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Centralized Monitoring, Resistance, and Reform Outcomes: Evidence from School Inspections in Prussia

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Evidence from School Inspections in Prussia

Abstract

During the *Kulturkampf* at the end of the nineteenth century, Prussian authorities introduced centralized inspections to improve school outcomes in particular in Catholic regions. To measure the effect of the reform, I combine unique data on school inspectors with Prussian county-level data. I apply a difference in difference approach exploiting regional differences in the introduction of the reform. I find positive effects of the reform on school performance in interdenominational regions but no effect in predominantly Catholic regions. An increase in private enrollment in the latter regions provides further evidence for Catholic resistance.

Keywords: Prussian economic history, education, monitoring, reform, resistance

JEL classification: N33, I21

INTRODUCTION

Can a reform opposed by the targeted population improve school conditions? Introducing school accountability has generally shown positive effects on student test scores as David Figlio and Susanna Loeb's (2011) review of the literature shows. The introduction of a school inspection reform in Prussia against the background of the *Kulturkampf*, a conflict between the Prussian government and the Catholic Church, provides an ideal laboratory to test the effectiveness of an early form of school accountability in a setting where the targeted population vehemently opposed the introduction of the reform. Furthermore, this paper for the first time provides comprehensive empirical evidence on the effect of the *Kulturkampf* and more specifically the School Inspection Law whereas the historical literature so far provided piecemeal evidence for single provinces but no coherent picture for whole Prussia with the exception of Marjorie Lamberti's (1989) encompassing work on the elementary school in Imperial Germany.

The reform introduced school inspectors, who were selected, mandated and paid by the central government and replaced the clergy who had previously exercised this task gratuitously and additional to their clerical office. The task of centrally installed school inspectors encompassed enforcing school attendance and improving the school system in general (Lamberti 1989, pp. 40-87).

In order to observe the introduction of the reform, I hand-collected data on school inspectors for the period from 1876 to 1886, containing information on the names, employment status (in other words whether the school inspector was mandated through the central state or through the church) and location of on average 552 inspectors per year, from a publication of the Prussian Ministry of Ecclesiastical and Education Affairs. I

combine these data with Prussian county-level census data from 1864 and 1886 allowing measuring outcomes both before and after the reform.

The setting and data allow applying a difference in differences approach, comparing the different trends of the outcome variables between the counties under centralized monitoring versus the counties not affected by the reform. As the objective of the reform was to increase school attendance, school enrollment will be looked upon as the main outcome variable and is expected to increase through the reform. To get closer at the underlying mechanisms of the reform, I furthermore examine school density, the student-teacher ratio and private enrollment as intermediate channels. As the school inspector's task encompassed observing the resource deficiencies of the schools and to recommend remedies to the local bureaucracy (Lamberti 1989, p. 82), I expect, an improvement in the provision of schools and teachers. Given the prior that the quality of the public educational system improved through the introduction of centralized monitoring, sending children to private schools becomes less pressing which is why I expect private enrollment to decrease. The historical narrative stresses resistance against the reform coming from the Catholic population that opposed the introduction of the reform. To identify possible resistance effects a triple interaction of the treatment effect and the share of Catholics is introduced in a second step.

Results show that centralized monitoring increases school enrollment overall. When examining the intermediate channels, centralized monitoring amplifies the overall increase in teacher supply. The general shift towards more private schooling is mitigated in counties with centralized monitoring, suggesting higher adherence to the public school system as hypothesized. No significant effect for school density is found.

When it comes to detecting resistance effects, the positive effect on school enrollment is mitigated in predominantly Catholic counties. As an evasion mechanism, private enrollment increases in predominantly Catholic counties. In the western part of Prussia, the teacher supply decreases in counties with a predominantly Catholic population despite an overall secular hinting at a particularly strong resistance from the Catholic population in western Prussia.

The paper combines two strands of the literature, namely the literature on school inspections and put broadly, school accountability, and the literature on the resistance to reforms. In detecting resistance effects, I follow Daron Acemoglu and co-authors (2011) who examine the effect of the enforced introduction of the French Civil Code in Germany to see whether "designed" and externally imposed institutions can foster economic progress or whether they are, instead, ineffective due to resistance from the targeted population. Acemoglu et al. (2011) find positive effects of the French reforms, arguing that imposed institutions can lead to more growth and higher prosperity if the newly imposed institutions replace growth-impeding ancient institutions. I expand this inquiry to educational interventions, considering that identity might play a bigger role when carrying out reforms in the educational as opposed to the economic sphere. In this line, David Austen-Smith and Roland G. Fryer (2005) theoretically explain the black-and-white achievement gap in the U.S. by the loss of identity. By choosing white and thereby on average better-performing schools, blacks lose their adherence to the group. Fearing exclusion from their social group, they avoid white schools, consequently leading to lower school performance. This theoretical argumentation goes in line with the alleviated effect found for school enrollment in counties with a high share of Catholics as

Catholics would want to avoid losing their Catholic identity by attending schools promoting Prussian-Protestant values and a German identity.[1]

The literature on school monitoring discusses the effectiveness of school inspections in countries such as England, the Netherlands and Sweden (for example, Harry Patrinos, 2011; Leslie Rosenthal, 2004). Beyond this, introducing central school inspectors can be understood as an early form of school accountability. Evidence on school accountability mainly comes from intra-U.S.-state comparisons finding that the introduction of accountability systems leads to increased student achievement (for example, Martin Carnoy and Loeb, 2002; Thomas Dee and Brian Jacob, 2011; Eric Hanushek and Margaret Raymond, 2005; Jacob, 2005). Figlio and Loeb (2011, p. 384) argue that accountability systems work in settings where community members and parents have an interest in improving school performance and are eager to pursue the objectives of the reform, which is clearly not the case in the historical setting provided by the School Inspection Law. While the existing literature often lacks an appropriate control group to clearly determine a causal effect (Hanushek and Raymond, 2005), the introduction of the reform in regions with a substantial share of Catholics as opposed to predominantly Protestant regions allows comparing the variation of outcomes between the treatment and control group both before and after the reform.[2]

[1] On nation and identity building through primary schools, see Francesco Cinnirella and Ruth Schueler (2016a).

[2] Similarly for the U.S., Manyee Wong, and co-authors (2009) compare the improvement of public schools which are covered by the "No Child Left Behind Policy" which introduced school accountability in U.S. states to Catholic and non-Catholic private schools which are excluded from this policy.

HISTORICAL BACKGROUND

The foundation of the German Empire in 1871 led to the foundation of a German nation state excluding German-speaking Austria. As Prussia was the largest and most powerful state in the German Empire, Prussian-Protestant hegemony arose with the Prussian King meanwhile being the German Emperor (for example, Stan Landry, 2011). Douglas Hatfield (1981) describes the consequences for the Catholic population of the newly founded Empire. As Catholic Austria was excluded, the Catholics became a decided minority in the new Empire. 40 percent of the population was Catholic and concentrated in the Rhenish and Westphalian provinces in the West and in the eastern provinces of Silesia, Posen, and both East and West Prussia.

Kulturkampf

As the German unification movement represented a triumph of Protestant state interests over the Catholics, the grounds were paved for a serious conflict between the Prussian state and the Catholic Church, the so-called *Kulturkampf*, which coined the Protestant-Catholic relationship throughout the first decade of the newly founded Empire (Hatfield 1981).[3]

The *Kulturkampf* was fuelled by the fear of organized Catholicism. First of all, the Papal infallibility decree that was passed during the First Vatican Council in 1869/70 in order to declare that the Pope's decisions concerning theological matters were preserved from the possibility of error was understood as being incompatible with the sovereignty of the German Emperor as the head of the state. The Center party emerged as the Catho-

[3] For a detailed narrative on this historical period and the *Kulturkampf*, see Wolfgang Mommsen's (1993) definitive book on Imperial Germany during Otto von Bismarck's mandate.

lic stronghold in the party system and the Polish nationalist current in Prussia's eastern provinces increasingly identified with the Catholic confession (Hatfield 1981).

Laws on both the German federal and the Prussian state level were passed to decrease the power of the Catholic Church. The first active step at the Prussian state level was the dissolution of the Catholic division of the Ministry of Ecclesiastical and Education Affairs in July 1871. The so-called "Pulpit Paragraph" followed in December 1871 which ruled that clergymen were prohibited to use their positions to influence public assemblies for political means. The School Inspection Law of 11 March 1872—which will be described in detail below—shifted the authority to appoint inspectors for all levels of public and private schools from the church to the state and left to the state to define the extent of the inspector's supervisory power. Its objective was to eliminate the clerical domination of the schools both at the local and district level.[4] On 4 July 1872, another law ruled on the expulsions of the Catholic order of the Jesuits from Germany. Finally, the May Laws of 1873, 1874 and 1875, restricted the recruitment for and practice of clerical posts, making a "culture exam" mandatory for becoming a priest and allowing expelling priests in case of non-obedience as well as the dissolution of all clerical orders (Hatfield 1981).

The *Kulturkampf* coincided with the *Germanization* policy of the Prussian state in the eastern provinces aiming at *Germanizing* the Polish (or other Slavic) minorities. In 1873/74 language decrees introduced German as the only language of instruction in primary schools—with religious education being the only exception allowing for the

[4] Lamberti (1989), arguing that the *Kulturkampf* was especially fought in the schools, describes the School Inspection Law as the actual initiator of the *Kulturkampf*.

instruction in a minority language—in the provinces of Posen and West Prussia (Lamberti 1989, p. 113). This historical simultaneity led to the fact that the common historical narrative describes the so-called Polish question and the *Kulturkampf* as being strongly intertwined.

How rigorously the *Kulturkampf* legislation was enforced varied across provinces. Klaus van der Groeben (1992a, p. 194) describes the enforcement of the *Kulturkampf* in the province of East Prussia while Georg-Christoph von Unruh (1992, pp. 392-99) examines the implementation in the province of Posen. In the province of East Prussia, the highest administrative official of the province (the so-called *Oberpräsident*) decided upon the implementation of the *Kulturkampf* legislation. In Posen, on the other hand, the laws were implemented at the lowest administrative level which especially fuelled the conflict between Germans and Poles.

Wherever possible, the Catholic clergy reacted to the laws with noncompliance. Regarding the May laws, no Catholic student ever presented himself as a candidate for the state's "culture exam" which—as a response—made the Prussian authorities intensify their measures. Bishops and other responsible clergymen were fined, imprisoned for short sentences or removed from office. The consequence was that by 1879 when the *Kulturkampf* practically ended, nine of 12 Prussian bishoprics and 955 parishes were vacant (Hatfield 1981) and 2,848 priests had lost their right to teach religious education (Frank-Michael Kuhlemann 1991, p. 185).

