 1946 to 1985 seems less pronounced. In order to ensure comparability between the two groups, I use either propensity score matching (columns (4) to (6)) or entropy balancing (columns (7) to (9)). Differences are balanced due to weighting of individual observations. Any significant mean differences between the two groups are eliminated with these balancing procedures (columns (6) and (9)).

[Table 2 about here]

3.3 Identification

I am interested in how local high school closures affect voter turnout. Therefore, I estimate the following difference-in-differences specification with OLS:

$$Turnout_{i,s,t} = \beta Closure_{i,t} + \alpha_i + \delta_{s,t} + \epsilon_{i,t} \tag{1}$$

with $Turnout_{i,s,t}$ defining voter turnout in municipality i in state s in state election t. The dummy variable $Closure_{i,t}$ takes on the value of one if a municipality hosted a high school in 1992 that was closed before 2010 and zero otherwise. The coefficient β measures whether municipalities where the local high school has been shut down differ in election turnout compared to municipalities that always had one high school between 1992 and 2010. Difference-in-differences estimations compare the changes in voter turnout before and after the local high school closure in affected municipalities with changes in unaffected municipalities. This helps to control for time trends and identify the specific effects of school closures. Thus, the difference-in-differences estimate should induce causal effects if the selection into the treatment is (quasi-)random. I include state-year fixed effects $\delta_{s,t}$ and municipality fixed effects α_i. Fixed effects at municipality level control for time-invariant factors such as the distance to the next largest city or a railroad station, as well as unobserved unchanging factors. Time-variable characteristics that follow long-term trends, such as the employment rate or tax revenues, are taken into account using time-fixed effects. The long-lasting time trend of these variables should dominate the spatial differences at

the municipality level. Spatial disparities at the municipal level are assumed to remain fairly unchanging. Control variables at the municipality level are not always available, e.g., for data protection reasons. Thus, I add only a vector of a few control variables ($X_{i,t}$) that are already unavailable for the full time span in robustness tests.

The estimations should not be biased if the selection into treatment is quasi-random. I use a weighted OLS regression, as depicted in equation (1), utilizing weights derived from propensity score matching and entropy balancing based on 1985 demographic characteristics to enhance comparability between the two groups of municipalities (see, section 3.2). This weighting approach ensures that 1992 characteristics do not predict the probability of high school closures. Kernel matching is utilized for propensity score matching, while entropy balancing enables adjustments to both means and variances. This allows me to compare communities with and without local high school closures that had similar demographic characteristics before the closures by taking into account the weighted samples.

High school closures constitute a binary treatment and not all high school closures occur simultaneously. Thus, the research design is staggered. Municipalities in the treatment group experience the closure at different points in time, resulting in a lack of a standardized post treatment period for the control group.

Current literature highlights the potential issues with two-way fixed effects models and difference-in-differences estimates, as these can produce false or deceptive results and biased estimations, particularly when treatment effects are heterogeneous between groups or when the treatment is staggered.[6] I am using the estimator proposed by Borusyak *et al.* (2024). Their imputation approach uses non-treated observations to predict the possible outcomes of treated observations. This estimator tends to be more efficient than comparable estimators (e.g., Callaway and Sant'Anna, 2021; Sun and Abraham, 2021) under certain assumptions. These are amongst others that the supposition of parallel trends holds and that there is no anticipation (Roth *et al.*, 2023).[7] Section 4.3 shows that I have good reason to believe in these assumptions.

[6]De Chaisemartin and d'Haultfoeuille (2023) and Roth *et al.* (2023) provide detailed overviews of the topic and explain the newly developed difference-in-differences estimators capable of addressing such heterogeneity.

[7]See De Chaisemartin and d'Haultfoeuille (2023) for an detailed explanation.

