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Schools without a law: primary education in France from the Revolution to the Guizot Law

Adrien Montalbo*†

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Abstract

The French Revolution had a substantial impact on the functioning of primary schools as it suppressed one of their major funding sources, taxes collected by the clergy. Nonetheless, the geographical distribution of schools and enrolment rates remained relatively stable until late into the nineteenth century. In this article, I show that understanding the reorganisation of primary schooling after the Revolution is essential in accounting for these long-lasting variations in educational attainment. By using a new database at the level of primary schools, I first show that municipalities took over the control of instruction in areas well-endowed in economic resources and where schools were more concentrated before the revolutionary time period. Secondly, I demonstrate that, by subsidising schools, municipal authorities acted in favour of a fall in schooling fees, lowering the average cost of education and therefore increasing enrolment rates. Finally, I show that teaching conditions were better and human capital accumulation higher in the schools provided with municipal grants. Public investment in primary schooling is therefore a key element to understand the uneven distribution of schools, enrolment rates and knowledge accumulation in France during the nineteenth century.

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1 Introduction

The Revolution in France constituted a considerable shock for primary schooling. Indeed, to this date, the existence of many schools was depending on the resources collected by the clergy. Especially north of a line going from Saint-Malo to Geneva, teachers were mostly assisting parish priests along with their educational activities, serving as mass cantors for example. Part of their remuneration thus came from taxes dedicated to the clergy, as the tithe. After the Revolution, these taxes were suppressed and teachers could, from then on, only rely on tuition fees (known as the *écolage*) paid by parents, and on the potential investment of municipalities in primary schooling. If the school was financed only by fees, it was said to be private. On the contrary, if the municipality at stake was investing in education, the school was public[1]. This public investment could took several forms: paying the teacher annually, providing him with an accommodation, a classroom or another municipal activity. In this last case, the teacher had also to serve as town clerk or mass cantors to benefit from the municipal financial support. This type of investment characterised small towns with low economic resources and a few pupils attending primary schools. In this work, "school" is a synonymous to "teacher's presence". Indeed, in the vast majority of municipalities, no schoolhouses were actually built to welcome teachers and pupils, even when the school was public. As a consequence, teachers were often using their own house as a classroom. Nonetheless, I will stick to "school" to describe the presence of a teacher for the sake of simplicity.
At the eve of the French Revolution and north of the Saint-Malo/Geneva line, around two-thirds of men knew how to sign, with a maximum of 88% for men and 66% for women in Lorraine [Duveau, 1957]. The respective average levels for the whole country were 47% for men, 27% for women. South of the line, these levels were much lower as in Brittany for example where only 15% of the adult population knew how to sign. This was also true for the number of schools and enrolment rates. For example, there were 740 816 children schooled north of the line and 375 931 south of it at the same period, while the population in the southern part was higher [Furet and Ozouf, 1977a]. Therefore, in areas where primary schooling was more closely associated to religious activities and financed by taxes dedicated to the clergy, the concentration of schools, along with enrolment and literacy rates, were much higher than in the remaining parts of the country.

Despite fierce debates during the nineteenth century to assess the effect of the Revolution on primary schools [Allain, 1881], [Gontard, 1959][2], the geographical differences in their concentration remained stable until the Guizot Law of 1833 [Dupin, 1826], [D'Angeville, 1836], [Babeau, 1885], [Fleury and Valmary, 1957] and even until late in the nineteenth century[3]. North to the Saint-Malo/Geneva line, the number of schools and enrolment rates continued to be highly

[1] I will sometimes use the term "subsidised" instead of public in order to avoid repetitions.

[2] The core point of the debate was to know if the suppression of taxes dedicated to the clergy impacted negatively, and by how much, the presence of schools.

[3] This law made compulsory to open a primary school for boys in every municipality more than 500 inhabitants. These municipalities also had from then on to remunerate teachers annually, at least 200 francs per year.

superior to the ones south of this very line (except for the Rhone Valley and the Aquitaine region which were also characterised by a relatively good presence of schools). However, little has been said, either in the historical or economic literature, to explain the strongly stable pattern of primary instruction in France between the Revolution and the Guizot Law. Shedding lights on this issue is of prior importance to understand the history of education in France all along the nineteenth century. Indeed, even if a convergence already existed between departments (counties) [Diebolt et al., 2005], the geographical differences in educational attainment were long-lasting and perpetuated at least until the Ferry Laws of 1881-1882, which made enrolment in primary schools mandatory for children. The main objective of this work is to evaluate how primary schooling recomposed itself after having been deprived of one of its major source of funding. This will help to understand how the geographical differences in education spreading were maintained and even reinforced after the Revolution, and why some areas kept an educational edge over the others until late into the nineteenth century.

Several social and economic factors that influenced positively the presence of schools have already been identified in the literature. The extensive use of a non-written patois, as in Brittany for example, was shown be have been detrimental to primary schooling [Furet and Ozouf, 1977b], as well as the average altitude of municipalities and a higher population dispersion. Indeed, these two characteristics were often associated with poor-quality byroads and higher travelling distances, which made the continuous attendance of children harsher [Meynier, 1970], [Gontard, 1959]. This was influencing negatively enrolment rates and the amount of fees perceived by teachers, making their presence in the municipality unstable. Economic factors were also clearly linked to the spread of primary schooling. Many indicators as the amount of taxes on doors and windows [D'Angeville, 1836], commercial networks proximity [Julia, 1970] or the concentration of skilled occupations [Corbin, 1975] were associated with a stronger presence of primary schools at the department or district level[4]. The same was true for industrial activities in the second part of the century [Diebolt et al., 2017], [Franck and Galor, 2017]. A demand and a supply-side argument explain this association. First, since families had to pay monthly schooling fees so that they children could go to school, a higher purchasing power was making primary schooling more affordable. Secondly, the municipalities that wanted to invest in primary schools could also do so more easily if they were collecting great amounts of money coming from taxes. The high concentration of primary schools and economic resources in the north-east part of France exemplifies this relation [Lepetit, 1986], [Grew and Harrigan, 1991]. There were, however, some counter-examples, as the relatively poor mountainous area of *Briançonnais* in the Hautes-Alpes department where literacy rates were among the highest in France at the beginning of the nineteenth century. In this case, it seems that poverty and bad weather during the long winter months, making agricultural work harsher, prompted people into becoming teachers in the surrounding areas [Sandre and Ozouf, 1979].

All these factors account partly for the unequal involvement of families and municipalities in

[4]The districts indicate in this work the French administrative territorial divisions known as *sous-préfectures* or *arrondissements*. There were between two and six of them in each department.

primary schooling. Broadly speaking, they point out that in departments with higher economic resources, a more concentrated population and a longer tradition of instruction outside the family sphere, there was a higher probability to find more primary schools and larger enrolment rates. However, they do not indicate how the schooling system was organised after the Revolution and how this influenced the presence of schools, enrolment rates and the accumulation of human capital. In this work, I will show that the distinction between private and public primary schooling was essential in explaining the uneven distribution of these three phenomena between municipalities.

To do so, I will use a newly constituted database on education at the level of districts and municipalities. This database is extracted from a national survey launched by French Minister of Education François Guizot in 1833, the very year he made mandatory for any municipality over 500 inhabitants to open and maintain a primary school for boys. The survey, conducted in every primary school of every French municipality, provides very precise information on the characteristics of schools, teachers and municipal investment in education before the implementation of the law. I collected the data at the municipal level for 22 departments, which amounts to 8 129 towns and villages, a primary school being located in 59.5% of them.

My contribution to the understanding of primary schooling differentiated spread at the end of the 18th century and at least until the Guizot law is threefold. Firstly, I exhibit a positive correlation between wealth at the level of districts and municipal investment in primary schools. From the Revolution to the Guizot Law, municipalities were more often investing in public schools by paying teachers on a regular basis, by providing them with an accommodation or a classroom, ... when they were located in districts with higher economic resources. Therefore, the stable difference between French areas in terms of primary schools concentration at that time actually corresponded greatly to differences in public investment. Several reasons and motives as a positive income effect, the will of local authorities to favour social mobility or ensure public order can be thought of to explain this association. Therefore, after the Revolution, in areas previously endowed with higher resources and primary schools, municipalities took over the control of instruction and made it largely publicly supplied.

Secondly, I show that in these public schools, the level of schooling fees was on average lower than in their private counterparts. This level was set freely by teachers if they were not provided with municipal grants (therefore in private schools) but was subject to a negotiation between them and the local authorities when a school was subsidised. Therefore, a lower level demonstrated the will of authorities to decrease the cost of education borne by families in exchange for grants. This contributed to increase enrolment rates as education came at a lower cost for parents. As a consequence, public investment also accounted greatly for the differences in enrolment rates, even after controlling by the level of economic resources.

Thirdly, thanks to the precision of the Guizot survey, I identify an association between public primary schooling, teaching conditions and human capital accumulation. Municipalities tended to recruit more qualified teachers for their schools, which resulted in a higher teaching quality, a higher discipline within classrooms and more progress made by pupils. The number of subjects

taught in these schools, along with the average number of schooling years, were also higher than in the private ones, indicating that children were learning more. Human capital accumulation, whether proxied by the progress of pupils or by the the number of subjects taught and schooling years, was then higher within public schools.
Municipal investment was therefore a crucial factor in explaining the evolution of primary schooling before the Guizot Law. In richer areas where schools were already well-spread before the Revolution, municipalities took over the control of primary education and actively worked on extending it. This accounted for the unequal presence of schools, the variation in enrolment rates and in human capital accumulation. Since the legislation on primary instruction for boys remained globally the same until the Ferry Laws of 1881-1882, the areas in which public involvement was high kept a clear schooling edge until late into the nineteenth century [Grew and Harrigan, 1991]. Therefore, this paper helps understanding the causes of primary schooling differentiated spread from the Revolution to this date.

This paper is organised as follows. Section 2 describes the historical background of primary schooling. Data is introduced in Section 3. Section 4 presents the results for what regards the presence of schools and municipal grants while section 5 deals with the relationship between enrolment rates and the level of schooling fees. Section 6 explores the link between public primary schooling, teaching conditions and human capital accumulation. Section 7 concludes.

2 Historical Background

Before the Guizot Law, local initiatives were determinant in explaining primary schools' presence and characteristics, while national legislation was often absent or ineffective. Indeed, the first "coercing" royal decree on primary education was passed on the 13th of December 1698 under King Louis XIV[5]. It aimed at making primary instruction mandatory but was never really applied. From the end of the 15th century and until the French Revolution, the organisation of primary schools was broadly divided into two models, one in the north and north-east parts of France and the other one characterising rather the southern part of the country. The first one can be described as ecclesiastical or parochial. Teachers were indeed paid with a part of the tithe, as in Lorraine, or directly by the parishioners as in Normandy[6]. Religious foundations were more actively participating to fund primary schools in the north-western area. In each case, teachers were expected to be clerics, assisting parish priests during the mass and to serve as cantor. In the south of France, especially in Provence, the organisation of primary schooling was rather municipal. Teachers were recruited by local authorities by means of an annual contract like it was the case with bakers or butchers. A negotiation with the town council permitted to choose teachers' wage, financed by a combination of a tax supplement on the inhabitants of the municipality and by schooling fees, or only by the fees paid by families. Therefore, the school could remain privately financed even if local authorities were involve in

[5]Followed by another in 1724.
[6]In both cases, they could also have benefited from *corvée* and *taille* (land tax) exemptions.

choosing the teacher. Most of the times, no religious obligations were expected to be fulfilled as in the northern model. Apart from these two general models, there were also other forms of schooling organisation characterising the small or on the contrary the bigger towns. Parish priests could take over the provision of primary instruction in small localities while in cities like Paris or Rouen, corporations of *maitres-écrivains* were in theory granted with the monopoly of teaching how to read and write[7] [Lebrun et al., 2003].

This description of primary schooling mostly applied to boys. Girls were, until the Falloux Law of 1850, left apart from the national legislation on primary schools and not supposed to be taught along with boys. However, it was common to gather both sexes when economic resources were too scarce to create two distinct schools[8]. Therefore, until late in the 19th century, numerous religious congregations actually took over the schooling of girls. For example, the *Ursulines* in the south-east, the *Filles de Notre-Dame*, the *Sœurs de la Charité de l'instruction chrétienne* or the *Filles de la Visitation* within the Parisian region. But for the majority of them, no education was provided outside of the family sphere. The most prominent congregation for boys was the *Frères des écoles chrétiennes* authorised in 1724, mostly present in towns, which provided free education. There were around 1 000 *frères* at the time of the French Revolution, 36 000 pupils being instructed by them.

The revolutionary period and the First Republic (1789-1804) were marked by the suppression of congregations in 1792, but no significant measure on primary education were adopted despite numerous debates in the Assembly led by Talleyrand, Condorcet, Lakanal, ... However, the end of the Old Regime saw the separation between primary schooling and the religious sphere. Indeed, teachers couldn't be paid with a share of ecclesiastical taxes any-more, which had been suppressed. Their wages were from then on to be composed of schooling fees, municipal grants or a combination of both.

No clear indications on how municipalities should levy funds to finance schools were formulated until the Guizot law [Savoie, 2014]. After the passing of this law, they had to finance schooling with a share of their own resources which could come from the four direct contributions created during the revolutionary period[9]. They could also make use of resources coming from the *octrois*, which corresponded to indirect taxes on products imported and sold within the delimitations of the municipality[10]. Finally, municipalities could also levy additional cents for special purposes, as instruction for example. This consisted in asking taxpayers to pay an additional given amount of cents for any franc of tax. Departments were also contributing to the funding of primary schools but in a very limited proportion. Indeed, it was only after the Guizot law that

[7] This was in practise impossible to apply.