Anne Roerkohl (1992) describes the resistance against the *Kulturkampf* in the province of Westphalia. Due to the strong enforcement of the *Kulturkampf* legislation through the Westphalian *Oberpräsident*, resistance against the *Kulturkampf* measures was particularly strong in the province of Westphalia, culminating in demonstrations

held to manifest the Catholic solidarity. The resistance in Westphalia was mainly led by the bishops of Muenster and Paderborn and ranged from the passive resistance by the Catholic population to strikes of Catholic industrial workers and boycotts of national holidays such as the Day of Sedan to celebrate the victory over the French army in 1870 or the Anniversary of the Emperor. The Catholic press supported and fuelled the resistance. As a consequence of the resistance, many Catholic chief administrative officers of a county (*Landrat*) lost their office. The school again became a battleground of the *Kulturkampf* as Catholic parents withdrew their children from joining military parades in honor of the Emperor.

Despite all this agitation, the *Kulturkampf* did not achieve its aim to undermine the power of the Catholic Church. Instead, it ultimately strengthened the unity of the Catholic Church and established a solidarity between the clergy and the Catholic population and increased support for political Catholicism, namely the Center party. Instead of generating a homogeneous nation, it widened and deepened the inter-confessional split in Germany (Hatfield 1981) and gave rise to the so-called "Catholic social milieu" (a term coined by Rainer Lepsius (see for example Landry 2011)).

After diplomatic negotiations between the Prussian state and the Vatican, the *Kulturkampf* was officially ended in 1886/87 by the so-called Peace Laws.

The School Inspection Law of 1872, its Implementation, and Resistance

The functioning and quality of the Prussian educational system was guaranteed by school inspectors and as a consequence, the backwardness of schools in predominantly Catholic regions was ascribed to Catholic school inspectors who did not exercise their office dutifully (Groeben 1992b, p. 321).

The principal task of school inspectors was to monitor school attendance. Catholic school inspectors were accused of systematically exempting students from school in the harvesting season, leading to lower school enrollment in Catholic regions (Kuhlemann 1991, pp. 182-183). Furthermore, school inspectors examined the achievement of pupils and the effectiveness of teacher's instruction and reported those to the district government in the form of annual reports as described by Gert Geissler (2011, p. 201) in his compendium on the development of the German school system.

When in March 1872, the School Inspection Law was introduced by Adalbert Falk, the Minister of Ecclesiastical and Education Affairs, school inspection was shifted from the church to the state. As described by Helmut Glück (1979, pp. 260-69) school supervision was supposed to professionalize through the installment of full-time and paid school inspectors which consequently should make primary school more effective.

Even though contemporary observer Johannes Tews (1914, p. 161) notes that the law did not specify any qualifications of central inspectors, the new inspectors constituted themselves of secondary schoolteachers, school principals, and instructors in teacher seminars (Lamberti 1989, p. 81). They were state officials and received a fixed salary (Unruh 1992, p. 393).

There was no implementing rule for the law (Kuhlemann 1991, p. 185). In 1873, the implementation of central school inspectors was restricted to 50 counties due to a limited state budget. Decisions on the reorganization of school supervision were taken case by case. As the law was implemented triggering the *Kulturkampf* and as it had the objective to improve the poor school conditions of the Catholic and especially the formerly Polish regions, central school inspectors were first of all introduced in Polish-speaking Catholic counties as a testing field which geographically meant that central

school inspectors were clustered in the Catholic regions east of the Elbe which had formerly belonged to the Polish-Lithuanian Commonwealth.

The provinces of Rhineland and Westphalia in the West which were also predominantly Catholic followed. The implementation of the law in the East as opposed to the West of Prussia differed in the way that the school inspectors installed in the East, especially in the province of Posen, originated from other provinces. They were German-speaking Prussians who had little knowledge on the local educational system leading to resentment of the local Polish-speaking population towards the newly imposed inspectors (Lamberti 1989, p. 81). The strict implementation of the law in Catholic regions, mandated by the central state authorities, led to the fact that the historical literature describes the law as clearly anti-Catholic and anti-Polish (Kuhlemann 1991, p. 184).

The implementation of the law was closely connected to the figure of Adalbert Falk who aimed at modernizing the Prussian educational system. When the *Kulturkampf* was practically brought to an end in 1879, Adalbert Falk had to bear the consequences as the School Inspection Law was understood as one of the laws having triggered the *Kulturkampf*. He had to lay down his office in 1879 which led to an immediate stop of the implementation of the reform. Even though the new Minister of Ecclesiastical and Education Affairs, Robert Viktor von Puttkamer aimed at reintroducing the distinct denominational educational system, the reform was never reversed which meant that central and clerical school inspectors stayed in office simultaneously and the non-uniform implementation of the reform remained in practice until the end of World War I in 1918 (Kuhlemann 1991, p. 185). The timeline in Figure 1 depicts the timing of the historical events.

[Figure 1 about here.]

The historical literature judged that the law did not bring about big changes in its ultimate goal of improving school performance. Temporary observers stressed the resistance against the law and how it changed the relationship between the Catholic Church and the state. Tews (1914, pp. 161-170) reports that citizens in Catholic counties were less willing to follow what is taught in primary school as they understood the School Inspection Law as a means to fight the Catholic clergy. The more recent literature is more favorable in its evaluation of the law, conceding that school inspectors especially served as catalysts to improve school performance in the Rhine Province (Lamberti 1989, p. 82).

DATA

To examine whether introduction of central school inspectors had a positive impact on school performance and its intermediate channels, I digitized data on central and clerical school inspectors and combine these newly digitized data with Prussian county-level census data.

Data on School Inspectors

The data on county school inspectors stem from the *Zentralblatt*, a monthly publication of the Prussian Ministry of Ecclesiastical and Education Affairs that informed on current topics in education (Ministerium der geistlichen Unterrichts- und Medizinal-

Angelegenheiten, 1876-1878, 1880-1886).[5] Issues of the *Zentralblatt* from 1876 to 1878 contain information on central school inspectors appointed by the central state authorities, including their last names and the county, municipality or parish in which they were installed. Furthermore, vacant positions are advertised. I collected data for each location and allocated school inspectors to the corresponding county in order to be able to ultimately merge the data on school inspectors with Prussian county-level data. For the years from 1880 to 1886, the *Zentralblatt* additionally includes information on clerical positions. This information equally includes the school inspector's last name and his location, as well as his main profession (in other words, priest, pastor, deacon, superintendent, among others) if he held a clerical office. This information provides the total number of school inspectors and allows observing whether central and clerical school inspectors were in office simultaneously. On average information about 552 school inspectors is collected for each year.

I compute the share of central county school inspectors among all county school inspectors to capture the intensity of the treatment. For the years from 1876 to 1878, for which I lack information on the total number of school inspectors, I assume that the

[5] An example of a page reporting information on central and clerical school inspectors for the year 1886 can be found in the Appendix, Figure A1.

number of school inspectors stayed fairly constant over time and use the total number of county school inspectors for the year 1880.[6]

To capture the gradual implementation of central school inspectors over time and account for the fact that some counties were treated from the beginning while others received a central school inspector only later, I sum up the shares of central county school inspectors per total county school inspectors and divide the sum by the period of observation, that is, 10 years, applying the following formula:

$$c_i = \frac{1}{10}\left(\sum_{1876}^{1878} \frac{central\ inspectors_{it}}{total\ inspectors_{1880}} + \sum_{1880}^{1886} \frac{central\ inspectors_{it}}{total\ inspectors_{it}}\right) \qquad (1)$$

The treatment variable c_i, therefore, measures the average annual share of central school inspectors in a county *i* over the period between 1876 and 1886. It is bound between 0 and 1, taking the value of 0 if the county was never under central school inspection and taking the value of 1 if school inspection was carried out by a central school inspector during the entire period of observation. This measure of the treatment allows observing the implementation of the reform—both concerning its timing and its intensity.[7]

[6] For 1880 and 1881, the number of total school inspectors is indeed quite stable with a total of 602 school inspectors in 1880 and a total of 613 school inspectors in 1881. After a sharp drop in 1882 the number of school inspectors increases from 1883 onwards reaching 631 inspectors in 1885. Instead of assuming a constant number of school inspectors between 1876 and 1878, the number of total school inspectors for the years 1876 to 1878 can be interpolated. Doing so does not affect the results.

[7] In employing this measure, I assume that a central school inspector in office in 1876 had the same effect on outcomes as a school inspector in office in 1886.

As can be seen in Figures 2 and 3, the share of central school inspectors was especially high in those regions of Prussia that faced a high concentration of Catholics, in other words in the provinces of Westphalia and the Rhineland in the West and the eastern provinces of Silesia, East and West Prussia and Posen. This illustrates the above described implementation of the reform in predominantly Catholic areas of Prussia.

Figure 4 stresses that the implementation of central county school inspectors clearly followed ideological motives. Central school inspectors were introduced in those regions where the share of Catholics was highest. Figure 4 also illustrates that the introduction of central county school inspectors stopped when Adalbert Falk, Minister of Ecclesiastical and Education Affairs, stepped down from office in 1879. After this, the share of central county school inspectors even slightly decreased in predominantly Catholic counties (in other words, counties with a Catholic share exceeding 90 percent in 1885) due to the period of *reconfessionalizing* primary schools, and stayed fairly constant in predominantly Protestant (in other words, counties with a Protestant share exceeding 90 percent in 1885) and interdenominational counties. For the identification—especially of the resistance effects below—it is important to bear in mind that central school inspection was introduced both in predominantly Catholic and interdenominational counties. I will exploit these degrees of Catholicism in the introduction of the reform to detect resistance effects.

[Figures 2, 3 and 4 and Table 1 about here.]

Table 1 (Panel A) shows that the average treatment with central school inspectors amounted to 37 percent throughout the ten years of observation. Counties west of the

Elbe were treated in 44 percent of the cases, while counties east of the Elbe were only treated in 33 percent of the cases. In 1886, there were on average close to two school inspectors per county (including both central and clerical school inspectors). As the implementation of the School Inspection Law was taken case by case, geographical patterns emerge for different districts. In the predominantly Catholic districts of Muenster in Westphalia and Breslau in Silesia, the implementation of the School Inspection Law meant a complete substitution of clerical inspectors by central inspectors. In the district of Posen with a large Polish-speaking Catholic population, clerical and central inspectors were in office simultaneously (which is counted as an annual value of 0.5). In other districts multiple clerical inspectors were in office simultaneously. There were 35 counties which faced centralized school inspection over the whole period of observation which were mainly situated in the provinces of Silesia, the Rhineland and Westphalia whereas 152 counties never experienced the introduction of the reform. On average, one school inspector, irrespective of whether he was a clerical or central school inspector, was in charge of 50 schools and consequently 7,010 students in 1886. The ratio of inspectors over schools was slightly better in the western provinces of Prussia where one school inspector was in charge of 45 schools while one school inspector had to inspect 53 schools in Prussia east of the Elbe.