4 Results

4.1 Two-way fixed effects regressions

I begin with a two-way fixed effects estimation where I regress voter turnout in state elections on high school closure. Table 3 shows negative and significant coefficients for the regression: a local high school closure goes along with a lower voter turnout in state elections when controlling for time-invariant differences across municipalities. Column (1) includes all East German municipalities. When considering both municipalities where a local high school was closed and those that always had one high school throughout the observation period, voter turnout in the subsequent state election is approximately 3.3 percentage points lower in municipalities where the local high school was closed compared to those where it remained open (column (2)). Propensity score matching (column (3)) and entropy balancing (column (4)) produce results that remain largely consistent with the unweighted analysis. The point estimates are negative and statistically significant at the 1% level. Effects are also quantitatively important. The drop in voter turnout of around 3.4 percentage points is also considerable when compared to the average turnout of around 57% during the observation period.

[Table 3 about here]

4.2 Staggered difference-in-differences estimations

As pointed out above, the estimates in Table 3 using a two-way fixed effects model might produce biased estimates. Since the school closures probably did not happen randomly, comparing municipalities that experienced a school closure and municipalities whose schools were open all the time during the observation period is likely to lead to inaccurate estimates. For identification purposes, I use the different timing of school closures, which should be as good as random. Therefore, I move on to staggered difference-in-differences estimations using the estimator proposed by Borusyak *et al.* (2024).

Table 4 shows again a negative relationship between a local high school closure and voter turnout in state elections. In the unweighted sample, the point estimate is negative but statistically significant at the 5% level (column (1)). Employing propensity score matching

leads to a slightly increased coefficient, which remains negative and statistically significant at the 1% level. On average, a school closure comes with a reduction in voter turnout of around 1.9 percentage points (column (2)). The effect hardly changes when using entropy balancing. Voter turnout falls by an average of 1.8 percentage points if the local school is closed (column (3)). The point estimates are considerably smaller than the ones in Table 3, but still not negligible. This indicates that these estimations compared to the baseline estimate using a linear difference-in-differences specification are more conservative and potentially more efficient.

[Table 4 about here]

I submit these results to some robustness tests (see, Table A2 in Online Appendix A). In the years from 1992 to 1999, only few observations are in the treatment group. Therefore, in a first test, I limit the observation period to the years 2000 to 2010 (column (2))[8]. The point estimate becomes slightly smaller, but the significance level does not change. The results also hold when I add control variables to the estimation (column (3)). As only one school was closed in Thuringia during the observation period (see, Figure 2), I exclude this federal state in a further test. Nevertheless, the results hold (column (4)). In column (5) I use an alternative estimator capable of handling staggered designs, the one proposed by Sun and Abraham (2021). While both the point estimate and significance level exhibit a slight decrease, the overall implications remain unchanged.

4.3 Event study estimation

Next, I move on to an event study estimation to track the impact of a local high school closure over time and to rule out potential anticipation effects. Since election data is not available annually, I include the election preceding the high school closure and the two subsequent elections, totaling three elections, in the estimation. Due to variations in treatment timing, extending the time window for the event study specification would result in insufficient observations. The closure of a high school may be known several years in advance and may therefore affect turnout in an election before the actual closure. Nonetheless, Figure 3 shows that it is reasonable to believe in parallel trends. The

[8] In order to include the election before the school closures in 2000, I start with 1998 and not 2000.

point estimate in the election prior to the high school closure is statistically insignificant. Treatment and control groups exhibit similar trends in the voter turnout in the election leading up to the school closure. At least in the election previous to the school closure, no anticipation effects are detectable. This observation suggests that the assumption underlying the estimator proposed by Borusyak *et al.* (2024), which renders it more efficient than others, appears to be satisfied. Moreover, the effect is only significant in the election immediately following the high school closure. Subsequently, in the election thereafter, no disparity in voter turnout between municipalities with and without a local high school closure is observed. The impact of a local high school closures is therefore relatively immediate and does not take a long time to be fully established. This indicates that while voters may react to dissatisfaction with the adjustment of public infrastructure in their municipality, this effect is not enduring. By one additional election period later, no significant relationship between a local high school closure and voter turnout is evident. This suggests that the local population displays resilience towards public infrastructure adjustment, at least in the medium term.