[8] At the time of the passing of the Guizot Law, separated primary schools for girls were still rare. Victor Cousin described them as "almost luxury schools" before the Chamber of Deputies in 1833.

[9] The *Assemblée Constituante* implemented in 1791 a land tax, a personal property tax on incomes coming from other sources than land and commercial activities and a *patente* tax on these commercial resources. An additional tax on the number of doors and windows of habitations was later implemented in 1798.

[10] These *octrois* had been suppressed in 1791 and progressively reintroduced from 1798 onwards. Taxes on beverages were for example re-established in 1804, in 1806 for those on salt. They constituted a crucial source of income for municipalities. For example, in 1913, it is estimated that one-third of the economic resources of provincial towns were coming from these indirect taxes, half of the resources of Paris.

municipalities had formally the right and the duty to ask for their help when they own resources and the amounts collected through additional cents were too low to finance the schools[11].

The Napoleonic period (1804-1815) saw the creation of the *Université* in 1806-1808 and a focus on secondary schooling rather than primary education. Along with the preceding period, a lack of financial means prevented national authorities from undertaking important reforms on primary instruction [Mayeur, 2004]. The Restoration (1815-1830) was the time period of a stronger implication of authorities. This began by an increase in the funds dedicated to primary schooling. Also, in 1816, a new law created supervising committees at the level of cantons and a certification of morality granted by the mayor and the parish priest. This latter was from then on required to become a teacher. Along with this, a three-level certification of skills was implemented. Teachers were supposed to have at least the lowest one in order to practice. Municipalities were also compelled to provide children with primary instruction, which was also supposed to be free for the indigents. This last measure was actually not applied[12].

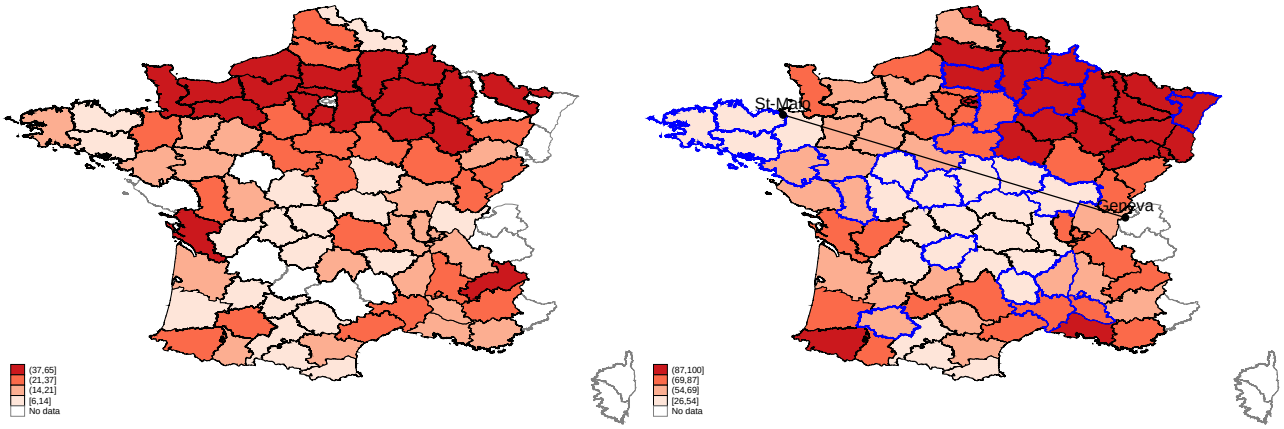
The two models of primary schooling which existed before the Revolution in France also corresponded to two unequal spread of schools. From the 16th century onwards, regions north of the Loire river like Alsace or Normandy were well-endowed in primary schools while, in the South-West, only one parish over five had a school. The situation didn't evolve much during the next century. Taking marriage signature as a proxy for literacy[13], only three departments (within their nowadays borders) north of the Saint-Malo/Geneva line exhibited a signature rate for spouses lower than 20% whereas no more than four of them had a higher rate south of this very line. The average national values for women and men were of 14% and 27% at that time. In Figure 1, one may see the geographical division of French territory for what regards this signature rate and its stability from the end of the 17th century to the Guizot law of 1833. There has even been a reinforcement of differences in favour of the eastern regions and a relative decline of western ones. This pattern remained stable at least until the 1860s in France, even if a convergence in educational attainment was already at work between departments before the Ferry Laws. The number of children schooled per 10 000 inhabitants, for example, still followed closely the geographical distribution described in the mid-1850s and mid-1860s. The same is true for percentage of women or men signing their marriage license in 1871-1875.[14].

[11]The role of the state was even smaller since it is only during the Restoration that the credits dedicated to primary schooling began to rise, from 50 000 francs to 981 000 francs between 1816 and 1832. They were doubled in 1829 and 1830. These credits were essentially employed in buying textbooks intended to be distributed to indigents.

[12]A precise description of the daily life of schools and teachers in the eighteenth and early nineteenth centuries can be found in [Duveau, 1957]. Analyses or testimonies on the state of primary schooling by teachers from the early nineteenth century are available in [Lorain, 1837] and [Meunier, 1981]. In order to have an analysis of local schooling development in the eighteenth century, see for example [Vovelle, 1975] or [Laget, 1971]. See [Gildea, 1983] for a local study from 1800 onwards for the departments of Ille-et-Vilaine, Gard and Nord. In order to have a full political analysis and a description of the laws, projects, and debates about primary instruction during the eighteenth and nineteenth centuries, one can refer to [Gontard, 1959] and the second and third chapters in [Furet and Ozouf, 1977b]. See [Nique, 1990] to have a description of educational state measures from 1815 onwards.

[13]Spouses and their witnesses had to sign marriage register from 1667 onwards. This is why this proxy has been only available since the end of the 17th century.

[14]See Figure B1 in the Appendix.



Men marriage signature rate 1686-1690 Percentage of municipalities with schools 1833

Figure 1: Literacy rate and primary schooling

Source: *Statistique générale de la France*, Guizot survey.

Note: Departments in blue are the ones for which education data are available at the level of municipalities.

3 Data

3.1 Data on Education

The data I use in this work is coming from a national survey conducted in 1833 under the supervision of French Minister of Education François Guizot[15]. 490 inspectors were sent throughout France in autumn 1833 to inspect all primary schools, both public and private. However, primary schools to which only girls were attending were excluded from the scope of the survey as the Guizot law didn't apply to them. All departments were inspected, except Corsica[16].

Data coming from the Guizot Survey of 1833 was published for all French districts in a *Report to the King* [Guizot, 1834]. Only some of the questions asked in the initial survey, those deemed of major interest, were aggregated in this report. From the initial individual (at the level of each primary school) forms, the data was collected for 22 departments and 8 129 municipalities[17]. At least one primary school was present in 4 836 of them (59.5%). This project has been initiated by the *Service d'Histoire de l'Education* of the I.N.R.P, which collected data for the academies of Nantes, Bourges and Nîmes. Other departments were then added to this initial database. In Figure 1, one can see that these departments (in blue) belonged to areas with very different levels of enrolment. Collection of data was indeed conducted with the aim of catching

[15] A lot of information on this survey is available here : http://www.inrp.fr/she/guizot/.

[16] One issue with this data is that only the schools indicated as so by mayors and local authorities were reported by the inspectors. Therefore, it doesn't capture the intensity of familial education or the presence of more informal classes in which a person mastering the basics of literacy was teaching a few children, like the carpenter in [Thabault, 1993].

[17] These departments are: Ardèche, Ardennes, Cher, Corrèze, Côtes-du-Nord (Côtes D'Armor), Finistère, Gard, Gers, Indre, Indre-et-Loire, Loire-Inférieure (Loire Atlantique), Loiret, Lozère, Marne, Morbihan, Nièvre, Oise, Bas-Rhin, Saone-et-Loire, Seine-et-Marne, Deux-Sèvres and Vaucluse. At that time, there were 86 departments existing and 26 academies. Current denominations of departments are specified in parenthesis when a change occurred.

all the determinants that underpinned primary schools' spreading. Other data on education is coming from the *Statistique générale de la France*[18].

The departments selected were quite representative of France for what regards the primary education characteristics that will be under scrutiny in this analysis. Taking average values at the level of districts in order to compare this "municipal level sample" to the entire country thanks to the *Report to the King*[19] shows that the investment of municipalities in primary education (provision of a fixed salary or an accommodation to teachers) and the number of primary schools didn't differ significantly between the whole population and the sample. However, enrolment rates and the percentage of municipalities with schools (60.8% against 71.5% for France) were lower in the sample, which means that the departments at stake were less well-endowed in primary schools than the average national level. This is why several wealth controls along with district and department fixed effects will be introduced in the estimations to reduce potential biases linked to time-invariant specific factors.

3.2 Data on Economic Resources

Data on economic resources is collected from different sources and at different levels of aggregation. For departments, the *Statistique générale de la France* provides data on roads and canals length. Information on taxes is collected from the *Annuaire des contributions directes de l'Empire français* of 1805[20]. Data on cereal production in 1815 is collected from the *Archives statistiques du Ministère des travaux publics de l'agriculture et du commerce* published in 1837. Wheat prices taken from departmental series established in Labrousse et al. [1970]. Other data on agriculture is taken from the national Agricultural Survey of 1852 analysed in [Demonet, 1990]. The location of industrial activities and their characteristics come from the Industrial survey conducted between 1839 and 1847 and presented in [Chanut et al., 2000]. Finally, data on life expectancy is provided in [Bonneuil, 1997].

3.3 Demographic Data on Municipalities and Districts

Data on the population (total and the number of children and single people) of municipalities and departments is taken from the *Statistique générale de la France*, along with religious presence measured by the number of presbyteries. Population dispersion is taken from the Postal Survey of 1847, along with the surface area of municipalities which have disappeared or merged since 1833[21]. The *Institut national de l'information géographique et forestière*, a public organism in charge of the diffusion of geographic information in France, provides this data for the other municipalities. The altitude of municipalities is also taken from this organism.

[18] These data can be found here https://journals.openedition.org/acrh/2890

[19] See Table A1 in the Appendix.

[20] This statistical directory provides data about the "*quatre vieilles*" direct taxes implemented in France after the Revolution.

[21] More information on this survey is available in [Marin and Marraud, 2011].

3.4 Descriptive Statistics

Data at the primary school or municipality level is displayed in Table 1.

Table 1: Education Summary Statistics - Municipal and school levels

Variable	Mean	Std. Dev.	Min.	Max.	N
Primary schools level					
Average schooling fees (data)	96	60	8	600	2420
Average schooling fees (computed)	113	69	6	795	4092
Fixed salary	0.58		0	1	6380
Salary amount - Only when paid (francs per year)	255.99	236.72	2	3000	3737
Salary amount	148.31	221.32	0	3000	6292
Accommodation	0.47		0	1	5742
Classroom	0.55		0	1	5742
Other municipal occupation	0.47		0	1	6328
Other municipal occupation salary amount - Only when paid	101.69	108.85	1	900	2695
Other municipal occupation salary amount	45.46	88.65	0	900	6014
Number of subjects	4.76	1.62	1	11	5715
Schooling years	4.99	1.93	1	9	5678
Municipality level					
Primary school	0.59		0	1	8129
Fixed salary	0.39		0	1	8129
Salary amount	97.09	184.38	0	2400	8129
Accommodation	0.29		0	1	8129
Classroom	0.33		0	1	8129
Other municipal occupation	0.58		0	1	4651
Other municipal occupation salary amount	30.42	74.11	0	900	8129
Pupils per 100 inhabitants - Winter	9.49	6.79	0.27	61.64	4658

Source: Guizot survey.
Notes: Schooling fees are in cents of francs. In 58% of the primary schools, the teachers were provided with a fixed salary. In 39% of municipalities, there existed a primary schools providing a fixed salary to a teacher. The average fixed salary granted was of 259 francs per year, taking into account only the teachers paid so. This average value was of 97 francs when taking the mean of the average salary at the municipality level, meaning that, on average, municipalities were each paying teachers 97 francs annually. In the data, there are observations for which only the minimum and maximum fees paid by parents is specified. I took the mean of these two values to add observations to the average schooling fees. This measure corresponds to he "computed" average schooling fees in the table.

Primary schools were located in 59% of the municipalities and 39% of them were paying teachers a fixed annual salary. Around 30% of them were providing teachers with an accommodation or a classroom. These figures were higher at the school level since in 58%, 47% and 55% of the primary schools, a teacher was provided with such municipal grants respectively. Some municipalities were therefore subsidising more than one primary school. This was only the case in bigger towns which had the financial capacities to enhance primary schooling. The average schooling fees paid each month by families amounted to around 1 franc.

At the level of districts, and therefore for the entire country, the average percentage of municipalities with at least one primary school was around 69% in 1833. However, this measure varied a lot since some districts had less than 20% of their municipalities endowed with schools. It is not possible to know the percentage of public schools as this information was not aggregated. However, there were around 57 public schools per 100 municipalities on average within each district. Once again, some districts were characterised by a very low schooling investment of municipalities, with less than 5 subsidised schools for 100[22].