Prussian Census Data

To examine the effects of the school inspection reform, I manually allocate the data on school inspectors to Prussian county-level census data stemming from the Royal Statis-

tical Office of Prussia, made available by the ifo Prussian Economic History Database (iPEHD)[8].

School Attendance

As the goal of the reform was to improve school attendance, I use school enrollment as the main outcome variable. I construct the dependent variables, both before and after the treatment, from the population census of 1864 and the education censuses of 1886. School enrollment is measured by the number of students attending public or private primary school among all children of mandatory school age, that is, between six and 14 years old.

The descriptive statistics in Table 1 (Panel B) show an increase for the overall enrollment rate. The standard deviation decreases tremendously, hinting at convergence in enrollment rates over the 22 years of observation which can be attributed to the fact that school enrollment is censored between 0 and 1. The convergence of school enrollment is also illustrated by the subsamples east and west of the Elbe. While school enrollment started off at 69 percent in the sample east of the Elbe, average enrollment rates of 78 percent were already achieved in Prussia west of the Elbe in 1864. However, East Elbian counties managed to catch up to the counties west of the Elbe with school enrollment rates above 87 percent in both parts of Prussia in 1886.

Intermediate Outcomes

In order to explore the channels on how the introduction of central school inspectors might have improved the ultimate goal of increasing school enrollment, I furthermore

[8] For details on iPEHD, see Sascha O. Becker and co-authors (2014).

examine the effects of the reform on school density, the student-teacher ratio, and the ratio of private over public students as inputs into the production function, following the logic of an educational production function. Data equally stem from the population census of 1864 and the education census of 1886. School density is the number of primary schools per 1,000 children of school age (6-14). The student-teacher ratio is constructed by the ratio of students attending public or private primary school over the total number of primary school teachers. Private enrollment is the ratio of private over public students attending primary school.

Table 1 (Panel C) again gives insights into the changes of the intermediate variables of interest. The small decrease in school density—observed in all three samples—is likely to go back to tremendous population growth in the ending nineteenth century. Wolfgang Neugebauer (1992, pp. 707-08) already notes that the school roll-out could not keep up with the increasing number of students. The decrease in the standard deviation shows that schools became more evenly distributed across Prussia between 1864 and 1886. The increasing student-teacher ratio observed for the full sample is due to the population increase at the end of the nineteenth century. Once splitting the sample into the East and the West, it becomes evident that this increase is driven by the eastern provinces of Prussia. As private schools played a minor role in the Prussian educational system (Geissler 2011, p. 267), the increase in the private-public enrollment ratio from 1 to 6 percent is remarkable.

Other Determinants of Educational Outcomes

Data for covariates are from the population censuses of 1864 and 1885 and the occupation censuses of 1867 and 1882. Additionally, state expenditures per child are construct-

ed from the education census of 1886 to control for interventions from the central government.[9] For a placebo test, presented below, data from the population and occupation census in 1849 are used.

I include standard covariates to capture differences in the supply of and demand for education across counties. The share of Protestants accounts for the fact that Protestants had a higher demand for education as demonstrated by Sascha O. Becker and Ludger Woessmann (2009). The share of urban citizens among the total population captures that people living in cities need different skills than those living in rural areas, which might increase the demand for schooling in cities, and equally accounts for the fact that the urban schooling system was generally more advanced. The share of people working in manufacturing or agriculture, respectively, accounts for the demand for schooling in counties that have different industrial structure.[10] The dependency ratio captures that the provision of schooling is more difficult where many young people in school age face few people in active labor force age, being able to pay for the public educational system.[11] The share of people who indicate another language than German as their first language controls for the possibly lower demand for education by ethno-linguistic minorities. As one of the aims of the School Inspection Law was to generate a homogene-

[9] State expenditures for primary education were marginal in 1886 as school funding was organized locally.

[10] The share of people working in manufacturing or agriculture is constructed by dividing the number of workers employed in the respective sector by the total population.

[11] The child dependency ratio is measured as the number of people below 19 years over the population between 20 and 70 years old in 1885 and as the number of people below 15 years over the population between 15 and 65 years old in 1864.

ous German nation, the population that did not identify as German might have been less willing to comply with its provision.[12] By including population density, I control for the claim made in the historical literature that densely populated parishes suffered particularly from clerical school inspection resulting in lower provision of schooling (Lamberti 1989, p. 23). Furthermore, I control for landownership concentration by including the share of large landholdings as Cinnirella and Hornung (2016) show that the presence of large landowners lowered school enrollment. A dummy for whether the county was mainly under partible inheritance law captures historical inheritance patterns, which might have influenced the demand for schooling as non-partible inheritance could have led to a higher demand for schooling because non-inheriting children would have to look for work outside agriculture. Finally, I control for central expenditures. Funding for primary schools had for a long time been the responsibility of the municipality. Even though central school funding only increased after a shift in legislation in 1888/89 and constituted on average only about 10 percent of school funds in 1886, including this variable rules out that improvements in the educational system are simply driven by higher financial support by the state.[13] When looking at the student-teacher ratio, I additionally include school density in order to capture the intensive margin.

Table 1 (Panel D) depicts the industrial and social trends in the 20-years window of observation. The denominational composition of Prussia stayed fairly constant with the

[12] On the effect of linguistic polarization on the provision of public goods, see (Cinnirella and Schueler 2016b).

[13] Cinnirella and Schueler (2016) show that coordination failure impeding the provision of primary education in ethno-linguistically polarized regions of Prussia might be overcome by central state interventions induced in 1888/89.

Prussian population being nearly 60 percent Protestant. The increasing urban and industrial shares capture the industrialization taking place during this period. The tremendous population increase is mirrored by the increasing child dependency ratio and the rising population density. The share of the population whose first language is not German stays fairly constant over time.

CENTRALIZED MONITORING AND REFORM OUTCOMES

The historical narrative has overall described the introduction of centralized monitoring as having failed in increasing school enrollment and schooling conditions. By first looking at pure correlations between centralized monitoring and school outcomes, I illustrate the historical narrative. Using a difference in differences approach in a second step permits comparing differences in outcomes between those counties that came under central school inspection and those that remained under clerical inspection which allows detecting the true effects of the reform and revisiting the historical narrative.

Conditional Correlations – the Contemporary Narrative

I first look at central school inspectors in a cross-sectional setting by estimating the following estimation equation:

$$Y_i = \beta_0 + \beta_1 c_i + X_i \beta_2 + \alpha_p + \varepsilon_i \qquad (2)$$

where Y_i denotes school enrollment rate in county *i* in 1886. In a second step, I look at the intermediate channels by observing school density, the student-teacher ratio, and the ratio of private over public students as outcome variables. c denotes the treatment varia-

ble, measuring the annual average share of central county school inspectors between 1876 and 1886. It therefore measures how intensively the county has been treated by centralized monitoring over the period of 1876 to 1886. X denotes the vector of covariates. α_p denotes province-fixed effects for eight provinces. ε denotes the error term.

As the Prussian state had a particular objective in the formerly Polish regions in the East (which meant Germanizing the Polish-speaking population) as opposed to the Catholic provinces of Rhineland and Westphalia, I split the sample into the counties west and east of the river Elbe in a next step. I furthermore exclude city-counties from the sample as the professionalization of school inspectors had begun in cities starting in 1848 (compare Neugebauer 1992, p. 685), reducing the sample by 12 observations.

The results—as shown in Table 2, Panel A—back up the common-held view of the historical narrative that the school inspection reform did not achieve its objective. The coefficients of regressing school enrollment on the share of central school inspectors do not show up significantly; an exception being the coefficient for the sample east of the Elbe which is positive and significant at the 5 percent significance level (column 4).

Panel B (Table 2) presents the coefficients for the intermediate outcomes on centralized monitoring. The estimates of regressing school density on the share of central school inspectors, depicted in the first bloc of Panel B do not show a clear pattern. While the parsimonious coefficient in column 1 is significantly negative, the coefficient turns positive and insignificant once covariates are accounted for. The coefficient in the West Elbian sample is positive while it is negative in the East Elbian sample. The student-teacher ratio is positively correlated with the share of central school inspectors in the parsimonious model (second bloc of Panel B, column 1). Ergo, the number of teachers was lower in regions facing the implementation of the reform. This could be due to

the fact that the reform was introduced in counties that lagged behind in terms of school capacity and also economic development impeding school expansion. Once conditioning on covariates, no significant association can be depicted for the student-teacher ratio. Private enrollment is negatively and significantly associated with the share of central school inspectors in the parsimonious model (third bloc of Panel B, column 1). Again the significant association disappears once covariates are accounted for. The finding that a higher share of central school inspectors is related to both lower provision of schools and teachers in the parsimonious suggests that centralized monitoring was introduced in regions that initially lagged behind in terms of school capacity.

[Table 2 about here.]

Establishing Causality

If central county school inspectors were introduced in counties that had a special need to improve schools, because school enrollment, school density, and the provision of teachers were low, OLS results might simply capture the generally lower levels of educational infrastructure in these counties and might hence be biased. Being able to observe measures for school performance and the intermediate channels in 1864 and exploiting the gradual and partial implementation of the School Inspection Law allows applying a difference in differences approach.

The Difference in Differences Model

By looking at changes in the variables of interest, I can capture the actual improvements in schooling due to the introduction of central county school inspectors. I estimate the following equation:

$$Y_{it} = \beta_0 + \theta(c_i * Post) + \beta_1 c_i + \beta_2 \cdot Post + X_{it}\beta_3 + \alpha_p + \varepsilon_{it} \quad (3)$$

where c_i again denotes the average annual share of central county school inspectors in county i between 1876 and 1886. $Post$ is a dummy variable for the year 1886. The treatment effect is measured by θ. X again denotes the vector of controls. α_p denotes province-fixed effects for eight provinces. ε is the error term. Standard errors are clustered at the county-level.