[Figure 3 about here]

5 Discussion

Given the observed relation between school closures and voter turnout in state elections, an obvious next step is to investigate whether such high school closures also impact national elections. Typically, voter turnout tends to be higher in national elections compared to lower-level elections (e.g., Alford and Lee, 1968). People also differentiate between different levels of government in terms of trust in government and turnout (Arends *et al.*, 2023). However, Table 5 presents ambiguous findings regarding the relationship between high school closures and voter turnout in national elections. Point estimates fail to achieve statistical significance in both the unweighted sample (column (1)) and weighted regressions (columns (2) and (3)). Consequently, it can be assumed that citizens attribute responsibility for a local high school closures to the appropriate political level, without projecting their

concerns onto a higher level. This suggests that voters assign accountability to the level of government responsible for the high school closure.

[Table 5 about here]

Moreover, the closure of a high school might influence other voting outcomes, such as party vote shares. For instance, disillusioned individuals may turn to fringe or populist parties as an alternative to current politics (e.g., Albanese *et al.*, 2022). Therefore, local school closures could change the political preferences of affected citizens. Families who have had negative experiences with school closures may tend to support parties or candidates that are more committed to education and infrastructure. When examining party vote shares, a significant positive effect is observed solely for far-left populist parties, with no discernible correlation between school closures and other political camps (see, Table 6). Notably, the point estimate amounts to 0.6 percentage points, a noteworthy magnitude considering the mean value of approximately 20% of votes in favor of far-left populists. Whether individuals opt to vote for far-left populists in the context of a permanently closed local high school hinges on their evaluation of how these politicians address their values, beliefs, and expectations regarding the issue. Generally, left-leaning parties are supportive of public infrastructure and see it as a key instrument for promoting social justice and equal economic opportunities. They also emphasize the need for state investment in educational institutions, among other things, in order to improve the quality of life and ensure equal access for all citizens.

[Table 6 about here]

It is also noteworthy that local high schools often function as polling stations. If the local high school is closed, voters in the affected area might need to go to another polling location if the school building is no longer available as a polling place.. Some citizens may then simply refrain from voting altogether. Alipour and Lindlacher (2022) show that the relocation of polling stations is accompanied by a decline in voter turnout.

6 Conclusion

I look at local high school closures in East German municipalities. The key finding indicates that a local high school closure reduces voter turnout in the subsequent state election. Nevertheless, municipalities demonstrate resilience in the face of such significant cutbacks in their development, as this effect dissipates in the election thereafter. Moreover, the local society demonstrates an understanding of which level of government to hold accountable, evidenced by the lack of impact on voter turnout in national elections following a local high school closure.

Furthermore, the political ramifications of school closures carry policy implications, potentially influencing community participation in politics. By highlighting the link between public infrastructure and civic engagement, these findings underscore the need to consider the societal impact of decisions to close local high schools. Going forward, policy makers might prioritize strategies to mitigate the negative effects of local high school closures on voter turnout and civic engagement. This study could help politicians and decision-makers to better understand how to strengthen trust and political participation in deprived regions.

In conclusion, it appears that local communities show a degree of resilience to changes in their educational infrastructure, at least in the medium term. Future research could explore methods to minimize the negative impact of school closures, especially in the short term.