4 Municipal Investment in Primary Schooling

In this section, I exhibit a positive correlation between economic resources and public investment in primary schooling. To do so, I use data on the heights of military conscripts to approximate the level of economic resources. Indeed, other economic indicators for this time period are either only available at the department level (as agricultural production for example) or too concentrated in some areas to fully account for the economic resources of districts (as the industrial characteristics). In France, since the Jourdan-Delbrel law of 1798, all single French men had to accomplish a compulsory military service between 20 and 25 years old. In 1804, Napoléon instituted a random draw to select the conscripts. Therefore, there is no selection bias with these data as each young men had the same probability to serve[23]. On top of that, at the end of the 19th century, the height of conscripts drew away from the normal distribution only in a small number of departments[24] [Bassino and Dormois, 2009][25].
Data on the height, collected at the level of districts for the 1818-1830 time period on 489 160 twenty years old conscripts (that is to say on men born between 1798 and 1810) is presented and analysed in [Aron et al., 1972]. The average height was clearly mirroring the economic development of France. This is in line with other studies exhibiting strong correlations between height, living and health conditions, work at young ages, nutritional intake, ... during the 17th and 18th centuries [Komlos et al., 2003], the 19th century [Villermé, 1829], at the end of this former and during the following [Chamla, 1964], [Meerten, 1990], [Brinkman et al., 1988][26].

For the present study, I select the percentage of young men whose height was above 1.679 meters and call this measure "the percentage of high heights among conscripts". The average height

[22] See Table A2 in the Appendix.

[23] There still existed some ways to avoid entering the army since wealthy enough people could pay a substitute for their sons by means of a contract before notary. Moreover, some conscripts were still volunteers. However, as this represented only a small part of the total conscripts, it should not lead to a bias in the quality of average height as a proxy for economic resources.

[24] None of these departments are part of the ones for which data on education has been collected at the primary school and municipal levels.

[25] What could be important is also to control for the fact that some conscripts may have enrolled in districts different from the ones where they were born in. However, migrations at the beginning of the nineteenth century were on average 35 kilometres long [Heffernan, 1989], mostly concentrated below 55 kilometres even at the end of the century [Rosental et al., 2000], [Rosental, 2004]. Therefore, it is very unlikely that a sufficient number of young men would have migrated to a department differing greatly in terms of economic resources to bias the measure.

[26] See [Steckel, 1995] for a review of the literature on this point.

was around 1.65 meters for the whole sample. However, since this measure was reported by intervals in the original data, I select as "tall" the conscripts present from the interval next to the one where the average height lied[27]. Comparing data on conscripts to the economic indicators available at the department level tends to confirm that the percentage of high heights can be used as a fairly good proxy for economic resources. There was indeed a positive correlation between this measure and life expectancy, the production of cereals per hectare and the amount of taxes on doors and windows per capita at the beginning of the nineteenth century. Height was on the contrary negatively correlated with mortality rate between 0-5 years old and the price of wheat per hectolitre[28].

Descriptively, the percentage of high heights among military conscripts correlates positively with the aggregated data on education at the district level[29].

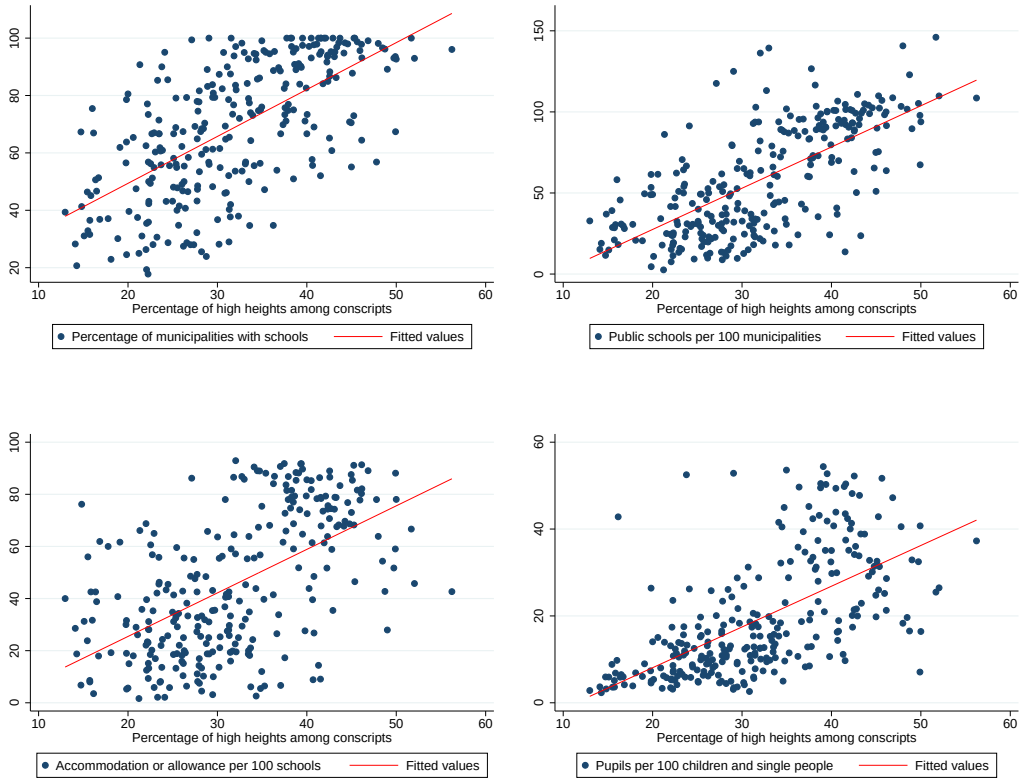


Figure 2: High heights among conscripts and primary schooling

Source: Guizot Survey and military data on conscripts from [Aron et al., 1972].

[27]Height intervals, the histogram of the percentage of high heights and the geographical repartition of high conscripts are reported in Figure B2 in the Appendix. The percentage of high heights varied between 13% ad 56% with a mean of 32%. There was a quite strong symmetry between the map of high heights and the distribution of marriage signatures and municipalities with schools [Aron et al., 1972], [Ladurie et al., 1976], [Ladurie and Demonet, 1980].

[28]This price is taken as measure of food cost. See Figure B4 in the Appendix.

[29]The geographical patterns of high heights and municipal investment in primary schooling indicators are displayed in Figure B3 in the Appendix. They illustrate the correspondence at the department level between these two phenomena.

Figure 2 plots the relationship between this percentage and the ratio of municipalities with primary schools, the number of public schools per 100 municipalities, the number of teachers benefiting from an accommodation or accommodation allowance from municipalities and the number of children attending schools per 100 children and single people. The correlations are all positive and significant[30]. Therefore, districts in which the standards of living were higher were also characterised by high enrolment rates and a strong concentration of primary schools and municipal grants.

In order to evaluate this relation, I use the following simple OLS framework :

$$Schooling_{arr,d} = \alpha_{arr} + \beta_1 Height_{arr,d} + \beta_2 Ind_{arr,d} + \beta_3 Demo_{arr,d} + \beta_4 Eco_d + \epsilon_{arr,d} \quad (1)$$

where *Schooling* stands for primary schooling variables at the level of the district *arr* and department *d*. *Height* represents the percentage of high heights among military conscripts, *Ind* stands for industrial controls, *Demo* for demographical and geographical controls and *Eco* for economic controls at the department level[31]. Standard errors indexed by *d* are clustered at the department level. This is done in order to account for spatial correlation within them. Indeed, as some control variables are defined at a more aggregated level than districts, not doing so could cause standard errors to be seriously downward-biased and lead to spurious findings. This may happen for example if the micro units (the districts) share some unobservable characteristics in a given group (departments) [Moulton, 1986], [Moulton, 1990]. For example, the long-term effect of Protestant settlement and the use of a patois were identified in the literature as having influenced schooling spread[32].

For what regards demographic and geographic variables, I control by the average altitude of municipalities within each district, their surface area, their total population in 1831 and by the share of their population that is considered to have been scattered. This last measure is coming from the postal survey and based on a simple contiguity criterion. It is expected to have influenced negatively primary schooling by increasing the distance from habitations to schools and therefore decreasing the number of pupils. Mountainous land is expected to have had the same effect. Population should, on the contrary, have increased the potential number of pupils and the resources municipalities could dedicate to education. I also add the number of single people and children in 1831 in each department as a control. Surface area's effect is *a priori* less clear since it could have at the same increase distances from school and the amount of agricultural resources available. Finally, I also control by the fact that the prefecture is located

[30] Their magnitudes are respectively of 0.64, 0.69, 0.56 and 0.62, all significant at a one-percent level.

[31] See the description of data in the Appendix to have a full list of the controls used in the estimations.

[32] Indeed the effects of the Reform and Counter-Reform were found to have had a positive effect on schools. See for example [Laget, 1971] in the case of Bas-Languedoc. Moreover, at the beginning of the nineteenth century, the strong presence of a patois was identified by social observers as a barrier to the spread of instruction. Evidence seems to comfort this point of view as, for example, in the case of Morbihan, the fact of speaking Breton compared to French was correlated with a lower literacy rate, for any kinds of profession [Furet and Ozouf, 1977b].

in the district at stake.
Economic controls at the district level are: the ratio of municipalities with industrial activities, the number of workers and engines in industry along with the value of industrial production. The amount of agricultural land is also controlled for. Finally, at the level of departments, I also control by the length of roads and water communications, the price of wheat in 1799, the amount of taxes on doors and windows per capita in 1836, the production of cereals per hectare in 1815 and life expectancy at birth in 1806-1810. These economic controls are complemented by the number of presbyteries used as a proxy for religious influence.

Results are displayed in Table 2. The presence of primary schools as well as the public investment in instruction were negatively influenced by population dispersion and positively by the presence of industrial factories which can be taken as a sign of economic dynamism. Population dispersion is the only demographic or geographic variable remaining significant across the specifications. This is in line with the importance attributed to the effect of this variable on education in historical case studies [Furet and Ozouf, 1977b]. All the coefficients associated to the percentage of high heights among conscripts are positive and significant. Given that this percentage had a standard deviation of 9, one standard deviation increase implied a rise of around 6.7 in the percentage of municipalities with schools within the districts. The effect was of the same magnitude for the number of public school per 100 municipalities. When decomposing this latter, it appears that the magnitude was slightly higher for what regards providing teachers with an accommodation or an allowance than for paying them on a regular annual basis. This was certainly due to the fact that municipalities could more easily find an empty house for their teachers than the funds necessary to pay them during a whole year. Therefore, economic resources tended to be to associated with a higher total number of schools, a higher percentage of municipalities with schools and municipal investment in education.
The same was true for enrolment rates[33]. Since there is no data on the number of children per district before the mid-nineteenth century, I take the number of children and single people as the denominator in the enrolment rate measure. This assumes the repartition between children and single people to have been equivalent between districts, which seems to be a fairly reasonable assumption. One standard deviation increase in the heights of conscripts was associated to a 3.3 increase in the number of pupils schooled.

[33]Pupils attending schools in winter are taken into account in this enrolment measure. This is done in order to avoid letting aside all children performing agricultural tasks in summertime. Taking winter numbers therefore prevents from downplaying the importance of primary schooling in agricultural districts.

Table 2: Heights of conscripts and primary schooling

	(1) Percentage of municipalities with primary schools	(2) Primary schools per 100 municipalities	(3) Public schools per 100 municipalities	(4) Accommodation or allowance per 100 schools	(5) Paid teachers per 100 schools	(6) Enrolment
High heights among conscripts	0.682***	0.874**	0.759***	0.523*	0.499*	0.366***
	(3.292)	(2.174)	(2.922)	(1.724)	(1.979)	(3.101)
Population dispersion	-0.388***	-0.527***	-0.655***	-0.338***	-0.511***	-0.126***
	(-5.658)	(-4.890)	(-6.356)	(-3.935)	(-6.372)	(-2.782)
Factories' presence	0.288***	0.467***	0.565***	0.221	0.154	-0.046
	(2.813)	(2.770)	(4.028)	(1.632)	(0.988)	(-0.780)
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes	Yes
Department wealth controls	Yes	Yes	Yes	Yes	Yes	Yes
Department clusters	81	80	81	81	81	81
Observations	268	264	270	268	264	267
R^2	0.563	0.505	0.701	0.592	0.596	0.689

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *High heights among conscripts* refers to the percentage of conscripts in each district taller than national mean. *Population dispersion* is the percentage of population which was reported scattered in the Postal Survey, based on a contiguity criterion [Roncayolo, 1987]. *Factories' presence* is the percentage of municipalities in which at least one factory more than ten workers was located. The *enrolment* rate is defined as the number of children attending schools in winter per 100 children and single people.

Taking another measure of height as a robustness check, the number of young men that were examined but deemed too small (below 1.57 meters) for the conscription doesn't change the results[34]. Thanks to the Guizot survey, I can also take as a dependent variable the public investment at the level of municipalities and not districts. Descriptively, the proportion of municipalities with at least one primary school was higher in districts where the proportion of high heights was high too. This was also the case with any type of municipal investment and the wages provided to teachers[35]. The relation is confirmed by the use of OLS estimations, displayed in Table A4 in the Appendix. Whether using department wealth controls or department fixed effects, the results remain positive and significant. This is true for any type of investment: paying teachers a fixed salary (and its amount), providing them with an accommodation, a classroom, another municipal occupation (and its salary amount).

Public investment was also higher in wealthier districts when focusing on schoolhouses. Estimations outcomes in Table A5 in the Appendix indicate that the percentage of municipalities with a sufficient number of schoolhouses was higher in districts well-endowed in economic resources, and where population dispersion was lower. They also indicate that the total number of schoolhouses was higher in such districts, along with the number of schoolhouses owned by

[34]See Table A3 in the Appendix. The results are all negative and significant with respect to the same dependent variables that were under scrutiny in the previous table, except when public schools are decomposed between teachers with a salary and teachers with an accommodation This is certainly due to the fact that I don't have the percentage of teachers paid or provided with an accommodation at the level of districts. Since more primary schools existed in the areas where public investment was high, this entails that decomposing this investment between its different components may reduce the number of observations too much to induce a significant difference with districts where public investment was low.