The assumptions underlying the identification are standard for applying a difference in differences approach. The timing of the school inspection reform has to be uncorrelated with any trends in outcomes or any county-specific shocks that affected school outcomes at the same time or with any other policies influencing the observed school outcomes.

When thinking of other major changes that might have affected the demand and supply of education between 1864 and 1886, it might be that different development patterns such as a different uptake of industrialization and urbanization increased the demand for education and triggered school improvements. I therefore include the changes in all covariates in order to account for possible confounding factors over time which are not attributable to the School Inspection Law. The first comprehensive Prussia-wide school law was only passed in 1906. Moreover, central funding of primary schools, which increased the central government's influence on educational matters, was only introduced in 1888/89.[14]

[14] On the effect of the reform see Cinnirella and Schueler (2016b).

[Table 3 about here.]

The Effect of Centralized Monitoring on School Attendance

Following the structure of the OLS design, I first look at the full sample, observing the effects of the reform both in the parsimonious model and subsequently accounting for confounding factors. I subsequently restrict the sample to the counties west and east of the Elbe and finally exclude city-counties.

By employing the difference in differences framework, I find that central school inspectors increase school enrollment significantly, reinforcing the overall positive secular trend captured by the post dummy, except for the sample west of the Elbe (see Table 3). Conditional on covariates, full centralized monitoring[15] amplifies the overall increase in school enrollment in the full sample by 2.4 percentage points (column 2). The effect is notably stronger for the sample east of the Elbe. Here, full centralized monitoring increases the overall positive rise in school enrollment by 5.9 percentage points on average. The negative, though statistically insignificant coefficient found for the sample west of the Elbe, might already hint at resistance effects. The sample west of the Elbe contains counties situated in the provinces of Rhineland, Westphalia and Saxony. The provinces of Rhineland and Westphalia were predominantly Catholic and the population in Westphalia strongly combatted the centrally imposed school inspectorate while in predominantly Protestant Saxony clerical school inspectors remained in office. The null effect found for West Elbia consequently hints at the fact that the population in the

[15] Full centralized monitoring means that school inspection is completely pursued by central school inspectorate between 1876 and 1886.

Rhineland and in Westphalia might have "successfully" hampered the central school inspector's task to increase school enrollment. Below I will examine the resistance effects more closely. Beyond potential higher resistance in West Elbia, another possible explanation for the negative and insignificant coefficient might be ceiling effects. As noted above, school enrollment in the provinces east of the Elbe was only at 69 percent in 1864, whereas it was at 78 percent in western Prussia. Thus, there was more potential for catch-up in the eastern counties.

The Effect of Centralized Monitoring on Intermediate Outcomes

Following the logic of the educational production framework, I now shift the focus to the intermediate outcomes of the reform which might have led to the increase in school enrollment; namely school density, the student-teacher ratio and private enrollment.

Table 4 (Panel A) shows mixed evidence on the effect of full centralized monitoring on school density. No significant effect of centralized monitoring is found. Interestingly, for the sample excluding city counties (column 5) a positive time trend for school density is found. This hints at the fact that rural areas saw a decrease in the number of students per schools due to urbanization.

Central school inspectors amplify the decrease in the student-teacher ratio, as displayed in Panel B, showing that the overall improvement in the provision of teachers is reinforced by centralized monitoring. The coefficient on the sample west of the river Elbe is insignificant, suggesting resistance effects. In the full sample, full centralized monitoring further decreases the student-teacher ratio by more than four students once conditioning on covariates (column 2). Consequently, the student-teacher ratio in counties with full centralized monitoring decreased by ten students overall over the period

between 1864 and 1886. Given the average student-teacher ratio of 78 students per teachers in 1864, this is a decrease of 13 percent. The pure treatment effect supports the fact that the reform was introduced in regions with a low initial provision of teachers.

Centralized monitoring mitigates the overall increase in private enrollment (Panel C). Given that the secular increase in private enrollment over time is high in all samples, this smaller increase can be considered substantial.

While the supply of teachers experienced an increase through centralized monitoring, the secular increase of private enrollment (which can be considered as a kind of evasion mechanism from the public educational system) was reduced in counties facing full centralized monitoring. This suggests that the higher attachment to the public educational system shown in Table 3 must have worked both through a higher attachment to the public system and through improving school capacity or quality.

[Table 4 about here.]

Specification Tests

A difference in differences approach relies on the common trend assumption in outcomes, meaning that the outcomes in both the treatment and the control group would follow the same trend in absence of the treatment. Applied to this setting, school enrollment and the intermediate outcomes would increase or decrease at the same rate both in counties facing centralized monitoring and in those remaining under clerical inspection. This assumption cannot be tested as this would require a parallel world allowing observing the trend in absence of the treatment. However, by examining whether

centralized monitoring affected other variables, not directly related to the objectives of the reform, I can reduce the concern by showing that the introduction of the reform was not related to any other fundamental changes.

Table 5 shows estimates for regressing the standard covariates, namely the share of Protestants, the urban share, the share employed in manufacturing and agriculture, the dependency ratio, the share of non-Germans, the population density, landownership concentration and inheritance on the treatment. The estimates for the different dependent variables illustrate that even though levels of the share employed in manufacturing or the share of non-German speakers vary between the treated and the control counties, most of the variables are not related to full centralized monitoring. A slight concern arises when looking at the share employed in agriculture, the dependency ratio and landownership concentration which all show up positive and significant.[16] The measure for the introduction of centralized monitoring naturally captures the intensity of the *Kulturkampf* in general, beyond the direct effect of the School Inspection Law. It remains to reflect whether there are any reasons how those variables could be connected to the *Kulturkampf* or also more specifically to the School Inspection Law. Population density is affected by previous fertility and migration. It could be that men in working age were

[16] Note that both population density and landownership concentration are defined slightly differently for 1864 and 1886. The dependency ratio in 1864 captures the population under 15 years over the total population between 15 and 65 years old. The dependency ratio in 1886 (1885) includes the population under 19 years over the population between 19 and 69 years. Landownership concentration is defined as the share of farms larger than 300 ha arable land in 1864 and as the share of farms larger than 100 ha arable land in 1886 (1882). Anyways, the differences in the definition of the variables should be captured by the post dummy.

more likely to leave their home county if they faced the *Kulturkampf* leading to an increase in the dependency ratio if the younger population remained. A hint to this could be the decreasing, though insignificant coefficient on population density. With the population in prime working age leaving the counties facing the *Kulturkampf*, it could equally be that it is those leaving that are qualified to hold jobs outside of agriculture, consequently increasing the relative share of people employed in agriculture in the remaining population. It would therefore be interesting to further explore if the *Kulturkampf* had economic consequences. However, this is beyond the scope of this paper.

[Table 5 about here.]

Another possibility to support the common trend assumption is to observe the effect of a so-called placebo treatment which means artificially shifting the treatment to a time period where it *did not* take place. Data on school enrollment in 1849 permit such a placebo test. The estimation follows equation (5.3), now assuming that the reform took place between 1849 and 1864. In absence of a treatment between 1849 and 1864, I expect zero effects.

Table 6 shows no effect of the placebo treatment between 1849 and 1864 on school enrollment, thus supporting the hypothesis that the increase in school enrollment between 1864 and 1886 can be attributed to the introduction of centralized monitoring in 1872.

[Table 6 about here.]

RESISTANCE

As discussed above, the historical literature claims that the *Kulturkampf* triggered massive resistance from the German-speaking Catholics in the Rhineland and Westphalia and the Polish-speaking Catholics in the territories that formerly belonged to the Polish-Lithuanian Commonwealth.[17] So far, I tested the average effect of centralized monitoring. As shown in Figure 4, centralized monitoring was introduced first of all in regions with a Catholic majority. However, interdenominational counties also faced the introduction of centralized school inspectors. In fact, interdenominational counties, which made up 43 percent of all counties, faced central school inspectors in half of the cases on average while predominantly Catholic counties, which made up 18 percent of all counties, were treated in three quarters of all cases.[18] Now, I want to compare effects in the predominantly Catholic counties to those in interdenominational counties, exploiting degrees of Catholicism.

By including a triple interaction term of the share of centralized school inspectors, the post-treatment dummy, and the share of Catholics in 1886, I examine whether resistance in predominantly Catholic counties as opposed to interdenominational counties can be observed. I estimate the following equation:

$$Y_{it} = \beta_0 + \gamma \cdot (c * Cath_{it} * Post) + \theta \cdot c_i \cdot Post + \beta_1 \cdot c_i \cdot Cath_{it} + \beta_2 \cdot Cath_{it} \cdot Post + \beta_3 \cdot c_i + \beta_4 \cdot Post + \beta_5 \cdot Cath_{it} + X_{it}\beta_7 + \alpha_p + \varepsilon_{it} \quad (4)$$

[17] In East Elbia, the share of Catholic and of non-German speakers is correlated at 67 percent. In regions of the former Polish-Lithuanian Commonwealth, the correlation coefficient reaches 75 percent.

[18] Predominantly Protestant counties face centralized monitoring in 7 percent of the cases.

where $c_i \cdot Post$ denotes the pure treatment effect θ as in equation 5.3, while γ captures the resistance effect, that is, the triple interaction between the share of central school inspectors, the post-treatment dummy, and the share of Catholics in 1886. I include the average annual share of central county school inspectors between 1876 and 1886 (c), the post-treatment dummy ($Post$), and the share of Catholics ($Cath$) separately. I add the interactions between all these variables. X again denotes the vector of controls and α_p province-fixed effects; ε is the error term.

When looking at school enrollment in Table 7, a high share of Catholics substantially mitigates the overall positive impact of the treatment in all three samples.

[Table 7 about here.]

Table 8 shows results on the intermediate outcomes. In Panel A, results for school density are depicted. The coefficients on the triple interactions are positive and significant in the full sample and the sample east of the Elbe, though insignificant for West Elbia. The provision of schools increased in predominantly Catholic areas that faced centralized monitoring. This might go back to the fact that interdenominational schools (so-called *Simultanschulen*) were introduced in Catholic areas of East Elbia to withdraw Catholic students from the impact of the clergy (Lamberti 1989, pp. 62-72).