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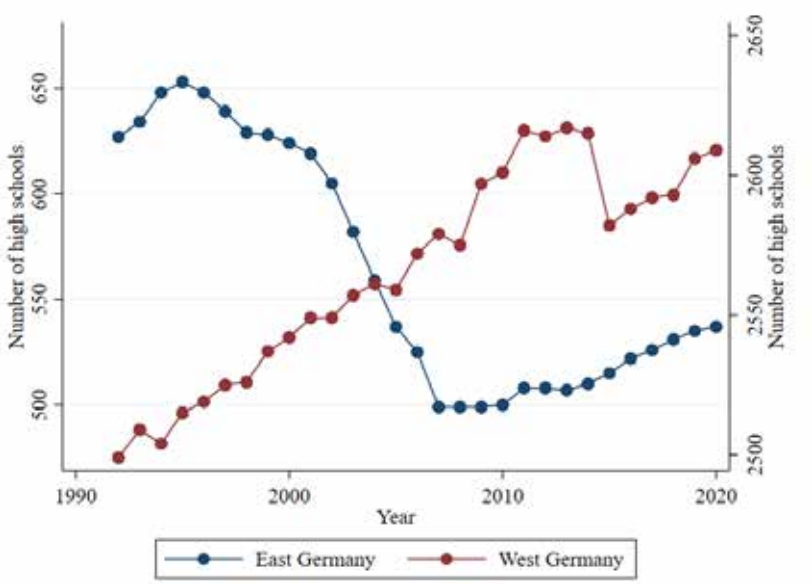
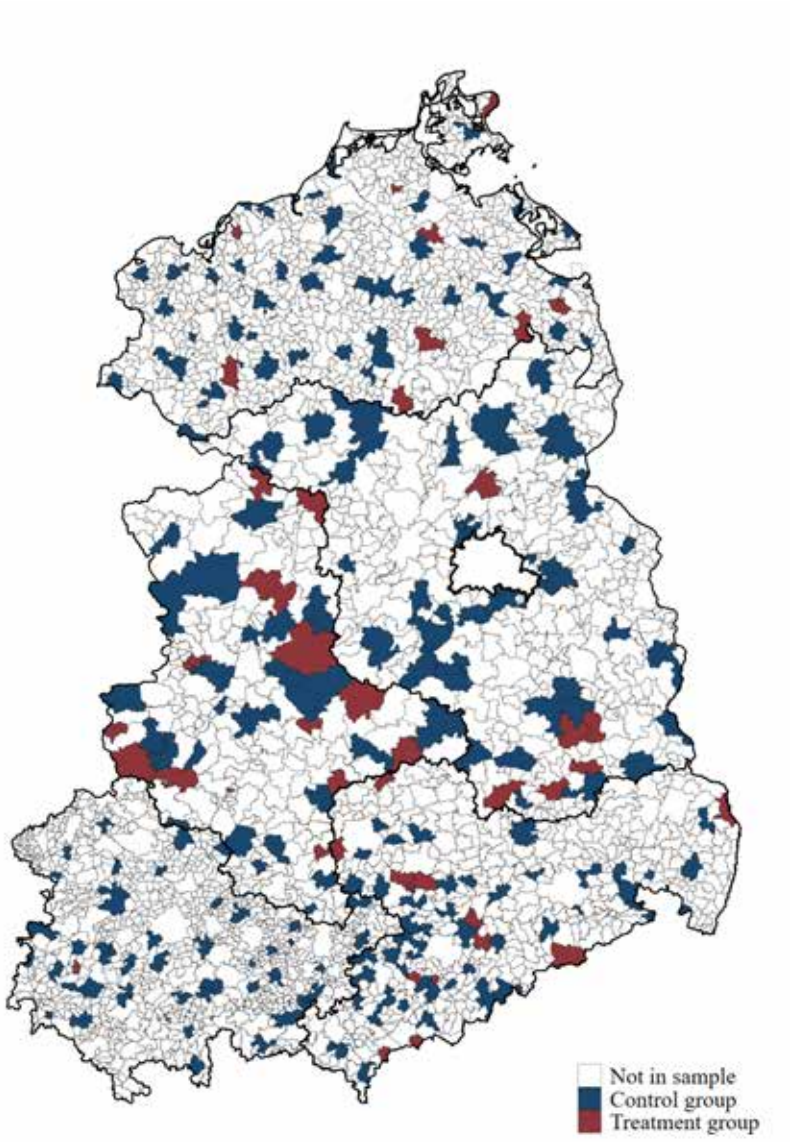
Figure 1: High schools in East and West Germany