[35]See Figure B5 in the Appendix.

municipalities. The effect on the number rented was positive but not significant. Erecting a building only dedicated to primary instruction demonstrated a great involvement of municipalities. Indeed, in half of the districts, less than one-third of all municipalities were deemed as endowed with a sufficient number of schoolhouses in the survey.

This section was not intended to prove the causal impact of economic resources on primary schools. However, it did demonstrate that, after the Revolution, the districts well-endowed in economic resources were also characterised by a high concentration of schools, a higher proportion of public schools and greater enrolment rates. Moreover, as shown in Figure 1, the geographical pattern of education remained quite stable from the Revolution to the Guizot law. Therefore, municipalities with a longer educational tradition took over the control of primary instruction and substituted their own resources to the religious taxes that were previously financing the schools. They were able to do so since these municipalities were also endowed with higher economic resources after the Revolution. In districts and municipalities where resources were scarcer and education previously less developed, primary schools remained generally private, financed only by fees, and were characterised by low enrolment rates. Municipalities in richer areas could also have left education to be financed this way, as families had a higher purchasing power there and could more easily pay the schooling fees. However, they did not so, and this is an important point. Indeed, they didn't only substitute a public supply of schools to the previous religious one. Municipalities also acted vigorously to increase enrolment rates and improve teaching conditions and the accumulation of human capital.

5 Lower Schooling Fees Level and Higher Enrolment Rates in Public Primary Schools

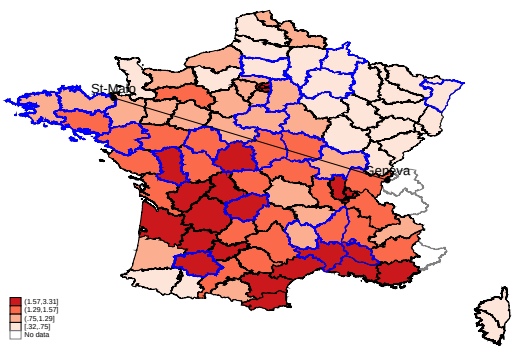
5.1 Descriptive Statistics

Over the 22 departments in the database, only 2.8% of the schools were totally free for families. Paying schooling fees was therefore part and parcel of primary instruction, even when the school was provided with municipal investment. These fees were paid monthly to teachers. Their level depended on the number of subjects learned and, therefore, often on the age of the pupil. Indeed, education was thought in a more linear way than nowadays. Children were first learning how to read, then how to write, then the basics of numeracy and so on [Mayeur, 2004][36]. If the teacher was depending only on schooling fees to make a living, then he could fix their level as he intended to. However, when he was provided with municipal grants, this level was subject to a negotiation between the teacher and local authorities.
These fees could constitute a high cost for families who wanted their children to attend primary schools. The minimum level to learn only how to read was often set between 50 and 75 cents of

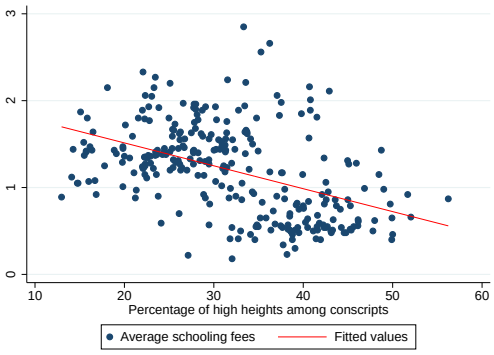
[36]Part of the fees could be paid in kind, which is hard to take into account and is a limit to the reliability of the data used. Loafs of bread, for example, could serve as a complement to payments in money [Furet and Ozouf, 1977b].

francs. Learning the arithmetic costed typically between 1.5 and 1.75 francs. Pupils learning history, geography, linear drawing, land surveying or music had to pay more[37]. On average, paying the schooling fees for one child amounted to spend between 1 and 1.2 francs per month[38]. This was equivalent to the daily wage of an industrial female worker, between 50% and 71% of an industrial male daily wage. The agricultural survey of 1852 indicates the annual spendings and savings of a day-worker family with three children[39]. Assuming that one of them was working and, depending on the hypotheses made on the attendance of the two children left (both 12 months, one 12 and the other 6 or both 6 months) schooling fees represented respectively 16, 21 or 26% of total savings. The fees were therefore a strong economic barrier to the schooling of children coming from destitute backgrounds.

Then, one could expect schooling fees to have been higher in richer areas, where families had a greater purchasing power and where children were learning more. However, in Figure 3, the geographical distribution of fees appears to have been the opposite to the one of primary schools and enrolment rates. Indeed, fees were higher south of the Saint-Malo/Geneva line, especially in the Gironde region and in the Mediterranean area. Their level correlated therefore negatively with the percentage of high height among conscripts within districts. Areas more endowed in schools and economic resources were also those where the fees were the lowest.



Average schooling fees (in francs per month)



Average schooling fees and height of conscripts

Figure 3: Distribution of schooling fees

Source: *Statistique générale de la France*, Guizot survey, military data on conscripts from [Aron et al., 1972].
Note: Departments in blue are the ones for which education data are available at the level of municipalities.

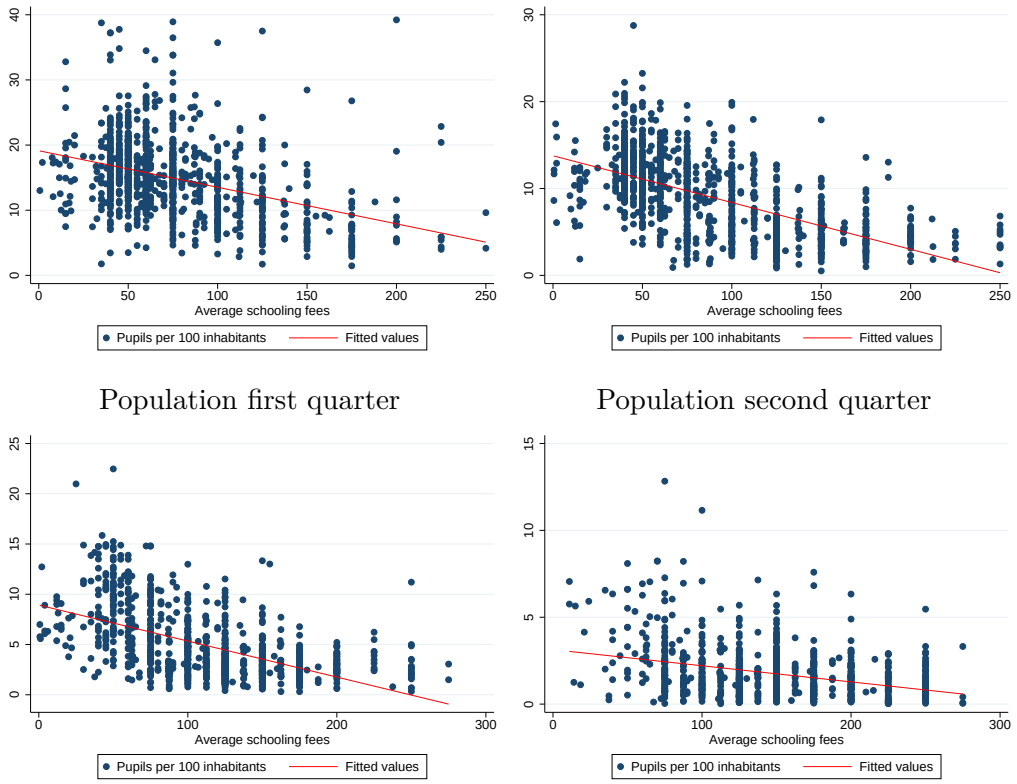
This was also true at the level of primary schools themselves. Since the number of children at the municipal level is not available for the time period under scrutiny, I report here as an enrolment rate the number of pupils per 100 inhabitants. I divide municipalities into quarters depending on their population in order to have similar towns in terms of population age structure. As

[37]These were the subjects which could be taught in primary schools along with literacy, numeracy and religious instruction. Only a few children were actually studying them.

[38]See Table A6 in the Appendix.

[39]Those were clearly the poorest among agricultural workers since, for example, food represented between 57 and 79% of their annual spendings, with a mean of 66%.

displayed in Figure 4, the higher the fees were in a school, the lower the enrolment rate. This was especially true for the first three population quarters. Therefore, there seems to have been a link between economic resources, municipal investment in schools, lower schooling fees and higher enrolment rates.



Population first quarter | Population second quarter

Population third quarter | Population fourth quarter

Figure 4: Average schooling fees (cents of franc) and enrolment. Primary school level

Source: Guizot survey.

5.2 A Municipal Will to Lower Schooling Fees

This relation is verified by OLS estimations, both at the level of districts and of primary schools. When more public schools were present in a district, fees were on average lower. The effect was especially strong when the municipal investment consisted in paying teachers[40]. The advantage of using data at the level of primary schools is to have a direct measure of municipal investment and schooling fees. Also, I can control by several other variables only reported at this level which could have influenced the fees. This gives more reliability to the estimations. Therefore, I add to the controls used so far[41] the number of subjects taught, the fact of welcoming girls, if

[40] See Table A7 in the Appendix.

[41] Demographic, geographic and industrial variables are available at the level of municipalities. Only agricultural area is still included at the level of districts. Literacy rates of men and women in 1686-1690 are also taken into account in order to control for any effect of the long term educational tradition on schooling fees and enrolment rates in 1833.

the school was a boarding one, the average admission age and length of schooling, the fact of having books in sufficient number, the number of persons at charge for the teacher and his level of certification. Indeed, the fees could have been higher if many pupils were learning several subjects and therefore staying at school for a longer period of time. By the same token, parents had to pay more if children were boarders or if schools were well-endowed in teaching materials. At last, if the teacher was more qualified or if more persons were at his charge, he was more likely to ask for higher fees.

In Table 3, I regress the level of schooling fees on a set of binary variables indicating if the teacher was provided with municipal grants in the primary school at stake. Therefore, each coefficient corresponds to the estimation outcome of a regression. The difference between the second and the third column is that I only take the average fees reported in the data in the third one. In the second one, I add to them an average value of fees computed as the mean between the maximum and the minimum values paid by parents when they were specified in the data but that the average value was not. This is due to the fact that inspectors reported in many cases only the minimum level of fees, that is to say the one paid by pupils only learning religious instruction and how to read, and the maximum level paid by those learning several subjects. They didn't make an estimation of the average level of fees at the level of the school[42]. I complement the data in order to have more observations at the primary school level. This issue also exemplifies the importance of controlling by the average number of schooling years and by the number of subjects taught. Indeed, if more pupils were learning several subjects, the level of fees might have been high because of this composition effect but not because of an active will of teachers or municipal authorities to set a high price for schooling. Therefore, estimations at the primary schools level are much more reliable than between districts as they control for this composition effect affecting the level of fees.

The impact of municipal investment is always negative, contributing to a reduction in the fees paid. The magnitude of the effect is between 12 and 13 cents of francs, while the average value of fees was around 1 franc per month. Therefore, on average, the mean level of fees in a school publicly subsidised was around 10% lower than in its private counterparts. When decomposing between the different types of subsidies, I find that providing teachers with a salary or a classroom had a higher effect that providing them with an accommodation. Since being paid annually was synonymous with financial ease, this doesn't come as a surprise. Teachers were certainly more willing to decrease fees when they were ensured with being paid on a regular basis. A standard deviation in the salary paid by municipalities was implying a 7 cents decrease of the level of fees. The higher magnitude of the effect without decomposing municipal investment trough its different types is due to the fact that, in around 50% of the cases when a school was subsidised, at least two types of grants were provided to teachers, the three of them in 44.5% of the public schools. Municipalities investing in education often did so intensively,

[42]Doing this computation, I have to assume that the mean value between the minimum and maximum values of fees is representative of the average level of fees paid by families. I also tried to take the computed average value as the addition to the minimum one of the average spread between the minimum and the maximum values when reported. This didn't change the results, which are available upon request.

using different types of financial support.

The negative effect on the maximum and minimum levels of fees are also interesting. The latter level was the schooling cost of education parents had to pay so that their children could enter the school[43]. Therefore, in schools with municipal investment, the cost of education for most of the families was actually reduced by around 13%. The negative impact on the maximum level, mostly associated to the provision of a fixed salary and its amount, also indicates that the education cost was reduced even for pupils learning the highest number of subjects within the school. The lowering of fees within public primary schools was therefore generalised for all pupils. A direct consequence is that children were more likely to learn more within these schools than within their private counterparts since the cost of learning several subjects (and not only that of entering the school) was reduced. This point is studied in Section 6.

All these estimations show an association between municipal investment and low schooling fees. As said before, there was a negotiation on their amount if municipalities were financing primary schools [Furet and Ozouf, 1977b]. When they did so, teachers were less dependent on fees to make a living since part of their expenses or salary was provided by the economic resources of the municipality. This higher financial ease and stability explains why they accepted to lower the level of fees.