Panel B, depicting the estimates on the student-teacher ratio brings about an interesting pattern between the western and the eastern sample. While the coefficient on the triple interaction is positive and significant in the sample west of the Elbe, it is negative though insignificant in the eastern sample. The secular decrease of the student-teacher

ratio, amplified by centralized monitoring, is substantially mitigated and even reversed in predominantly Catholic counties west of the Elbe. Here, centralized monitoring in counties with only Catholics increased the student-teacher ratio by seven students. In contrast, centralized monitoring in fully Catholic counties decreases the student-teacher ratio by about 19 students per teacher in the East Elbian sample. In short, the evidence on the western and eastern sample suggests that there was substantial resistance in the western regions while the student-teacher ratio could be decreased in the predominantly Catholic counties east of the Elbe. As the historical narrative showed that resistance in the provinces of the Rhineland and Westphalia was especially strong and that the protest of the clergy led to arrest and expatriation of priests who simultaneously functioned as (religious education) teachers in primary schools, this might have led to persistent teacher shortage in the predominantly Catholic regions of West Elbia.

Panel C presents results on the estimations on private enrollment. The positive coefficient on the triple interaction in all samples suggests resistance from the predominantly Catholic counties. Even though the coefficients are not statistically significant, the triple effect in the eastern and western sample reverse the overall negative effect of centralized monitoring on private enrollment. In predominantly Catholic counties even more parents seem to have evaded the public school system by sending their children to private institutions. This resistance effect underlines that Catholics tended to adhere to the Catholic Church's edict to send every child to a Catholic school especially when facing marginalization. Along these lines, Martin West and Woessmann (2010) show that counties with a high share of Catholics in the nineteenth century still have a higher share of private schools today.

Overall, I find strong resistance effects against the reform in counties that are mainly inhabited by Catholics when it comes to school attendance. A high share of Catholics in a treated county mitigates the overall positive effect of centralized monitoring on school enrollment and, as a kind of evasion mechanism, increases the ratio of students enrolled in private institutions. Particular resistance from the Catholic population in the western parts of Prussia is shown by an increase in the the student-teacher ratio. Evidence on the student-teacher ratio suggests that resistance came more heavily from the Catholics in the Rhineland and Westphalia and not from the Catholics of Polish decent in the eastern parts of Prussia. This casts some doubt on the commonly held view that the Polish question and the *Kulturkampf* were inseparably interwoven.

[Table 8 about here.]

CONCLUSION

Did the introduction of centralized monitoring improve primary education in Prussia? To answer this question, I combine data on central school inspectors, derived from a publication of the Prussian Ministry of Ecclesiastical and Education Affairs, with Prussian census data.

As the law was passed against the background of the *Kulturkampf,* a struggle between the Prussian Protestant authorities and the Catholic Church, it was mainly introduced in the Catholic regions of Prussia, which enables applying a difference in differences approach.

Results show that introducing central school inspection increased school attendance measured by school enrollment. To test whether these results were mitigated in areas

with an especially high share of Catholics, I add an interaction term of the share of Catholics to the treatment effect. I find that the overall positive effect on school enrollment is mitigated by a high share of Catholics, while positive secular trends in private enrollment are reinforced by a high share of Catholics.

I contribute to the literature on the resistance to reforms by showing that resistance is substantial in a context where reforms tackle the identity of the targeted population. As the introduction of centralized monitoring in late nineteenth-century Prussia can be understood as an early form of school accountability, I contribute to modern educational economics by showing that accountability systems are ineffective if introduced without the consent of the local population.

Applying a difference in differences approach stresses the importance of examining differences induced by the reform as opposed to comparing levels which proves wrong the contemporary evaluations of the reform which considered the law as being ineffective. However, the presence of central school inspectors captures other effects of the *Kulturkampf* which makes it interesting to examine the effect of this penetrative cultural struggle on other outcomes, such as economic development.

APPENDIX: DATA SOURCES

FIGURE A1

EXTRACT FROM ZENTRALBLATT 1886

C. Kreis-Schulinſpektoren.

I. Provinz Oſtpreußen.

Aufſichtsbezirke:

1. Regierungsbezirk Königsberg.

a. Ständige Kreis-Schulinſpektoren.

1. Allenſtein I. Spohn zu Allenſtein.
2. Allenſtein II. Vigouroux zu Wartenburg.
3. Braunsberg. Seemann zu Braunsberg.
4. Heilsberg I. Mühlhoff zu Guttſtadt.
5. Heilsberg II. Dr. Robels zu Heilsberg, kommiſſariſch.
6. Memel I. Schröder zu Prökuls.
7. Neidenburg. Dr. Gitſchmann zu Neidenburg, kommiſſariſch.
8. Ortelsburg. Pöhlmann zu Ortelsburg, kommiſſariſch.
9. Oſterode. Kob zu Oſterode.
10. Röſſel. Schlicht zu Röſſel.

b. Kreisſchulinſpektion im Nebenamte.

1. Prß. Eylau I. Schröder, Pfarrer zu Eichhorn, kommiſſ.
2. Prß. Eylau II. Schröder, desgl. zu Eichhorn.
3. Prß. Eylau III. Bandiſch, dsgl. zu Uderwangen.
4. Fiſchhauſen I. Steinwender, dsgl. zu Germau.
5. Fiſchhauſen II. Steinwender, dsgl. daſelbſt, kommiſſ.
6. Fiſchhauſen III. Horn, Superintendent zu Powunden.
7. Friedland I. Eſchenbach, Pfarrer zu Friedland.
8. Friedland II. Henſchke, dsgl. zu Bartenſtein.
9. Gerdauen I. Pichier, dsgl. zu Nordenburg.
10. Gerdauen II. Rouſelle, dsgl. zu Moltheinen.
11. Heiligenbeil I. Eyſenblätter, Superint. zu Heiligenbeil.
12. Heiligenbeil II. v. Rozynsky, Pfarrer zu Dt. Thierau.
13. Heilsberg III. Kähler, Superint. zu Heilsberg.
14. Prß. Holland I. Kruckenberg, dsgl. zu Prß. Holland.
15. Prß. Holland II. Kirſchſtein, Pfarrer zu Herrendorf.
16. Königsberg Stadt. Lackner, Diakonus zu Königsberg, auftragsw. (ſ. a. Nr. 18).
17. Königsberg Land I. Horn, Superintendent zu Powunden.
18. Königsberg Land II. Lackner, Diakonus zu Königsberg (ſ. a. Nr. 16).
19. Königsberg Land III. Eilsberger, Superint. zu Königsberg.
20. Labiau I. Kühn, desgl. zu Laukiſchken.
21. Labiau II. Dengel, Pfarrer zu Mehlauken.
22. Memel II. Habrucker, Superintendent zu Memel.
23. Mohrungen I. Ebner, Pfarrer zu Jäskendorf.

Source: Ministerium der geistlichen Unterrichts- und Medizinal-Angelegenheiten (1886).

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TABLE 1
DESCRIPTIVE STATISTICS

	Full sample		West Elbia		East Elbia	
	1864	1886	1864	1886	1864	1886
PANEL A - Treatment						
Central school inspectors 1876 - 1886 (share)		0.373		0.439		0.33
		0.414		*0.416*		*0.409*
Inspectors per county		1.877		1.735		1.97
		1.176		*1.184*		*1.164*
Schools per inspectors		50.36		45.326		53.341
		27.579		*26.877*		*27.621*
Students per inspector		7,010		7,075		6,972
		4,046		*4,052*		*4,052*
PANEL B - School attendance						
Enrollment rate	0.724	0.874	0.776	0.878	0.690	0.871
	0.108	*0.033*	*0.089*	*0.026*	*0.107*	*0.037*
PANEL C - Intermediate outcomes						
School density	9.607	7.756	10.311	8.186	8.526	7.096
	3.202	*2.867*	*2.818*	*2.439*	*3.457*	*3.325*
Student-teacher ratio	78.323	81.495	83.808	79.937	74.756	82.508
	16.982	*11.8*	*17.591*	*11.286*	*15.612*	*12.043*
Private enrollment (ratio)	0.014	0.06	0.009	0.055	0.017	0.064
	0.054	*0.075*	*0.010*	*0.069*	*0.068*	*0.079*
PANEL D - Controls						
Protestant (share)	0.594	0.596	0.442	0.448	0.693	0.693
	0.387	*0.385*	*0.415*	*0.408*	*0.334*	*0.336*
Urban (share)	0.26	0.285	0.283	0.319	0.245	0.262
	0.194	*0.202*	*0.228*	*0.241*	*0.167*	*0.169*
Employed in manufacturing (share)	0.08	0.116	0.108	0.149	0.062	0.094
	0.048	*0.058*	*0.051*	*0.055*	*0.036*	*0.049*
Employed in agriculture (share)	0.186	0.203	0.151	0.171	0.210	0.224
	0.066	*0.073*	*0.062*	*0.079*	*0.058*	*0.060*
Child dependency ratio	0.602	0.903	0.580	0.890	0.616	0.911
	0.067	*0.111*	*0.051*	*0.092*	*0.072*	*0.121*
Population density	2.236	3.194	0.002	0.014	0.212	0.209
	11.238	*17.613*	*0.027*	*0.032*	*0.291*	*0.290*
First language not German (1864 and 1890)	0.129	0.132	2.949	4.058	1.772	2.633
	0.249	*0.246*	*14.120*	*18.972*	*8.886*	*16.695*
Landownership concentration	0.025	0.009	0.008	0.002	0.036	0.014
	0.026	*0.009*	*0.007*	*0.004*	*0.028*	*0.008*
Inheritance (dummy)		0.245	0.500	0.485	0.079	0.089
		0.431	*0.502*	*0.502*	*0.270*	*0.285*
State expenditure on education per child		1.898		1.584		2.102
		1.476		*1.780*		*1.200*

Notes: Standard deviations in italics. 335 observations for the full sample, 132 for West Elbia and 293 for East Elbia. *Sources*: See text.

TABLE 2
CENTRALIZED MONITORING AND OUTCOMES IN THE CROSS-SECTION OF 1886

	PANEL A: Dep. Var. School enrollment				
	(1)	(2)	(3)	(4)	(5)
	Full Sample		West Elbia	East Elbia	w/o cities
School enrollment	-0.006	0.006	-0.003	0.020*	0.006
	(0.004)	(0.006)	(0.010)	(0.008)	(0.006)
	PANEL B: Intermediate outcomes				
School density	-0.812**	0.052	0.591	-0.495	-0.037
	(0.364)	(0.297)	(0.518)	(0.310)	(0.302)
Student-teacher ratio	4.655***	1.708	1.662	1.600	1.401
	(1.553)	(1.246)	(1.691)	(1.660)	(1.226)
Private enrollment	-0.040***	-0.007	-0.006	0.000	-0.005
	(0.008)	(0.007)	(0.010)	(0.010)	(0.007)
Controls	No	Yes	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes	Yes
Observations	335	335	132	203	323

Notes: OLS estimates at the county level. The coefficients follow from estimation (2), regressing school enrollment, school density, the student-teacher ratio and private enrollment, respectively, on the average annual share of central school inspectors over the period of 1876 to 1886. School enrollment is measured by the total number of students attending public or private primary schools over total number of children of mandatory school age. School density is measured by the number of total schools per 1,000 children of school age (6-14). The student-teacher ratio is measured by the number of public and private students over all fully employed teachers. Private enrollment is measured by the ratio of private over public students. Controls include Protestant (share), urban (share), employed in manufacturing (share), employed in agriculture (share), dependency ratio, non-German (share), population density, landownership concentration, the inheritance dummy and state expenditures on education. Estimations on the student-teacher ratio additionally include school density. Province FE denote province-fixed effects for eight provinces in the full sample, three provinces in the sample west of the Elbe and five provinces in the sample east of the Elbe. Constant omitted. Robust standard errors in parentheses. Significance: * $p<0.05$, ** $p<0.01$, *** $p<0.005$. *Sources:* See text.