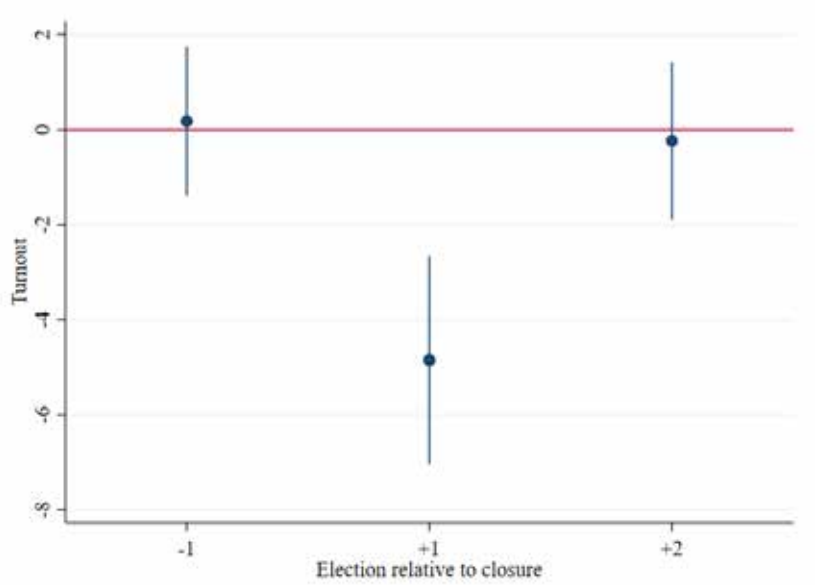
Notes: The figure shows the total number of high schools in both East (blue line) and West (red line) Germany. Statistisches Bundesamt. (2021). *Bildung und Kultur. Allgemeinbildende Schulen.* Fachserie 11, Reihe 1. Schuljahr 2020/2021.

Figure 2: Spatial distribution of treatment and control group



Notes: The map shows the regional distribution of high school closures in East German municipalities between 1992 and 2010. The red municipalities represent the treatment group where the local high school was closed between 1992 and 2010. The blue municipalities present the control group which always had one high school during the observation period. The white municipalities are not in the sample since they had no or more than one high school. I use the territorial status from 2010.

Figure 3: Event study estimation



Notes: The figure shows the results of staggered difference-in-differences regressions with voter turnout in state elections as dependent variable. Coefficients for a dummy indicating the closure of a local high school and three respective election years are shown. East German municipalities are the unit of observation. Standard errors clustered at the municipality level and 95% confidence intervals are shown.

Table 1: Descriptive statistics

	Obs.	Mean	SD	Min	Max	Obs. Period
	(1)	(2)	(3)	(4)	(5)	(6)
Main variables						
Turnout (State elections)	11,833	61.788	10.431	29.315	100.000	1990–2009[a]
Turnout (National elections)	14,798	69.962	8.493	28.093	100.000	1990–2009[a]
High school closure[b]	70,076	0.002	0.044	0.000	1.000	1992–2010
Matching variables						
Population 1985	2,958	7,402.422	22,096.633	0.000	60,436	1985
Population growth 1946–1985	2,958	-0.253	0.326	-1.000	5.377	1985
Population density 1985	2,958	321.354	796.273	0.000	20,570.992	1985
Control variables						
Population share of women	51,406	50.134	1.835	25.511	65.031	1993–2010
Local jobs per capita	51,406	25.829	16.880	0.000	137.391	1993–2010
Inward commuters per capita	51,406	64.611	15.938	0.000	100.000	1993–2010
Unemployed per capita	37,131	5.051	4.499	0.000	91.421	1998–2010

Notes: The table reports the descriptive statistics of the main dataset. East German municipalities between 1992 and 2010 are the unit of observation. [a]State elections are usually held only every four/five years which reduces the number of observations. [b]The variable *High school closure* is a dummy indicating when the only high school in a municipality was closed and does not include all high school closures that ever occurred during the observation period. Online Appendix B reports the data sources.