Table 3: Schooling subsidies and average schooling fees - Primary school level

	(1) Minimum schooling fees	(2) Computed average schooling fees	(3) Average schooling fees	(4) Maximum schooling fees	(5) Minimum schooling fees	(6) Computed average schooling fees	(7) Average schooling fees	(8) Maximum schooling fees
Fixed salary	-9.485***	-7.330**	-5.448*	-11.213***	-9.102***	-6.146**	-4.079	-16.821***
	(-3.699)	(-2.258)	(-1.717)	(-2.676)	(-4.156)	(-2.023)	(-1.267)	(-2.598)
Observations	1703	1460	976	1619	2018	1468	964	1647
R^2	0.517	0.636	0.665	0.554	0.573	0.658	0.686	0.587
Fixed salary amount	-0.037***	-0.035***	-0.032**	-0.051***	-0.024***	-0.034***	-0.028**	-0.052***
	(-3.588)	(-2.819)	(-2.487)	(-3.009)	(-2.860)	(-3.039)	(-2.162)	(-3.227)
Observations	1690	1452	971	1610	1978	1459	959	1637
R^2	0.516	0.639	0.669	0.557	0.565	0.661	0.690	0.588
Accommodation	-5.277*	-5.110	-7.543**	-1.935	-6.694***	-6.551**	-7.978**	-6.098
	(-1.968)	(-1.569)	(-2.187)	(-0.409)	(-2.812)	(-2.163)	(-2.236)	(-1.451)
Observations	1409	1183	799	1316	1718	1190	786	1342
R^2	0.495	0.627	0.667	0.538	0.564	0.650	0.689	0.569
Classroom	-7.217**	-7.814**	-9.832**	-4.328	-8.124***	-7.237**	-9.892 **	-6.808
	(-2.641)	(-2.248)	(-2.398)	(-0.840)	(-3.242)	(-2.149)	(-2.330)	(-1.370)
Observations	1409	1183	799	1316	1718	1190	786	1342
R^2	0.497	0.629	0.669	0.539	0.565	0.650	0.690	0.569
Subsidised school	-12.127***	-12.268**	-13.920**	-14.161**	-12.281***	-9.412*	-14.292**	-11.582*
	(-2.770)	(-2.413)	(-2.311)	(-2.129)	(-2.785)	(-1.830)	(-2.372)	(-1.780)
Observations	1674	1433	963	1582	1992	1443	952	1611
R^2	0.516	0.635	0.669	0.554	0.573	0.658	0.692	0.585
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department wealth controls	Yes	Yes	Yes	Yes	No	No	No	No
Department fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
District clusters	61	57	44	59	69	65	47	67

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

[43]It is not possible to know exactly the proportion of pupils paying only this minimum level. However, the proximity between this latter, 90 cents of francs, and the average level of fees, 96 cents, indicate clearly that many of the children actually learnt only religious principles and how to read and write at school.

In columns(5) to (8), I run the same estimations including department fixed effects so that the effect of public subsidies is measured using within-departments variation only. As the level of public investment was highly varying between them, this enables to control by economic or social factors specific to a department which might have influenced public investment, the presence of schools and schooling fees. The significance of the outcomes is only slightly modified by this adjustment. Therefore, either in department well-endowed in primary schools or where education achievement was low, public subsidies were associated with a fall in the cost of education parents had to bear.

5.3 Lower Fees, Higher Enrolment

The lower level of fees in public primary schools was associated with higher enrolment rates. Municipalities didn't invest in schools only to ensure the stability of teachers' presence, but also to increase enrolment. Indeed, a response to the investment of municipalities was that teachers had to welcome freely indigent children chosen by local authorities. They were arbitrarily listed by municipalities and teachers had no means to refuse these pupils[44]. On average, in 1833, 21% of the pupils were welcomed freely. This percentage amounted to 23.6% in public schools and to 10.7% in their private counterparts. Therefore, in exchange for a higher stability in their occupation, teachers were accepting to lower the level of fees and to welcome more pupils, who were either paying less or were attending primary schools freely.

At the level of districts, and therefore for the entire country, an increase in the average fees paid was clearly associated with a fall in enrolment, as displayed in Table 4. In all these estimations, I control by the number of pupils freely attending schools so that the effect on enrolment rates is coming from families paying fees. I also control by the total number of schools within districts and by the percentage of municipalities with schools since they were associated to a higher enrolment without any link with the average level of fees. In columns (2) and (4), I also control by the ratio of public schools within districts. In districts where municipal investment in education was high, schooling fees were lower, which contributed to widen the number of pupils attending schools. A standard deviation increase of 50 cents of francs in the average level of fees was entailing a reduction in enrolment between 2.2 and 4.3 pupils per 100 children and single people. Given that the average enrolment rate was of 19, this implied a reduction between 11% and 22% of the enrolment rate for one standard deviation in the average schooling fees[45].

[44]These lists were sometimes contested since some families were putting pressure on local authorities so that their children would be counted as indigents and could attend schools freely. Indeed, as there were often, for example in small and poor municipalities, more indigent children that one teacher could deal with, most of them were actually not provided with free education. The criteria according to which children were listed or not remain obscure and there was no clearly-defined process to select between them those who would be educated freely.

[45]In order to investigate the robustness of these estimations, I made use of the 1851 Census which reports the number of children by age in each department. Thanks to it, I can have an approximation of the number of children in each district and I don't have to rely on the number of children and single people to measure enrolment rates. The results were not affected by this modification. The effect of the average level of fees on enrolment remained negative and significant, with a slightly higher order of magnitude. See Table A8 in the

Table 4: Schooling fees and enrolment rates - District level

	Pupils per 100 children and single people			
	(1)	(2)	(3)	(4)
Average schooling fees	-7.564***	-5.519***	-4.339***	-3.958***
	(-6.170)	(-3.948)	(-3.208)	(-2.674)
Total number of schools	0.086***	0.096***	0.067***	0.070***
	(3.125)	(3.551)	(2.908)	(3.065)
Percentage of municipalities with schools	0.138***	0.136***	0.144***	0.141***
	(4.109)	(4.025)	(4.253)	(4.119)
Free pupils	-0.001	-0.002	0.001	0.001
	(-0.928)	(-1.272)	(1.444)	(1.347)
Demographical and geographical controls	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes
Ratio of public schools	No	Yes	No	Yes
Department wealth controls	No	No	Yes	Yes
Department clusters	81	81	74	74
Observations	265	265	244	244
R^2	0.788	0.793	0.864	0.864

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: see main text.
Notes: Average schooling fees are defined in francs. *Free pupils* correspond to the total number of pupils freely welcomed in primary schools within each district.

As before, the use of more disaggregated data is useful in specifying this relation. In Table 5, I study enrolment rates at the municipality level, controlling by the same factors as in Table 3 and adding the number of free pupils. The measure of fees used in the estimations is the computed level of average fees. However, the issue remains that I don't know the number of children at the level of municipalities. To decrease the potential bias linked to different age structure, I divide the estimations by population size. Indeed, municipalities with the same number of inhabitants were more likely to have been close in the age structure of their population. I run the regressions on municipalities less than 631 inhabitants, which was the median population level, and on those above this threshold. I also do so on municipalities less than 2 000 inhabitants, which amounts to excluding the top 10% in terms of population from the analysis[46]. I also control by the total number of schools in the municipality.

The effect found is always negative and strongly significant. In municipalities less than 631 inhabitants, one standard deviation increase in the average level of fees between schools (of around 48 cents of francs) was entailing a fall in enrolment between 0.8 and 1.6 pupils per 100 inhabitants, depending on the addition of department wealth controls. The average enrolment in these municipalities was of 13.4 pupils per 100 inhabitants. Therefore, one standard deviation increase in the average level of fees was associated with a fall between 6% and 12% of the

Appendix.
[46]See information on population deciles in Table A9 in the Appendix.

enrolment rate. The effect of such a standard deviation on municipalities more than the median population was a fall of the enrolment rate between 12.5% and 25%. On municipalities less than 2 000 inhabitants, the effect was bounded between 5% and 16%.
Therefore, the impact was close in magnitude between small municipalities below the median population and the bottom 90% of them in terms of population size. Many families in all these municipalities were therefore quite dependent on the cost of education. A fall in the level of fees was inducing a substantive rise in enrolment rates. The similarity of the effect between them also indicates that the age structure of the population was certainly not differing much between the two groups of villages[47]. The inclusion of department fixed effects doesn't modify the significance or the magnitude of the outcomes.
As a robustness check, I substituted the average level of fees by their minimum amount. I still find a negative effect of fees on enrolment, valid for municipalities less than 2 000 inhabitants and more then the median population level. The magnitude of the impact is decreased compared to the previous estimations. This is due to the fact that a fall in the minimum level is only prompting more pupils to enter the school, while a fall in the average level is also associated with pupils staying at school for a longer period of time, which is contributing to increase even more enrolment rates[48].

The reverse causality issue remains weak in these estimations. Indeed, the level of fees was first set by the teacher after a potential negotiation with municipal authorities. Then, families decided whether or not sending their children to school. Moreover, even if many pupils were subsequently schooled for a given level of fees, there was no strong incentive for teachers to lower this level by themselves. The municipal investment was ensuring them with a financial stability which made this lowering acceptable in the negotiation. However, when no such investment was present, teachers had interest in maximising the income coming from fees, even when enrolment rate was high. Indeed, they were, on average and compared to the other professions, not at ease financially speaking [Lorain, 1837]. That is why this occupation was often seen and described as unenviable in the nineteenth century, especially before the Guizot Law which for the first time implemented a minimum annual salary for teachers [Prost, 1968]. This argument also applies for these estimations in Table 3. Finding an altruistic and wealthy enough teacher, willing to decrease schooling fees, and being rewarded for his involvement in education by municipal authorities afterwards was extremely unlikely.

[47]The number of town for which average schooling fees are available is too low to run regressions only on towns more than 2 000 inhabitants. The effect found is negative but the number of observations and of clusters become too low to be reliable.
[48]See Table A10 in the Appendix.

Table 5: Average schooling fees and enrolment. Municipality level

	Dependent variable : Pupils per 100 inhabitants								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Population ≤631 (Med)	Population ≤631	Population ≤631	Population ≥631	Population ≥631	Population ≥631	Population ≤2 000	Population ≤2 000	Population ≤2 000
Average schooling fees	-0.032***	-0.017***	-0.016**	-0.020***	-0.011***	-0.009***	-0.028***	-0.009***	-0.007**
	(-5.097)	(-2.802)	(-2.530)	(-6.327)	(-3.815)	(-3.153)	(-6.554)	(-3.104)	(-2.142)
Number of schools	5.955***	5.966***	5.975***	1.255***	1.533***	1.474***	3.138***	3.667***	3.626***
	(7.687)	(7.434)	(7.393)	(6.329)	(8.799)	(8.132)	(6.369)	(8.307)	(8.303)
Number of free pupils	0.073***	0.050**	0.054**	0.046***	0.036***	0.032***	0.030***	0.016	0.014
	(3.625)	(2.374)	(2.502)	(4.921)	(3.806)	(3.672)	(3.210)	(1.494)	(1.339)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department wealth controls	No	Yes	No	No	Yes	No	No	Yes	No
Department fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
District clusters	46	39	46	67	59	67	66	57	66
Observations	965	953	965	859	812	859	1709	1658	1709
R^2	0.505	0.530	0.534	0.723	0.735	0.759	0.609	0.634	0.652

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *Average schooling fees* is computed in cents of franc as the mean value of fees within each municipality. When only the minimum and maximum values were specified for a given school, the average value in this school was taken as the mean between these two extreme levels.

It could be argued that lower fees within public schools were prompting their private counterparts in the same municipality to also decrease the cost of education in order to attract more pupils. In this case, the effect of fees on enrolment rates would also be due to spillover effects on private schools. However, there were at least one public and one private school in only 6.7% of the municipalities with schools. In only 38 municipalities were there strictly more than one public and one private school. Therefore, it is unlikely that these spillover effects were important in explaining the variations in enrolment rates.

Still, to give further reliability to the previous estimations and to avoid any potential interaction between schools, I restrict the sample of municipalities to those in which only one primary school was present. I do so in order to see if enrolment rates were higher in municipalities with one public school compared to those with one private. Schooling fees were much lower in municipalities with a public school, with an average level of 90 cents of francs against 1.34 in those with one private. Estimation outcomes are displayed in Table 6. To ensure an homogeneous age pattern, I restrict the sample to municipalities less than 4 000 inhabitants in the third and fourth columns, which amounts to letting aside around 1% of the municipalities. I do so on municipalities less than 1 000 inhabitants in columns five and six, which is equivalent to keeping the 75% less populated. Selecting other bounds wouldn't change the results which are quite close for any population restriction. The presence of a subsidised school compared to a private one was associated with a reduction of around 0.5 pupils per 100 inhabitants after the introduction of department controls. This corresponded to a 4% increase in enrolment rates.

Table 6: Public schooling and enrolment in municipalities with one school.

	Dependent variable : Pupils per 100 inhabitants								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	All	All	Population	Population	Population	Population	Population	Population
	sample	sample	sample	≤4 000	≤4 000	≤4 000	≤1 000	≤1 000	≤1 000
Subsidised school	1.149***	0.498***	0.432**	1.114***	0.481**	0.413**	1.064***	0.480**	0.546**
	(3.577)	(2.666)	(2.413)	(3.468)	(2.508)	(2.256)	(2.847)	(2.074)	(2.353)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department wealth controls	No	Yes	No	No	Yes	No	No	Yes	No
Department fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
District clusters	71	62	71	71	62	71	64	55	64
Observations	2163	1888	2163	2156	1881	2156	1720	1521	1720
R^2	0.582	0.621	0.653	0.585	0.625	0.657	0.536	0.598	0.610

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: Only municipalities with one primary school are selected in these estimations. Municipalities with one public primary school are therefore compared to their counterparts with only one private school.

6 Public Education, Teaching Efficiency and Intensive Human Capital Accumulation

So far, I demonstrated that from the Revolution to the Guizot Law, a high concentration of schools was closely associated to a high municipal investment, this latter implying lower schooling fees and higher enrolment rates. In this section, I will show that municipal investment was also linked to better teaching conditions and a higher intensive accumulation of human capital. By intensive, I mean that not only enrolment rates were higher (which would be an extensive accumulation of capital, the one exhibited in the previous section), but that pupils were also learning more.