TABLE 3

THE EFFECT OF CENTRALIZED MONITORING ON SCHOOL PERFORMANCE

Dep. Var. School enrollment					
	(1)	(2)	(3)	(4)	(5)
	Full sample		West Elbia	East Elbia	w/o cities
Central school	0.023	0.024*	-0.011	0.059***	0.032**
inspectors x Post	(0.013)	(0.012)	(0.017)	(0.015)	(0.012)
Post	0.141***	0.109***	0.089*	0.138***	0.097***
	(0.007)	(0.018)	(0.035)	(0.026)	(0.017)
Central school	-0.029*	-0.005	0.018	-0.016	-0.014
inspectors	(0.014)	(0.012)	(0.019)	(0.015)	(0.012)
Controls	No	Yes	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes	Yes
Observations	670	670	264	406	646
R-squared	0.47	0.65	0.47	0.75	0.68

Notes: Difference in differences estimates at the county level. The dependent variable is school enrollment, measured by the total number of students attending public or private primary schools over total number of children of mandatory school age. Central school inspectors captures the average annual share of central school inspectors over the period of 1876 to 1886. Post denotes a dummy variable which takes the value 1 if the year is 1886, 0 otherwise. Controls include changes in the Protestant (share), the urban (share), employed in manufacturing (share), employed in agriculture (share), dependency ratio, non-German (share), population density, the inheritance dummy, and landownership concentration. Province FE denote province-fixed effects for eight provinces in the full sample, three provinces in the sample west of the Elbe and five provinces in the sample east of the Elbe. Constant omitted. Standard errors are clustered at the county level. Significance: * p<0.05, ** p<0.01, *** p<0.005. *Sources:* See text.

TABLE 4
THE EFFECT OF CENTRALIZED MONITORING ON INTERMEDIATE OUTCOMES

PANEL A: Dep. Var. School density					
	(1)	(2)	(3)	(4)	(5)
	Full sample		West Elbia	East Elbia	w/o cities
Central school inspectors x Post	-0.109	0.060	0.113	-0.134	0.161
	(0.236)	(0.245)	(0.419)	(0.288)	(0.249)
Post	-1.810***	0.723	0.359	0.100	1.144*
	(0.117)	(0.461)	(0.983)	(0.635)	(0.522)
Central school inspectors	-0.703	-0.019	0.475	-0.514	-0.154
	(0.424)	(0.400)	(0.668)	(0.424)	(0.397)
Controls	No	Yes	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes	Yes
Observations	670	670	264	406	646
R-squared	0.09	0.67	0.65	0.70	0.65
PANEL B: Dep. Var. Student-teacher ratio					
	(1)	(2)	(3)	(4)	(5)
	Full Sample		West Elbia	East Elbia	w/o Cities
Central school inspectors x Post	-3.350	-4.291*	-0.953	-4.917*	-3.990*
	(1.927)	(1.739)	(2.877)	(2.100)	(1.640)
Post	4.423***	-5.763**	-12.387***	-1.008	-7.092***
	(0.912)	(2.096)	(3.599)	(2.787)	(2.152)
Central school inspectors	8.005***	3.583*	2.834	3.434*	2.948
	(2.271)	(1.536)	(2.411)	(1.724)	(1.509)
Controls	No	Yes	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes	Yes
Observations	670	670	264	406	646
R-squared	0.05	0.66	0.64	0.74	0.69
PANEL C: Dep. Var. Private enrollment					
	(1)	(2)	(3)	(4)	(5)
	Full sample		West Elbia	East Elbia	w/o cities
Central school inspectors x Post	-0.039***	-0.023***	-0.033*	-0.022*	-0.026***
	(0.009)	(0.008)	(0.013)	(0.010)	(0.006)
Post	0.061***	0.125***	0.145***	0.097*	0.113***
	(0.007)	(0.021)	(0.023)	(0.039)	(0.015)
Central school inspectors	-0.001	0.012*	0.015	0.015	0.011*
	(0.004)	(0.006)	(0.008)	(0.009)	(0.005)
Controls	No	Yes	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes	Yes
Observations	670	670	264	406	646
R-squared	0.14	0.42	0.48	0.45	0.45

Notes: Difference in differences estimates at the county level. The dependent variable is school density, measured by the number of total schools per 1,000 children of school age (6-14) in Panel A, the student-teacher ratio, measured by the number of public and private students over all fully employed teachers in Panel B, private enrollment, measured as the ratio of private over public students in Panel C. Central school inspectors captures the average annual share of central school inspectors over the period of 1876 to 1886. Post denotes a dummy variable which takes the value 1 if the year is 1886, 0 otherwise. Controls include changes in the Protestant (share), the urban (share), employed in manufacturing (share), employed in agriculture (share), dependency ratio, non-German (share), population density, the inheritance dummy, and landownership concentration. Province FE denote province-fixed effects for eight provinces in the full sample, three provinces in the sample west of the Elbe and five provinces in the sample east of the Elbe. Constant omitted. Standard errors are clustered at the county level. Significance: * p<0.05, ** p<0.01, *** p<0.005. *Sources:* See text.

TABLE 5

COMMON UNDERLYING TRENDS, 1849 – 1896

	(1) Protestant	(2) Urban	(3) Manufacturing	(4) Agricultural	(5) Dependency Ratio	(6) Non-German	(7) Population density	(8) Landownership concentration	(9) Inheritance
Central school	0.002	0.003	-0.001	0.016***	0.060***	0.010	-0.692	0.006*	0.018
inspectors x Post	(0.003)	(0.005)	(0.003)	(0.005)	(0.009)	(0.009)	(0.617)	(0.002)	(0.020)
Post	0.002	0.023***	0.036***	0.011***	0.279***	-0.000	1.217*	-0.018***	-0.007
	(0.002)	(0.003)	(0.001)	(0.002)	(0.005)	(0.004)	(0.595)	(0.002)	(0.006)
Central school	-0.464***	-0.032	-0.017*	-0.005	0.026*	0.201***	-1.266	-0.006*	0.109*
inspectors	(0.043)	(0.026)	(0.007)	(0.009)	(0.011)	(0.036)	(1.617)	(0.003)	(0.047)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	670	670	670	670	670	670	670	670	670
R-squared	0.70	0.11	0.44	0.23	0.81	0.53	0.02	0.49	0.47

Notes: Difference in differences estimates at the county level. The dependent variable is the share of Protestants (Column 1), the urban share (Column 2), the share employed in manufacturing (Column 3), the share employed in agriculture (Column 4), the dependency ratio (Column 5), the share of non-German speakers (Column 6), population density (Column 7), landownership concentration (Column 8) and inheritance (Column 9). Central school inspectors captures the average annual share of central school inspectors over the period of 1876 to 1886. Post denotes a dummy variable which takes the value 1 if the year is 1886, 0 otherwise. Province FE denote province-fixed effects for eight provinces. Constant omitted. Standard errors are clustered at the county level. Significance: * p<0.05, ** p<0.01, *** p<0.005. *Sources:* See text.

TABLE 6

PLACEBO 1849–1864

Dep. Var. School enrollment				
	Full sample		West Elbia	East Elbia
	(1)	(2)	(3)	(4)
Central school inspectors	-0.000	-0.026	-0.003	-0.023
x Post	(0.000)	(0.017)	(0.021)	(0.022)
Post	0.000	-0.093	-0.026	-0.138
	(0.000)	(0.059)	(0.049)	(0.086)
Central school inspectors	0.029	0.025	-0.037	0.035
	(0.039)	(0.047)	(0.072)	(0.047)
Controls	No	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes
Observations	670	670	264	406
R-squared	0.00	0.11	0.19	0.10

Notes: Difference in differences estimates at the county level. The dependent variable is school enrollment, measured by the total number of students attending public or private primary schools over total number of children of mandatory school age. Central school inspectors captures the average annual share of central school inspectors over the period of 1876 to 1886. Post denotes a dummy variable which takes the value 1 if the year is 1864, 0 otherwise. Controls include changes in the Protestant (share), the urban (share), employed in manufacturing (share), employed in agriculture (share), dependency ratio, population density, and the inheritance dummy. Province FE denote province-fixed effects for eight provinces in the full sample, three provinces in the sample west of the Elbe and five provinces in the sample east of the Elbe. Constant omitted. Standard errors are clustered at the county level. Significance: * p<0.05, ** p<0.01, *** p<0.005. *Sources:* See text.

TABLE 7

THE RESISTANCE EFFECT – SCHOOL ENROLLMENT

Dep Var. School enrollment				
	(1)	(2)	(3)	(4)
	Full sample		West Elbia	East Elbia
Central school inspectors	-0.154***	-0.165***	-0.110*	-0.179**
x Catholic x Post	(0.038)	(0.038)	(0.055)	(0.065)
Central school inspectors	0.138***	0.134***	0.070	0.120***
x Post	(0.024)	(0.023)	(0.042)	(0.024)
Central school inspectors	0.146***	0.088*	0.021	0.129*
x Catholic	(0.043)	(0.038)	(0.057)	(0.065)
Catholic x Post	-0.005	0.014	0.019	0.084
	(0.025)	(0.026)	(0.030)	(0.052)
Post	0.140***	0.103***	0.085*	0.129***
	(0.008)	(0.019)	(0.035)	(0.026)
Central school inspectors	-0.134***	-0.064***	0.004	-0.059*
	(0.026)	(0.021)	(0.040)	(0.023)
Catholic	-0.001	-0.026	-0.013	-0.107
	(0.029)	(0.028)	(0.032)	(0.055)
Controls	No	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes
Observations	670	670	264	406
R-squared	0.50	0.66	0.48	0.75

Notes: Difference in differences estimates at the county level. The dependent variable is school enrollment, measured by the total number of students attending public or private primary schools over total number of children of mandatory school age. Central school inspectors captures the average annual share of central school inspectors over the period of 1876 to 1886. Catholic captures the share of Catholics in 1886. Post denotes a dummy variable which takes the value 1 if the year is 1886, 0 otherwise. Controls include changes in the urban (share), employed in manufacturing (share), employed in agriculture (share), dependency ratio, non-German (share), population density, the inheritance dummy, and landownership concentration. Province FE denote province-fixed effects for eight provinces in the full sample, three provinces in the sample west of the Elbe and five provinces in the sample east of the Elbe. Constant omitted. Standard errors are clustered at the county level. Significance: * p<0.05, ** p<0.01, *** p<0.005. *Sources:* See text.