Table 2: Balancing of municipalities with and without a local school closure

	Before matching			After propensity score matching			After entropy balancing		
	Control	Treatment	Difference	Control	Treatment	Difference	Control	Treatment	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Population	15,168.81	11,894.77	3,274.04***	12,029.55	11,894.77	134.78	11896.48	11,894.77	1.71
1985			(1,150.03)			(1,093.06)			(1,086.22)
Population growth	-0.044	-0.108	0.064	-0.108	-0.108	0.000	-0.108	-0.108	0.000
1946–1985			(0.043)			(0.042)			(0.042)
Population density	324.867	216.220	108.647***	228.119	216.220	11.900	216.239	216.220	0.019
1985			(40.929)			(37.821)			(38.863)
Obs.	208	43	251	208	43	251	208	43	251

Notes: The table shows the mean differences of the 1985 control variables between municipalities with and without a local high school closure before (columns (1) to (3)) and after balancing using propensity score matching (column (4) to (6)) and entropy balancing (columns (7) to (9)). The corresponding standard errors of mean difference t-tests are shown in parentheses. Significance levels: * 0.1, ** 0.05, *** 0.01.

Table 3: High school closure and voter turnout in East German municipalities

	Turnout			
	All	Treatment + Control		
		No weights	Propensity score	Entrophy balancing
	(1)	(2)	(3)	(4)
School closure	-1.453*	-3.295***	-3.380***	-3.377***
	(0.812)	(0.878)	(0.821)	(0.820)
Mean dep. var.	61.788	56.471	56.786	56.805
Years	1992–2010	1992–2010	1992–2010	1992–2010
Municipalities	2,960	251	251	251
Obs.	11,833	1,003	1,003	1,003
State-year fixed effects	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Within R^2	0.793	0.833	0.858	0.861

Notes: The table shows the results of fixed effects OLS regressions with voter turnout in state elections as dependent variable. The main explanatory variable is a dummy indicating the closure of the local high school. East German municipalities are the unit of observation. Column (1) includes all East German municipalities, column (3) municipalities where the only high school was closed and all municipalities that always had one high school between 1992 and 2010. Column (3) depicts a weighted regression using propensity score matching and column (4) entropy balancing. Significance levels (standard errors clustered at the municipality level in brackets): *** 0.01, ** 0.05, * 0.1.

Table 4: Effects of local high school closures

	Turnout		
	Treatment + Control		
	No weights	Propensity score	Entrophy balancing
	(1)	(2)	(3)
School closure	-1.534**	-1.938***	-1.814***
	(0.598)	(0.607)	(0.609)
Mean dep. var.	56.490	56.490	56.490
Years	1992–2010	1992–2010	1992–2010
Obs.	999	999	999
State-year fixed effects	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes

Notes: The table shows the results of staggered difference-in-differences regressions with voter turnout in state elections as dependent variable. The main explanatory variable is a dummy indicating the closure of the local high school. East German municipalities are the unit of observation. Significance levels (standard errors clustered at the municipality level in brackets): *** 0.01, ** 0.05, * 0.1.

Table 5: National elections

	Turnout in national elections		
	No weights	Propensity score	Entrophy balancing
	(1)	(2)	(3)
School closure	-0.165	-0.038	0.060
	(0.618)	(0.596)	(0.599)
Mean dep. var.	67.087	67.087	67.087
Years	1992–2010	1992–2010	1992–2010
Obs.	1,250	1,250	1,250
State-year fixed effects	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes

Notes: The table shows the results of fixed effects OLS regressions with voter turnout in German national elections as dependent variable. The main explanatory variable is a dummy indicating the closure of the local high school. East German municipalities are the unit of observation. Significance levels (standard errors clustered at the municipality level in brackets): *** 0.01, ** 0.05, * 0.1.