6.1 The Recruitment of More Qualified Teachers

The Guizot survey provides information on the certification level of teachers. After 1816, in order to be able to practise, they had to obtain a certificate delivered after an examination conducted by a civil servant belonging to the ministry of public instruction. Three degrees were composing this school certificate, the third one being the lowest on the hierarchy since teachers could obtain it thanks to a minimum mastering of numeracy and literacy. With additional notions of spelling and calculus, they were likely to obtain the second degree. The first one was only accessible for teachers mastering grammar, land surveying, geography and arithmetic.

In Table 7, I regress municipal investment in primary schools on these characteristics in order to know if teachers with a higher certification were more or less likely to be recruited in public schools. In order to analyse the certification's effect, I introduce the three degrees in the estimations to know their impact, compared to the situation in which the teacher had no certificate, on the probability for a teacher to practise in a public school. I do so since 6%

of the teachers still didn't abide by the 1816 law and had no certificate in 1833. A positive effect would therefore mean that municipalities tended to more often recruit teachers with a certificate, a signal that the teacher made the efforts to acquire sufficient knowledge to pass the examination. It is also possible that a teacher was already employed in a public school before 1816 and that he was prompted by municipal authorities to abide by the new law after this date. In this case, there was no recruitment of better quality teachers but an in-service training decided by the municipality. If the teacher was not able to do so, the municipality could have very well recruited another one. Consequently, the coefficient associated to the certification degree captures either the effect of the certificate on the probability to be recruited by a public school, or its impact on the probability to be kept in a public school.

All certificate degrees were associated with a higher probability to teach in a public school[49]. The magnitude of the effect was of respectively 10, 9 and 7.6 percentage points for the first, second and third degree. More qualified teachers were therefore more likely to practise in public schools and to be recruited by them. The effect was especially strong on the probability to be paid annually by the municipality, respectively 18, 16.6 and 8.5 percentage points. Only the second degree of certification had a positive effect on the salary's amount and the provision of an accommodation or a classroom. It also had a positive impact on the probability to be granted with another municipal occupation, along with the third level. The absence of significant effect for the first degree when decomposing public subsidies is due to the fact that a teacher with this level of qualification was present in only 1.6% of the primary schools in the database. Therefore, this amounts to restricting highly the number of teachers with this certificate level and a given subsidy.
All in all, teachers who obtained the second degree certificate, 38% of them, were more likely obtain any kind of subsidy and to be paid more. The 54% of teachers who obtained only the third degree were also more likely to be subsidised by the municipalities, but mostly through the provision of a fixed salary or another municipal occupation. Their salary was however on average not significantly higher than the one of subsidised teachers without certificate. This is in line with the fact that these teachers were more often employed in smaller municipalities endowed with lower economic resources compared to the ones with a second-degree certificate. Therefore, these municipalities were more often hiring a teacher and providing him another occupation at the same time. They were also selecting teachers with a certificate and providing them with a fixed salary more often, even if this salary remained low.

Logit estimations confirm these outcomes for the three certification degrees[50]. Teachers with a third-degree certificate were around 1.7 times more likely to be provided with municipal grants, 1.6 times to be provided with a fixed salary or another municipal occupation. Teachers with a second-degree certificate were more likely to be granted with any type of subsidy, with a magnitude of around 2 times for the provision of a municipal grant generally speaking.

[49]Descriptively, there were 84% of the teachers with a first-degree certificate practising in public schools, 85% of those with a second-degree and 78% of the teachers with a first-degree.
[50]See Table A11 in the Appendix.

Table 7: Teaching certificates and public primary schooling

	(1) Subsidised school	(2) Fixed salary	(3) Salary amount	(4) Accommodation	(5) Classroom	(6) Other municipal occupation
First-degree certificate	0.100*	0.179***	71.437	0.118*	0.073	0.104
	(1.714)	(2.675)	(1.351)	(1.716)	(0.914)	(1.444)
Second-degree certificate	0.090***	0.166***	28.973**	0.128***	0.073**	0.101***
	(2.878)	(5.408)	(2.120)	(3.561)	(2.166)	(3.181)
Third-degree certificate	0.076**	0.085***	-19.926	0.028	0.030	0.092***
	(2.630)	(3.382)	(-1.547)	(0.923)	(1.014)	(3.241)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
District clusters	74	74	68	73	73	74
Observations	4052	4098	2640	3604	3604	4076
R^2	0.299	0.296	0.320	0.327	0.346	0.344

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: Certification degrees' impact is evaluated compared to the situation in which the teacher had no certificate. The salary amount is in francs per year.

6.2 Teaching Characteristics and Progress of Pupils

More qualified teachers were more concentrated in public schools. However, was this higher concentration leading to a greater accumulation of human capital ? To answer this question, I selected two sets of variables in the Guizot survey that can be taken as indicators of teaching quality and of the volume of knowledge learnt by pupils. The first set corresponds to qualitative variables and the second one to quantitative measures related to the number of subjects learnt and to the average number of years spent at school. The qualitative indicators are all binary variables taking the value one if the school was controlled by the teacher in terms of order, discipline and work. Another indicator is the fact that pupils were making progress and an evaluation of teaching quality, deemed satisfactory or not by the inspector[51].

In the data, the variables on teaching conditions and quality were coded with four to six items, typically from "very good" to "very bad". I collapsed them into binary variables in order to decrease any inspector-specific effect in the evaluation of teaching quality. If inspectors were not likely to make exactly the same observation about a teacher, there is a fairly good probability that a teacher deemed as bad by a given inspector wouldn't have been reported as good by another one. The recoding used should therefore decrease the likelihood of any bias associated to the individual evaluation of teaching quality.

In Table 8, I regress these indicators on public investment. All coefficients are positive and strongly significant[52]. This investment was increasing by around 6 and 7 percentage points the

[51]The questions asked in the survey were: "How is the school controlled for what regards order, discipline and work ?", "What is the state of teaching ?", "Are pupils making progress ?".

[52]Logit estimations lead to similar outcomes. See Table A12 in the Appendix. There could be a reverse causality issue here since municipalities may have decided to subsidise a teacher because he was efficient. However it is hard to see why, with a limited amount of resources, local authorities would be prompted to do

probability of having order and discipline in the classroom, by 10 the probability that pupils worked correctly. The effect on teaching quality had around the same magnitude and the impact on pupils' progress was of 7 percentage points. Teaching quality was therefore higher in public schools as pupils were more often making progress, within classrooms where teachers were more efficient and the environment more suitable to work.

Decomposing public investment between its different subsidies doesn't modify the results. All grants, except the provision of another municipal occupation which characterised smaller and poorer municipalities, was significantly associated with better teaching conditions and more progress made by pupils[53].

Table 8: Public primary schooling and teaching characteristics

	(1) Order	(2) Discipline	(3) Work	(4) Teaching	(5) Progress
Subsidised school	0.064**	0.068**	0.102***	0.094***	0.068***
	(2.085)	(2.322)	(3.297)	(3.122)	(2.773)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	73	71	73	74	74
Observations	3708	3381	3376	3570	3544
R^2	0.041	0.044	0.058	0.069	0.055

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *Subsidised school* is a binary variables which is equal to one if the municipality was investing in the school at stake. *Order, Discipline, Work, Teaching* and *Progress* are all binary variables taking the value to one when the school was controlled by the teacher for what regards order, discipline and work, when his teaching was deemed satisfactory and when pupils were making progress.

The association between public schooling and teaching efficiency was greatly due to the fact that more qualified teachers were also more efficient. In Table 9, I regress teaching characteristics and the progress made by pupils on the certificate degrees. All three of them are linked with a higher teaching quality. The second degree is the most strongly and significantly associated with this quality and with the progress of pupils[54]. This certificate was the most robustly influencing the probability to be subsidised. Municipalities investing in education were therefore recruiting these teachers to ensure a higher teaching efficiency. All these elements indicate that the accumulation of human capital should have been higher within public primary schools.

so if the schools was already functioning well. It is more likely that, by recruiting better teachers and providing them with grants, municipalities were actually voluntarily trying to increase teaching efficiency.

[53]See Table A13 and Table A14 in the Appendix.

[54]Using a logit estimation technique leads to the same outcomes. See Table A15 in the Appendix.

Table 9: Teaching certificates and teaching characteristics

	(1) Order	(2) Discipline	(3) Work	(4) Teaching	(5) Progress
First-degree certificate	0.078	0.041	0.089	0.379***	0.312***
	(0.838)	(0.447)	(1.030)	(3.995)	(2.914)
Second-degree certificate	0.154***	0.135***	0.220***	0.358***	0.297***
	(4.171)	(3.577)	(5.706)	(9.706)	(7.572)
Third-degree certificate	-0.026	-0.036	0.037	0.122***	0.051
	(-0.815)	(-1.022)	(1.051)	(3.809)	(1.464)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	73	71	73	74	74
Observations	3792	3471	3335	3652	3621
R^2	0.074	0.073	0.098	0.115	0.102

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *Order, Discipline, Work, Teaching* and *Progress* are all binary variables taking the value to one when the school was controlled by the teacher for what regards order, discipline and work, when his teaching was deemed satisfactory and when pupils were making progress. All independent variables are binary, taking the value one if the teacher had a certificate.

6.3 Number of Subjects and Schooling Years

In public schools, teaching characteristics were better and pupils were deemed to make more progress. However, this is only a qualitative indication that they were learning more there than in their private counterparts. The number of subjects taught within classrooms and the average number of years spent at school reported in the Guizot survey are helpful to evaluate if human capital accumulation was higher in these schools. If pupils were indeed learning more, the average number of schooling years should have been higher in the primary school at stake, as well as the number of subjects taught. This last measure was varying between one and eleven subjects which were: religious instruction, reading, writing, spelling, grammar, arithmetic, land surveying, linear drawing, geography, history and music. The most common subjects were religious instruction, reading and writing. The average schooling years were reported between one and nine. The education of pupils was typically beginning at five years old and was rarely extended over fifteen years old in the primary institution, with an average schooling length of five years.

The two measures are complementary. If more subjects were taught in a school, the average schooling years should have been higher too. Indeed, pupils needed to study for a longer period of time in order to master these subjects. It is however not possible with the data to know the proportion of pupils that were learning all the subjects taught. As a consequence, it is hard to say that a higher number of subjects was associated to a greater human capital accumulation

for all pupils. It was at least the case for some of them. The number of schooling years is helpful in specifying this point. Indeed, if the majority of pupils was learning all the subjects, the average schooling years should have been high. If, on the contrary, it was the case for only a minority of them, then this number of years shouldn't have been greatly affected by the fact that some pupils were learning more subjects.

Figure 5 displays the histogram of schooling years. The schools are divided in this graph between the ones granted with a given subsidy and the private. Public schools were clearly characterised by a higher number of schooling years. For any type of subsidy, there were around 20% of the schools in which pupils stayed six or seven years, 15% in which they stayed eight or five years. It was on the contrary more common to remain less than six years in the private schools. Indeed, in around 20% of them, pupils studied on average two or four years. In 30%, they studied three years, in 15% five years. The accumulation of human capital was therefore likely to be higher in primary schools since they were characterised by a higher schooling length. The same was true for the number of subjects. Six, seven or eight subjects were more often taught in public primary schools, two, three of four less often than in the private ones[55].
T-tests confirm this association between public investment and a higher accumulation of human capital. Indeed, around 4.8 subjects were taught in public schools against 4.6 in the private. Pupils were on average spending 5.3 years in subsidised schools and around 4 in their private counterparts. These mean values are all statistically different at a one-percent level. Each type of subsidy (a fixed salary, an accommodation, a classroom and another municipal occupation) was associated both to a significantly higher number of subjects taught and of schooling years[56]. This is a strong indication that teachers wanted to keep children longer in the public schools and making them learn more. Indeed, they could have tried to keep them a minimum amount of years, once they benefited from public grants, since they were less dependent on fees and were provided with a higher financial stability. In this case, they would have been paid or accommodated with only a small number of pupils to teach. Being granted with municipal subsidies was also likely to be a strong incentive to be involved in the education of children. Indeed, apart from the fixed salary which was annually provided, municipalities could get rid of the teacher pretty easily if he wasn't deemed good enough by parents or the local authorities themselves.

[55] See Figure B6 in the Appendix.

[56] See Table A16 and Table A17 in the Appendix. The number of subjects didn't differ significantly between schools where the teacher was provided with another municipal occupation and the others.