TABLE 8

THE RESISTANCE EFFECT – INTERMEDIATE OUTCOMES

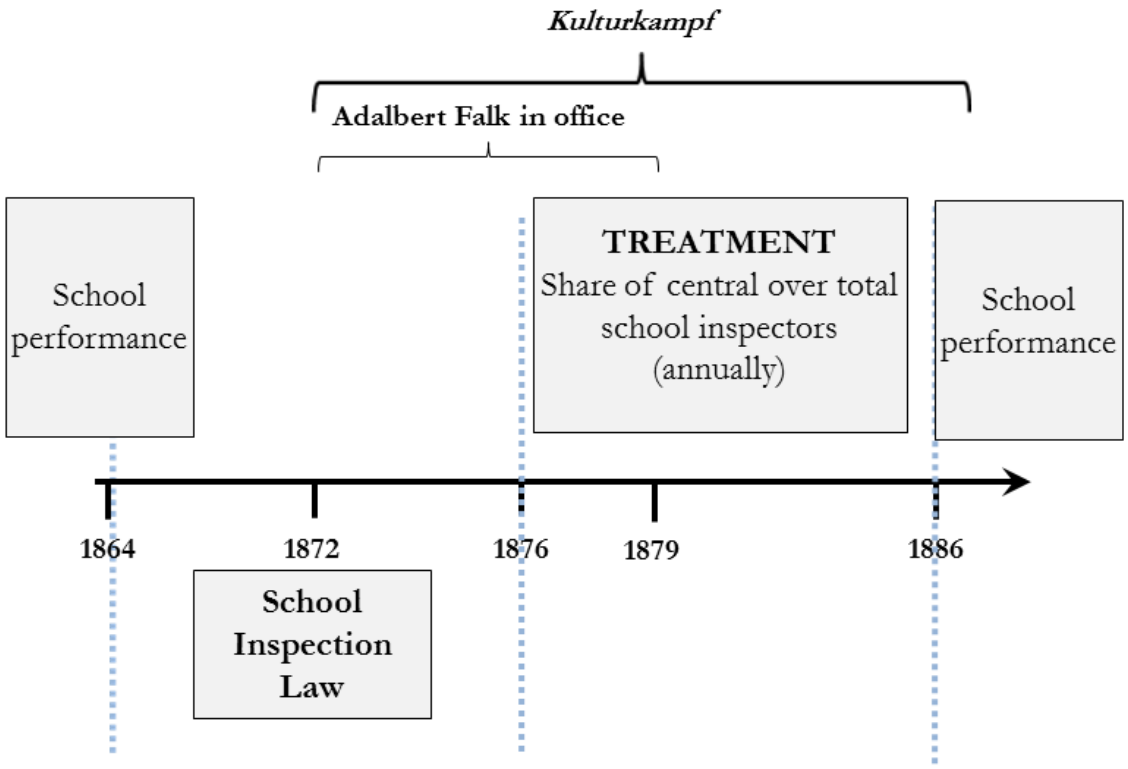
PANEL A: Dep. Var. School density				
	(1)	(2)	(3)	(4)
	Full sample		West Elbia	East Elbia
Central school inspectors	2.718***	2.240**	-0.041	4.642***
x Catholic x Post	(0.852)	(0.849)	(1.791)	(1.040)
Central school inspectors	-1.854***	-1.347**	0.331	-1.755***
x Post	(0.452)	(0.503)	(1.430)	(0.447)
Central school inspectors	-2.678	-1.634	-0.180	-5.501***
x Catholic	(1.512)	(1.061)	(2.567)	(1.383)
Catholic x Post	-0.340	-0.327	-0.277	-2.050*
	(0.559)	(0.533)	(0.685)	(0.812)
Post	-1.711***	0.831	0.440	0.466
	(0.137)	(0.466)	(1.037)	(0.632)
Central school inspectors	1.998*	0.955	0.529	1.158*
	(0.805)	(0.619)	(2.213)	(0.565)
Catholic	-1.146	-0.934	-1.509	2.596*
	(1.034)	(0.821)	(1.028)	(1.200)
Controls	No	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes
Observations	670	670	264	406
R-squared	0.13	0.67	0.65	0.72

PANEL B: Dep. Var. Student-teacher ratio				
	(1)	(2)	(3)	(4)
	Full sample		West Elbia	East Elbia
Central school inspectors	-6.918	2.284	26.277***	-22.081
x Catholic x Post	(6.948)	(5.866)	(8.566)	(11.261)
Central school inspectors	5.619	-1.512	-19.252**	2.714
x Post	(4.138)	(3.233)	(7.140)	(3.189)
Central school inspectors	6.272	-1.167	-23.532**	18.643*
x Catholic	(7.888)	(4.477)	(8.559)	(8.761)
Catholic x Post	-5.941	-6.905	-6.254	10.130
	(4.041)	(3.571)	(4.162)	(8.053)
Post	5.107***	-5.056*	-11.160***	-2.218
	(0.972)	(2.125)	(3.854)	(2.734)
Central school inspectors	-1.155	1.886	19.149*	-2.465
	(4.369)	(2.775)	(7.430)	(2.220)
Catholic	6.942	-4.071	-1.868	-17.022**
	(4.447)	(2.970)	(4.798)	(6.374)
Province FE	No	Yes	Yes	Yes
Observations	670	670	264	406
R-squared	0.06	0.66	0.65	0.74

PANEL C: Dep. Var. Private enrollment				
	(1)	(2)	(3)	(4)
	Full sample		West Elbia	East Elbia
Central school inspectors x	0.035	0.033	0.062	0.019
Catholic x Post	(0.021)	(0.021)	(0.032)	(0.036)
Central school inspectors x	-0.031*	-0.022	-0.043	-0.014
Post	(0.014)	(0.014)	(0.027)	(0.017)
Central school inspectors x	-0.012	-0.026	-0.008	-0.045
Catholic	(0.016)	(0.015)	(0.018)	(0.028)
Catholic x Post	-0.050***	-0.038*	-0.063***	-0.033
	(0.015)	(0.015)	(0.019)	(0.031)
Post	0.069***	0.130***	0.160***	0.099*
	(0.009)	(0.022)	(0.026)	(0.039)
Central school inspectors	0.010	0.016	0.002	0.020
	(0.012)	(0.010)	(0.015)	(0.014)
Catholic	-0.005	0.023*	0.012	0.032
	(0.007)	(0.010)	(0.009)	(0.024)
Controls	No	Yes	Yes	Yes
Province FE	No	Yes	Yes	Yes
Observations	670	670	264	406
R-squared	0.16	0.43	0.51	0.46

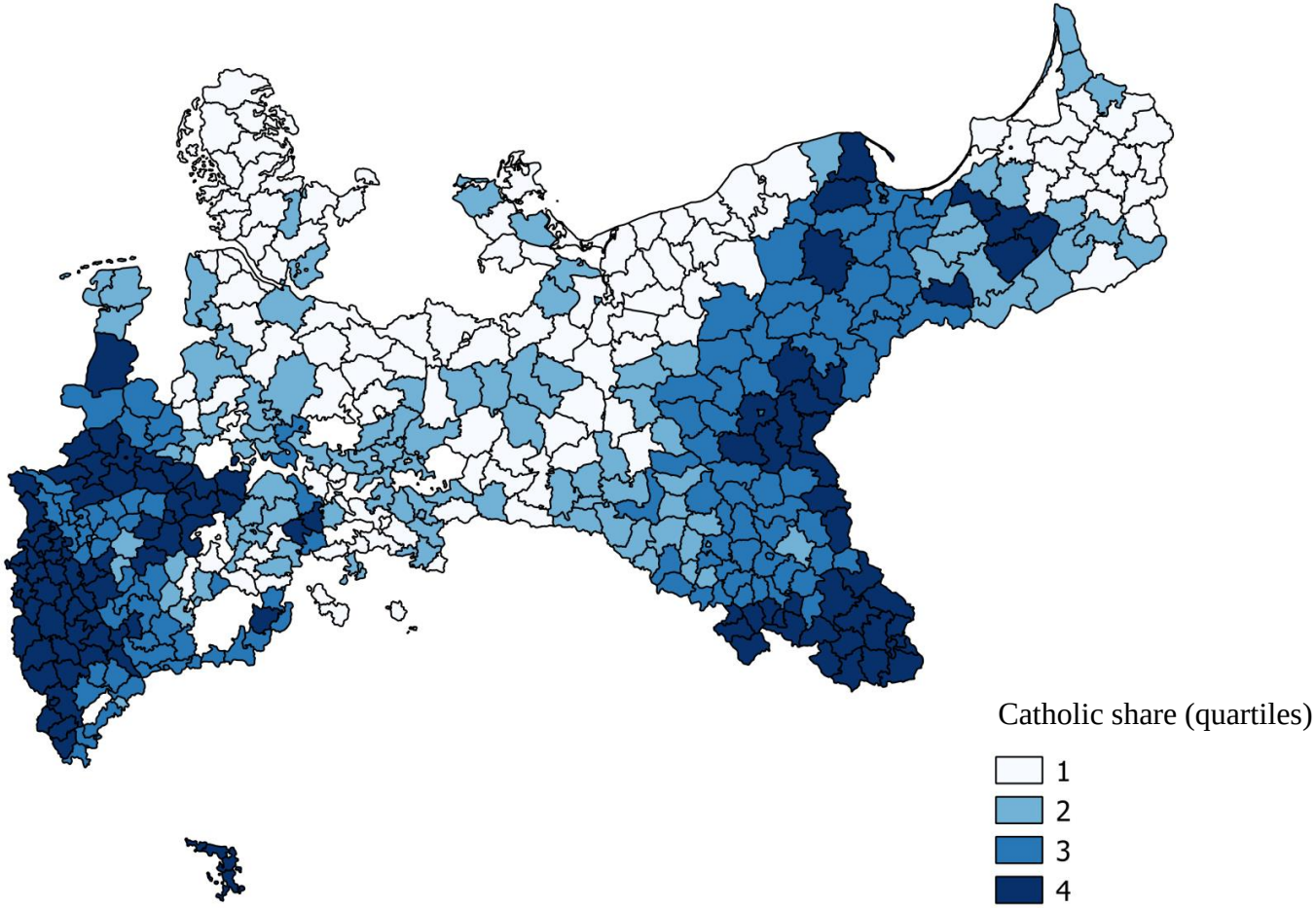
Notes: Difference in differences estimates at the county level. The dependent variable is school density, measured by the number of total schools per 1,000 children of school age (6-14) in Panel A, the student-teacher ratio, measured by the number of public and private students over all fully employed teachers in Panel B, private enrollment, measured as the ratio of private over public students in Panel C. Central school inspectors captures the average annual share of central school inspectors over the period of 1876 to 1886. Catholic captures the share of Catholics in 1886. Post denotes a dummy variable which takes the value 1 if the year is 1886, 0 otherwise. Controls include changes in the urban (share), employed in manufacturing (share), employed in agriculture (share), dependency ratio, non-German (share), population density, the inheritance dummy, and landownership concentration. Province FE denote province-fixed effects for eight provinces in the full sample, three provinces in the sample west of the Elbe and five provinces in the sample east of the Elbe. Constant omitted. Standard errors are clustered at the county level. Significance: * p<0.05, ** p<0.01, *** p<0.005. *Sources:* See text.