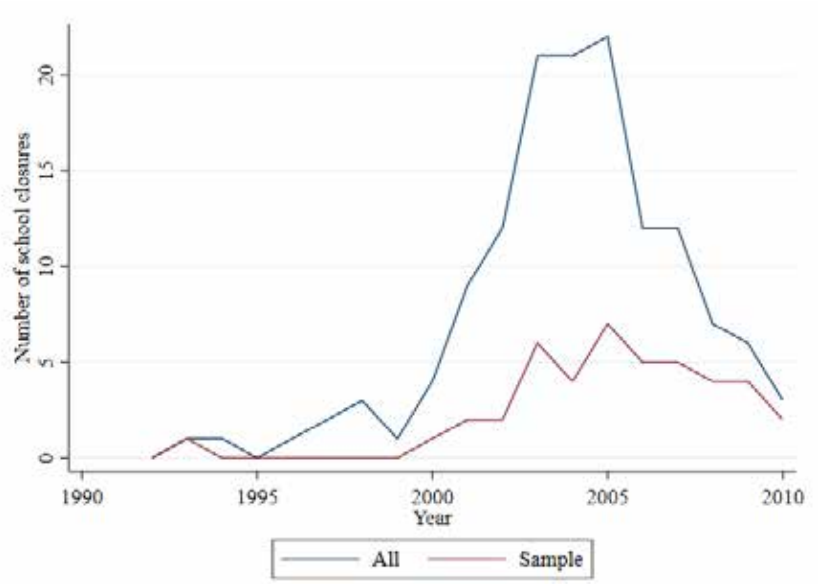
Table 6: Party vote shares

	Vote share for			
	center-right	center-left	far-right populist	far-left populist
	(1)	(2)	(3)	(4)
School closure	-0.179	-0.393	-0.121	0.607*
	(0.381)	(0.392)	(0.234)	(0.343)
Mean dep. var.	41.545	29.286	3.979	20.312
Years	1992–2010	1992–2010	1992–2010	1992–2010
Obs.	1,000	1,000	1,000	1,000
State-year fixed effects	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes

Notes: The table shows the results of fixed effects OLS regressions with vote shares for different parties in state elections as dependent variable. The main explanatory variable is a dummy indicating the closure of the local high school. East German municipalities are the unit of observation. Significance levels (standard errors clustered at the municipality level in brackets): *** 0.01, ** 0.05, * 0.1.

A Online Appendix: Supplementary material

Figure A1: High school closures



Notes: The figure shows the total number of high schools that were closed in a particular year between 1992 and 2010. The blue line shows all schools that were closed in East Germany. The red line shows the schools that were closed in one year in the sample used.

Table A1: Date of state elections

State	Election day				
Mecklenburg-Western Pomerania	10/14/1990	10/16/1994	09/27/1998	09/22/2002	09/17/2006
Saxony-Anhalt	10/15/1990	06/26/1994	04/26/1998	04/21/2002	03/26/2006
Brandenburg	10/14/1990	09/11/1994	09/05/1999	09/19/2004	09/27/2009
Saxony	10/14/1990	09/11/1994	09/19/1999	09/19/2004	08/30/2009
Thuringia	10/14/1990	10/16/1994	09/12/1999	06/13/2004	08/30/2009

Notes: The table shows the election day of state elections. Mecklenburg-Western Pomerania and Saxony-Anhalt held state elections in the same year but on different days; Brandenburg, Saxony, and Thuringia held state elections in the same year but on different days.