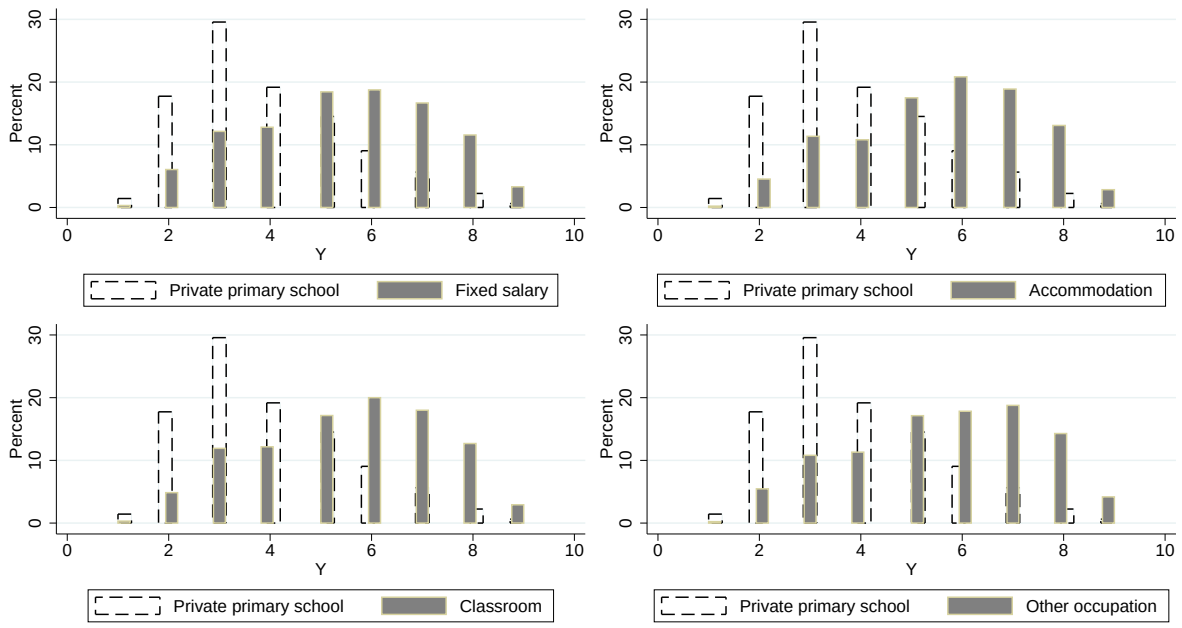


Figure 5: Public schooling and schooling years - Histograms

Source: Guizot survey
Notes: Each bar in the histograms represents the percentage of observations corresponding to a given number of schooling years. Therefore, it represents the percentage of primary schools for each number of years. The schools are divided between those which were granted with public subsidises and the private ones. Each subsidy is therefore compared to the same histogram of schooling years drawn only for private schools.

Estimation outcomes in Table 10 indicate that public investment was increasing the number of subjects by 0.34 on average, and the number of schooling years by 0.29. Both effects are significant at a one-percent level. In this table, I also add estimations on the probability that a given subject was taught in the primary school. I exclude religion, reading and writing since they were taught in nearly all schools[57]. Arithmetic was taught in 62% of the schools for which this specification is available, grammar in 44%, spelling in 49%, geography and linear drawing in 7%, land surveying in 10%, history and music in around 3%. All the percentages were significantly higher in public schools, except for arithmetic, geography and history. Grammar and spelling were for example taught in respectively 46 and 53% of the primary schools, against 38 and 35% of the private ones[58].

The outcomes demonstrate that pupils were more likely to learn arithmetic, grammar, spelling and linear drawing in a public school. The increase in the associated probability that these subjects were taught is respectively of 8.2, 8.6, 8.3 and 2.8 percentage points. The effect is particularly strong for arithmetic, grammar and spelling. Therefore, the accumulation of human capital was higher in public schools thanks to a higher probability to learn arithmetic, grammar, spelling and, for a much lower number of pupils, linear drawing[59]. Teaching in these schools was not limited to the basics of literacy and to religious instruction. By recruiting better

[57]They were so in respectively 99.4, 98.4 and 92.1% of the primary schools for which this information is available.

[58]See Table A18 in the Appendix.

[59]Logit estimations indicate that arithmetic was 1.6 times more likely to be taught in a public school, along with grammar and spelling. Linear drawing was 2.7 times more likely to be so. See Table A19 in the Appendix.

teachers more likely to be able to teach several subjects, and by lowering the cost of education, municipalities increased the probability for pupils to learn more and in better conditions.

Table 10: Public schooling and human capital accumulation

	(1) Number of subjects	(2) Schooling duration	(3) Arithmetic	(4) Grammar	(5) Spelling	(6) Geography	(7) Land surveying	(8) Linear drawing	(9) History	(10) Music
Subsidised school	0.344***	0.289***	0.082***	0.086***	0.083***	0.017	0.006	0.028**	0.011	-0.004
	(4.373)	(2.976)	(2.973)	(3.564)	(3.617)	(1.094)	(0.534)	(2.449)	(1.539)	(-0.439)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District clusters	70	70	70	70	70	70	70	70	70	70
Observations	3732	3628	3732	3732	3732	3732	3732	3732	3732	3732
R^2	0.134	0.506	0.187	0.153	0.270	0.069	0.082	0.045	0.047	0.094

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Note: All subject names correspond to binary variables taking value one if the subject was taught in the primary school.

7 Conclusion

After the shock of the Revolution, primary schooling reorganised around municipal investment. In areas previously well-endowed in primary schools and where economic resources were higher, municipalities took over the control of education. They contributed to a higher financial stability of teachers and reinforced their presence by providing them with a fixed salary, a classroom, an accommodation or an additional municipal employment. In poorer areas, on the contrary, schools remained more scarce and more often private, only financed through fees. But municipalities went beyond the mere financing of schools and acted vigorously to decrease the cost of education by lowering the level of schooling fees. Teachers accepted this decrease in exchange for a higher financial ease. This led to an increase in enrolment rates within public schools compared to their private counterparts, as primary education came at a lower cost for families. Teachers recruited in schools provided with municipal grants had on average a higher level of certification. Teaching conditions and progress made by the pupils were more often deemed as satisfactory within these schools. The number of subjects taught, as well as the average schooling years, were also higher in public schools. By lowering the fees and recruiting more qualified teachers, municipalities prompted more children to attend schools and to attend them for a higher number of years. Public investment therefore had a positive effect both on the extensive and intensive margins of human capital accumulation.

Even after the Guizot law of 1833, many municipalities (especially those below 500 inhabitants) remained without a school. Variations in schools' presence, enrolment and literacy rates were far from being absorbed in the mid-nineteenth century and even in the 1870s, in spite of a first convergence between departments and districts which was already at work. The early involvement of municipalities to increase enrolment and the accumulation of human capital appears to have been an essential factor in accounting for the long-lasting variations in educational attainment in France during the nineteenth century.

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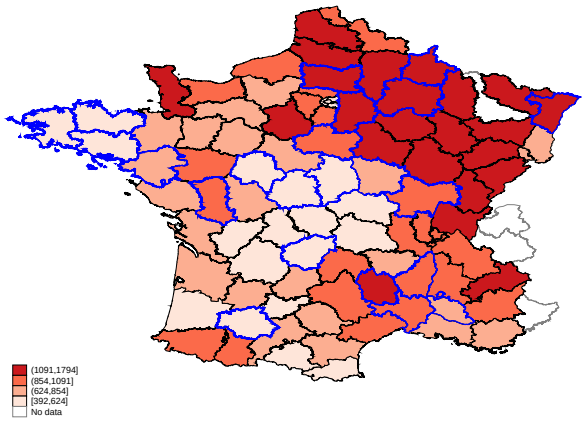
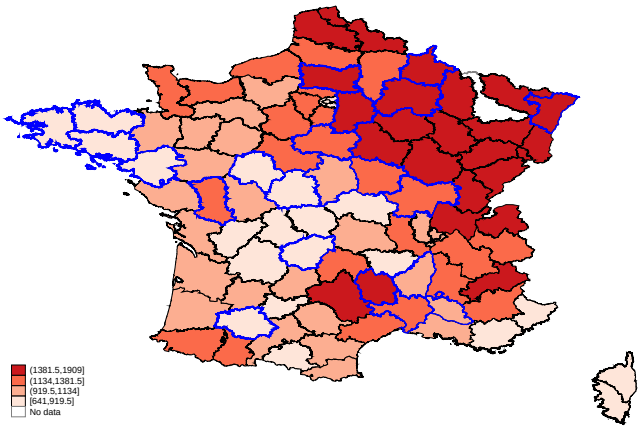
Appendix for On-line Publication

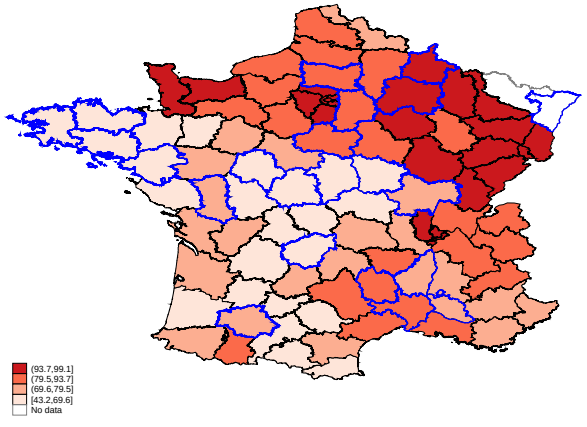
Data and Descriptive Statistics



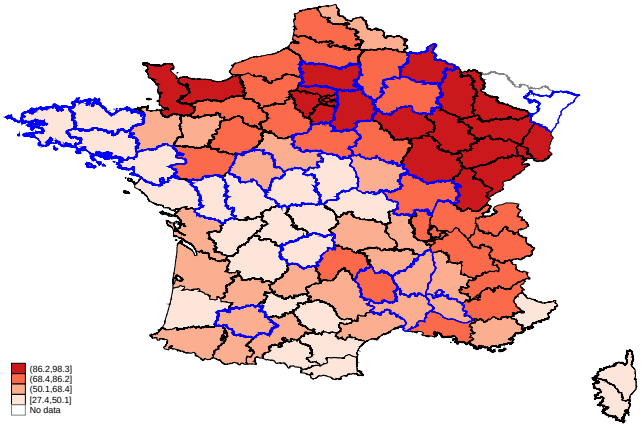
Number of pupils per 10 000 inhabitants 1850



Number of pupils per 10 000 inhabitants 1863



Marriage signatures - men, 1871-1875



Marriage signatures - women, 1871-1875

Figure B1: Enrolment in primary schools

Source: *Statistique générale de la France.*

Note: All types of schools are taken into account, whether public or private.

Table A1: Data representativeness, means and t-tests

	France	Municipal level sample	t-test
Population	91 948	85 794	NS
Number of municipalities	105	90	***
Percentage of population scattered	49.4	55.4	*
Average altitude - meters	300	211	***
Surface area - hectares	1 566	1 869	***
Percentage of municipalities with schools	71.5	60.8	***
Primary schools per 100 municipalities	215	79	NS
Teachers with a fixed salary per 100 municipalities	48.1	51.9	NS
Teachers with an accommodation per 100 municipalities	43.6	46.8	NS
Pupils per 100 children and single people	19.9	16.5	**
Percentage of municipalities with factories	17.2	21.6	**

*** p<0.01, ** p<0.05, * p<0.1.

Source: Guizot, industrial and postal surveys. IGN data and *Statistique générale de la France*.

Notes: All figures are computed at the level of districts. The average population in each district was respectively around 85 794 inhabitants for those belonging to the municipality level sample and around 91 948 inhabitants for the entire France. The difference between the two is non-significant.

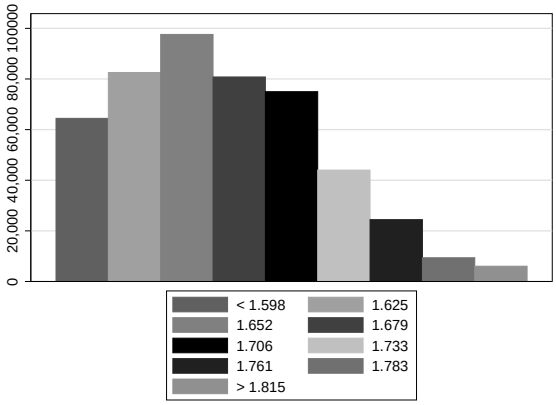
Table A2: Education Summary Statistics - District level

Variable	Mean	Std. Dev.	Min.	Max.	N
Percentage of municipalities with schools	68.6	23	17.8	100	355
Primary schools per 100 municipalities	95	60.6	26	753.3	357
Public schools per 100 municipalities	57.1	33.4	1.9	160.7	357
Accommodation or allowance per 100 schools	44.5	26.7	1.6	92.9	355
Paid teachers per 100 schools	49.1	27.8	2.9	105.1	350
Average schooling fees (in francs)	1.2	0.5	0.2	2.9	357
Pupils per 100 children and single people	19	13.7	2.3	54.4	351
Percentage of municipalities with schoolhouses	39.4	24.7	0	99.1	357
Schoolhouses per 100 municipalities	51.5	40.7	0	267.9	357
Schoolhouses owned per 100 municipalities	26.7	27.5	0.9	248.5	343
Schoolhouses rented per 100 municipalities	28.8	27.6	0.6	250	319
Population dispersion	50.9	27.12	2.52	89.59	355
Factories' presence	9.46	10.05	0	81.48	355

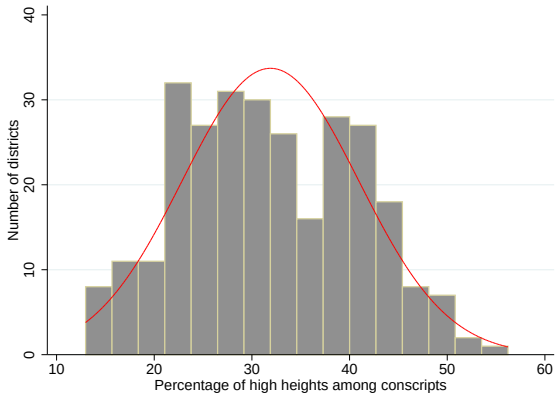
Source: Guizot, industrial and postal surveys. IGN data and *Statistique générale de la France*.

Notes: All variables are at the districts level. The percentage of municipalities with at least a primary school lied between 17.8 and 100%, with an average value of 68.6% and a standard deviation of 23. The number of teachers provided with an accommodation or a fixed salary per 100 schools may exceed the value of 100 since several teachers could be granted so in the same primary school. Factories' presence is defined as the percentage of municipalities with factories more than ten workers.