FIGURE 1
TIMELINE OF HISTORICAL EVENTS AND DATA, 1864 – 1887



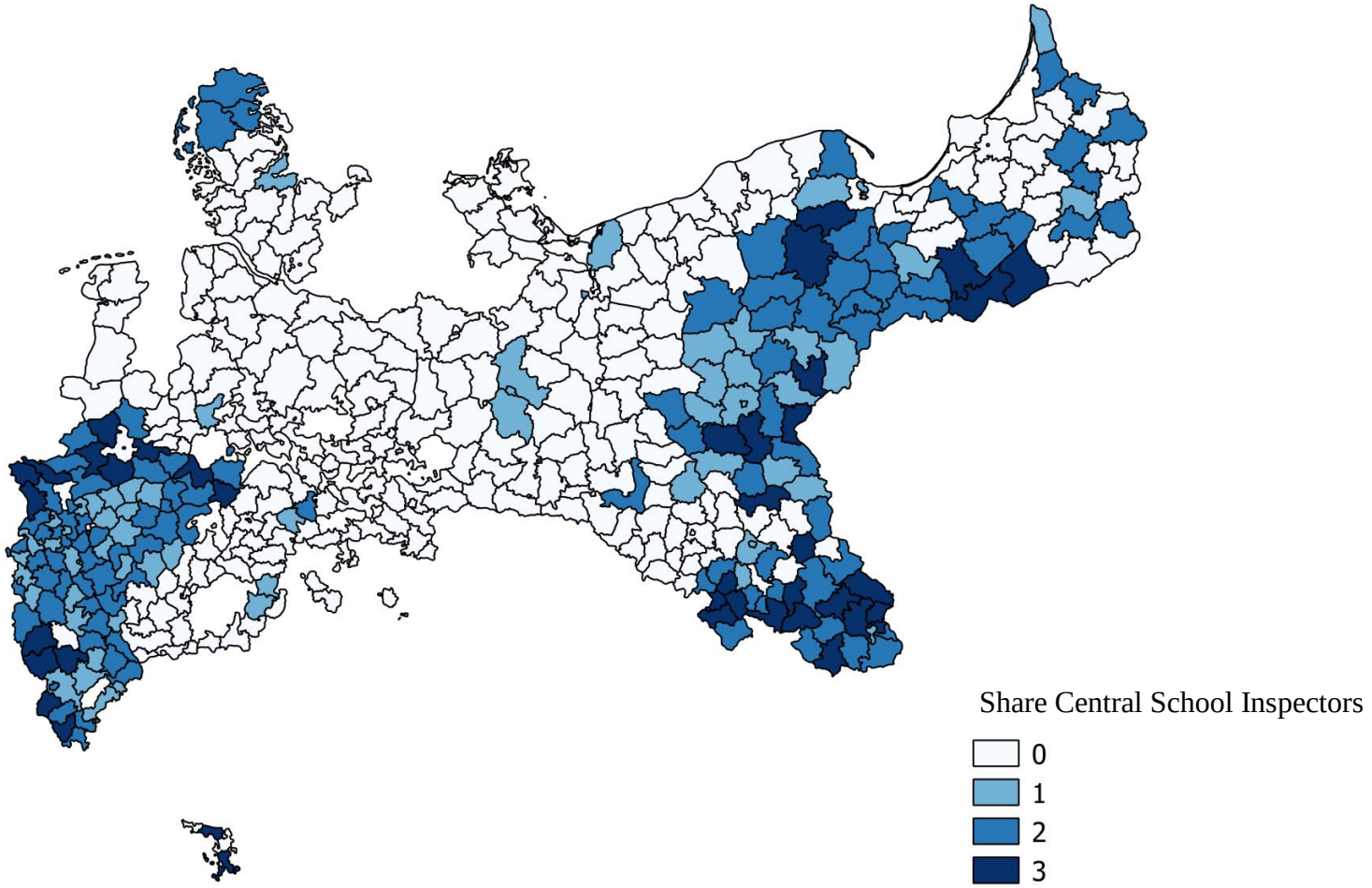
Notes: Own illustration.

FIGURE 2
CATHOLIC SHARE IN 1886



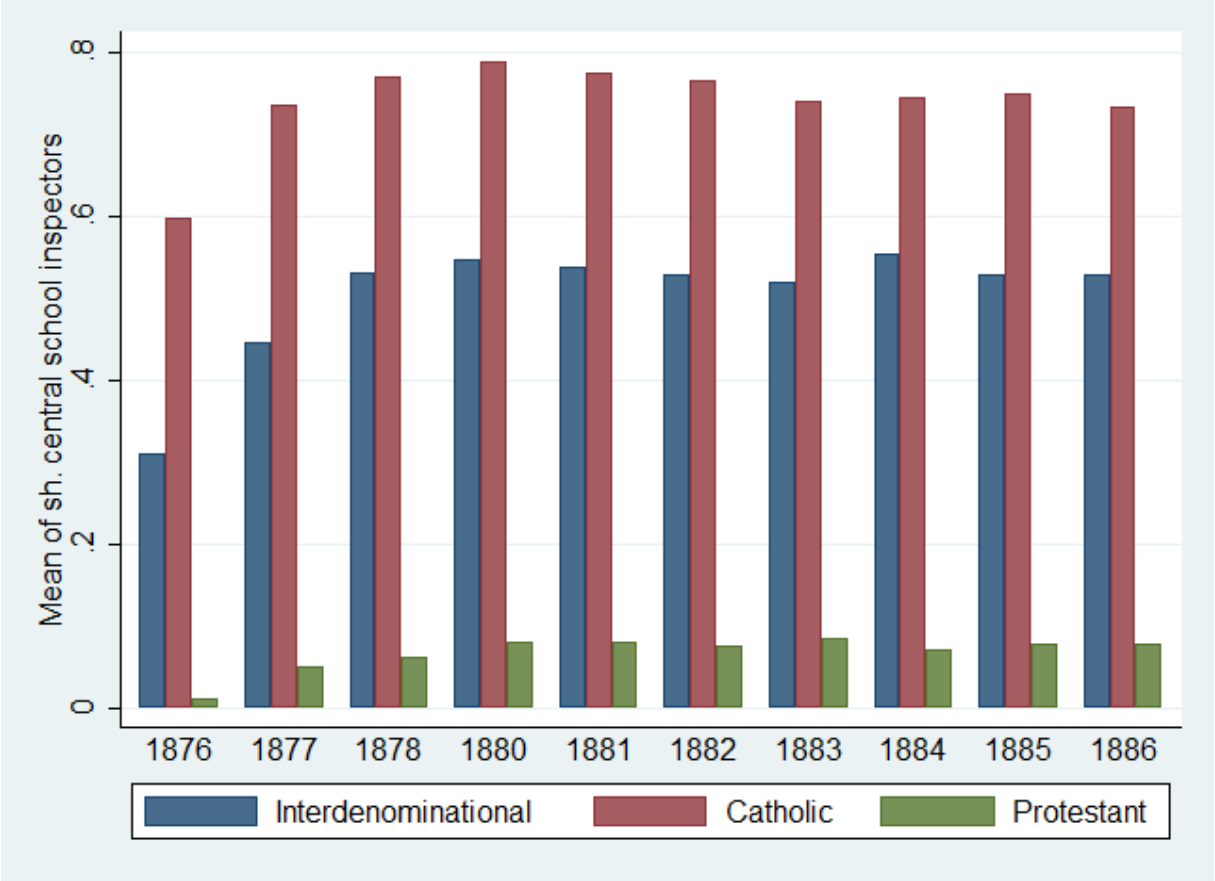
Notes: The share of Catholics is constructed as the number of Catholics over the total population in 1885. Quartile 1 comprises the share of Catholics from 0 to 1.32 percent; Quartile 2 from 1.32 to 16.1 percent; Quartile 3 from 16.1 to 73.3 percent; Quartile 4 from 73.3 to 100 percent. County borders as in 1871. *Sources:* Own illustration; see text for details.

FIGURE 3
SHARE OF CENTRAL SCHOOL INSPECTORS, 1876 TO 1886



Notes: The share of central school inspectors is estimated following equation (5.1). The category 0 comprises counties with 0 central school inspectors. The category 1 comprises counties with a share of central school inspectors of above 0 and below 50 percent. The category 2 comprises counties with a share of central school inspectors of above 50 and below 100 percent. The category 3 comprises counties with full central school inspectorate. County borders as in 1871. *Sources:* Own illustration; see text for details.

FIGURE 4
SHARE OF CENTRAL SCHOOL INSPECTORS BY MAJOR DENOMINATION, 1876–1886



Notes: "Catholic" comprises 59 counties with more than 90 percent Catholics in 1885. "Protestant" comprises 151 counties with more than 90 percent Protestants in 1885. The 145 "interdenominational" counties have a population with both less than 90 percent Catholics and Protestants. *Sources:* See text.