Table A2: Robustness tests

	Turnout				
	Base	1998-2010	Controls	w/o TH	Sun and Abraham
	(1)	(2)	(3)	(4)	(5)
School closure	-1.814***	-1.350***	-1.147***	-1.730***	-1.328**
	(0.609)	(0.395)	(0.393)	(0.615)	(0.664)
Mean dep. var.	56.490	55.358	55.231	56.679	56.805
Years	1992–2010	1998–2010	1998–2010	1992–2010	1992–2010
Obs.	999	750	698	823	1,003
Controls	No	No	Yes	No	No
State-year fixed effects	Yes	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes

Notes: The table shows the results of fixed effects OLS regressions with turnout in state elections as dependent variable. The main explanatory variable is a dummy indicating the closure of the local high school. East German municipalities are the unit of observation. Column (1) reproduces the baseline findings in column (4) in Table 4. Column (2) uses a shorter time period from 1998–2010. I include control variables in column (3). Column (4) excludes Thuringia. In column (5) I employ the estimator proposed by Sun and Abraham (2021). Significance levels (standard errors clustered at the municipality level in brackets): *** 0.01, ** 0.05, * 0.1.

B Online Appendix: Data description and sources

I compile a new dataset at the level of East German municipalities. I track all local government mergers as best as possible to reproduce a consistent territorial status as of 2010 for all years.

B.1 Election data

State elections 1990, 1994, 1998, 2002, 2006: I retrieve the data at the municipality level for Mecklenburg-Western Pomerania from the website of the State Office for Internal Administration `https://www.laiv-mv.de/Wahlen` and for Saxony-Anhalt from the website of the State Returning Officer of the State of Saxony-Anhalt `https://wahlen.sachsen-anhalt.de`. I compute voter turnout as the share of valid votes over the electorate.

State elections 1990, 1994, 1999, 2004, 2009: I retrieve the data at the municipality level for Thuringia from the website of the Thuringia State Statistical office `https://wahlen.thueringen.de`, for Saxony from the website of the Statistical Office of the Free State of Saxony `https://www.statistik.sachsen.de` and for Brandenburg from the website of the State Returning Officer of the State of Brandenburg `https://wahlen.brandenburg.de`. I compute voter turnout as the share of valid votes over the electorate.

B.2 Local high school data

Local high schools 1992–2010: I use data on the total number of local high schools for East German municipalities. Data has been graciously provided by Martin Simmler.

High schools 1992–2022: I use data on the total number of high schools in German states.

B.3 Matching variables

Population 1985: I use population data from Felix Roesel (Roesel, Felix (2022): The German Local Population Database (GPOP), 1871 to 2019, Journal of Economics and Statistics

(Jahrbücher für Nationalökonomie und Statistik). DOI: https://doi.org/10.1515/jbnst-2022-0046.).

Population growth 1946–1985: I use population data from Felix Roesel (Roesel, Felix (2022): The German Local Population Database (GPOP), 1871 to 2019, Journal of Economics and Statistics (Jahrbücher für Nationalökonomie und Statistik). DOI: https://doi.org/10.1515/jbnst-2022-0046.). I compute the population growth between 1946 and 1985.

Population density 1985: I use population data from Felix Roesel (Roesel, Felix (2022): The German Local Population Database (GPOP), 1871 to 2019, Journal of Economics and Statistics (Jahrbücher für Nationalökonomie und Statistik). DOI: https://doi.org/10.1515/jbnst-2022-0046.). This dataset includes also the area of a municipality.

B.4 Controls

Population 1990–2010: Female municipality population for 31st December is collected from the annual directory of German municipalities (*Gemeindeverzeichnis*) published by the Federal Statistical Office of Germany.

Jobs per capita 1994–2010: I compute the total number of jobs per capita and for all municipalities. Data are from annual publications of the Federal Employment Agency (*Sozialversicherungspflichtig Beschäftigte am Stichtag 30. Juni*).

Share of in-commuters 1994–2010: I compute the share of in-commuting workers per capita. Data are from annual publications of the Federal Employment Agency (*Sozialversicherungspflichtig Beschäftigte am Stichtag 30. Juni*).

Unemployed per capita 1998–2010: I use the total number of unemployed per capita. Data are from annual publications of the Federal Employment Agency (*Arbeitslose nach Gemeinden*).