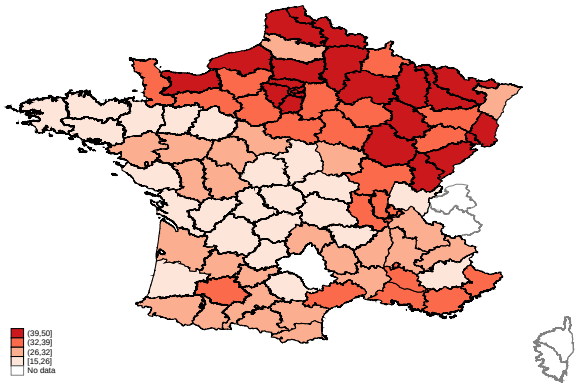
Municipal Investment in Primary Schooling



Number of conscripts by height intervals in meters (1819-1830)



Histogram of the percentage of high heights (1819-1830)



Percentage of high heights among conscripts

Figure B2: Height of military conscripts

Source: Military data on conscripts from [Aron et al., 1972].
Notes: In the first sub-figure, all numbers indicate lower bounds for the intervals except the first one which indicates that all conscripts below the minimum height of 1.598 meters are gathered in the first interval.

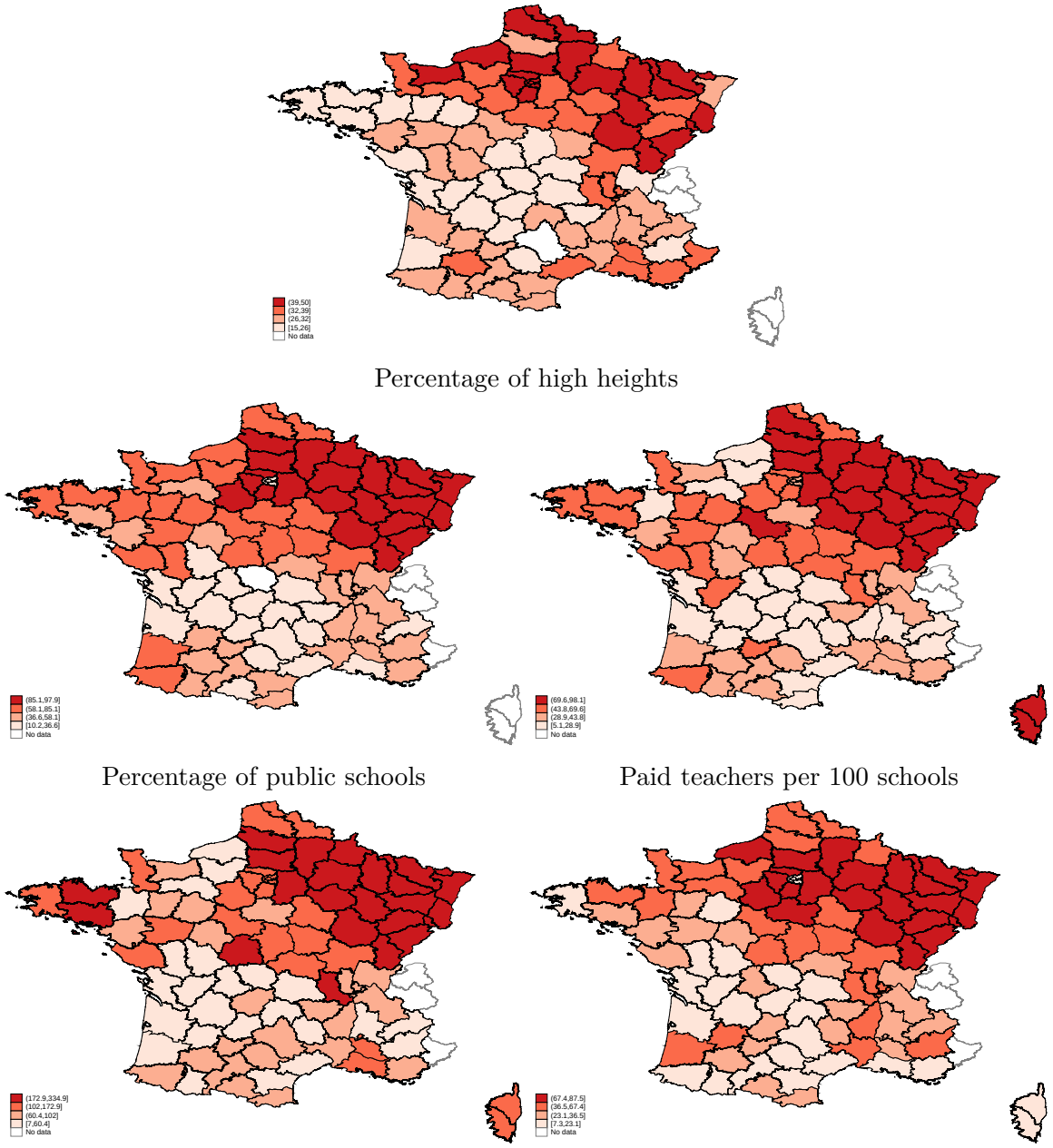


Figure B3: High heights among conscripts and municipal investment primary schooling

Source: Guizot survey and military data on conscripts from [Aron et al., 1972].

Description of data used in the estimations

Municipal-level estimations - controls

- Demographic and geographic municipal controls : population (in 1801, 1806, 1821, 1826, 1831), population dispersion, altitude, surface area of municipalities
- Economic municipal controls : presence of a factory, number of industrial workers, value of taxes on industrial production, number of engines
- District level controls : number of children and single people
- Department level controls : number of presbyteries, length of water and roads communication networks, price of wheat in 1799, amount of taxes on doors and windows, production of cereals, life expectancy at birth

District-level estimations - controls

- District level controls : population (in 1801, 1806, 1821, 1826, 1831), average population dispersion within municipalities, average altitude and surface area of municipalities, percentage of municipalities with factories, number of industrial workers, value of taxes on industrial production, number of engines, number of children and single people, district with prefecture
- Department level controls : same as for the municipal-level estimations

School-level estimations - controls

All the controls are the same as for the municipal-level-estimations, adding controls at the school level: number of subjects, coeducation, boarding school, admission age, schooling length, level of teachers' certification, persons at charge for teachers, progress by pupils, presence of textbooks, books in sufficient amount.

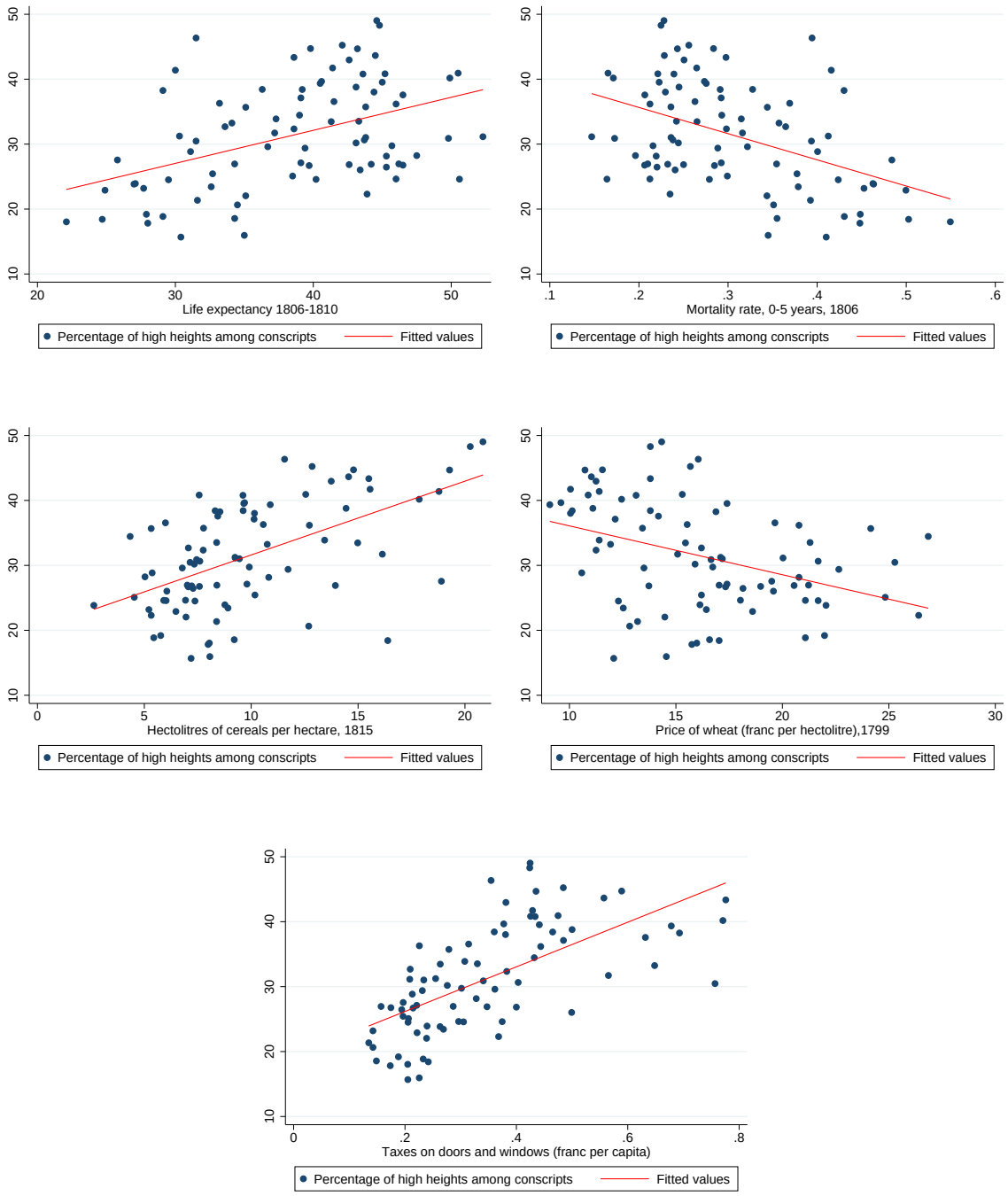


Figure B4: High heights among conscripts and development indicators

Source: Military data on conscripts from [Aron et al., 1972]. See main text for other indicators.

Table A3: Too small conscripts and primary schooling

	(1) Percentage of municipalities with primary schools	(2) Primary schools per 100 municipalities	(3) Public schools per 100 municipalities	(4) Accommodation or allowance per 100 schools	(5) Paid teachers per 100 schools	(6) Enrolment
Too small conscripts	-1.080***	-1.548***	-0.907**	-0.415	0.012	-0.343***
	(-4.370)	(-3.505)	(-2.484)	(-1.127)	(0.042)	(-2.691)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes	Yes
Department wealth controls	Yes	Yes	Yes	Yes	Yes	Yes
Department clusters	82	82	82	82	82	82
Observations	271	266	273	271	267	270
R^2	0.569	0.514	0.698	0.591	0.591	0.682

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *too small conscripts* refers to the number of percentage of examined 20 years old boys too small to fulfil military duties, that is to say less than 1.57 meters. Its standard deviation is of 5.8.

Table A4: Heights of conscripts and primary schooling. Municipal level

	(1) Primary School	(2) Fixed salary	(3) Salary amount	(4) Accommodation	(5) Classroom	(6) Other salary	(7) Other salary amount
High heights among	0.017***	0.013***	2.989**	0.009***	0.014***	0.013***	1.716***
conscripts	(3.659)	(3.616)	(2.209)	(3.162)	(4.868)	(2.924)	(3.621)
Department wealth controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District clusters	75	75	75	75	75	72	75
Observations	6324	6324	6324	6324	6324	3559	6324
R^2	0.302	0.297	0.308	0.246	0.262	0.302	0.150
High heights among	0.017***	0.012***	1.140	0.017***	0.014***	0.008	2.309***
conscripts	(3.041)	(2.665)	(0.627)	(5.670)	(3.339)	(1.053)	(2.952)
Department fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District clusters	75	75	75	75	75	72	75
Observations	6324	6324	6324	6324	6324	3559	6324
R^2	0.371	0.371	0.393	0.305	0.315	0.319	0.157
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *high heights among conscripts* refers to the percentage of conscripts in each district taller than national mean. *Primary school*, *Fixed salary*, *Accommodation* and *Other salary* are all dummy variables taking value one if there was at least one primary school in the given municipality, at least one teacher paid by this municipality, at least one teacher provided with an accommodation, at least one with another municipal occupation. The *Salary amount* and *Other salary amount* correspond to the teachers' annual wages in francs.

Table A5: Heights of conscripts and schoolhouses. District level

	(1) Percentage of municipalities with schoolhouses	(2) Schoolhouses per 100 municipalities	(3) Schoolhouses owned per 100 municipalities	(4) Schoolhouses rented per 100 municipalities
High heights among conscripts	0.598*	1.419***	1.057***	0.311
	(1.794)	(4.410)	(4.465)	(1.133)
Population dispersion	-0.207**	-0.506***	-0.289***	-0.243**
	(-2.194)	(-4.194)	(-2.836)	(-2.172)
Factories presence	0.153	0.699***	0.480***	0.316*
	(1.216)	(3.103)	(3.690)	(1.799)
Demographical and geographical controls	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes
Department wealth controls	Yes	Yes	Yes	Yes
Department clusters	74	73	74	74
Observations	249	243	241	225
R^2	0.477	0.588	0.599	0.354

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *high heights among conscripts* refers to the percentage of conscripts in each district taller than national mean. *Population dispersion* is the percentage of population which is reported scattered in the Postal Survey, based on a contiguity criterion [Roncayolo, 1987]. *Factories' presence* is the percentage of municipalities in which at least one factory more than ten workers was located. The *Percentage of municipalities with schoolhouses* corresponds to municipalities in which the number of schoolhouses was evaluated as sufficient in the Guizot survey, meaning that all teachers in the municipality at stake could benefit from such premises.

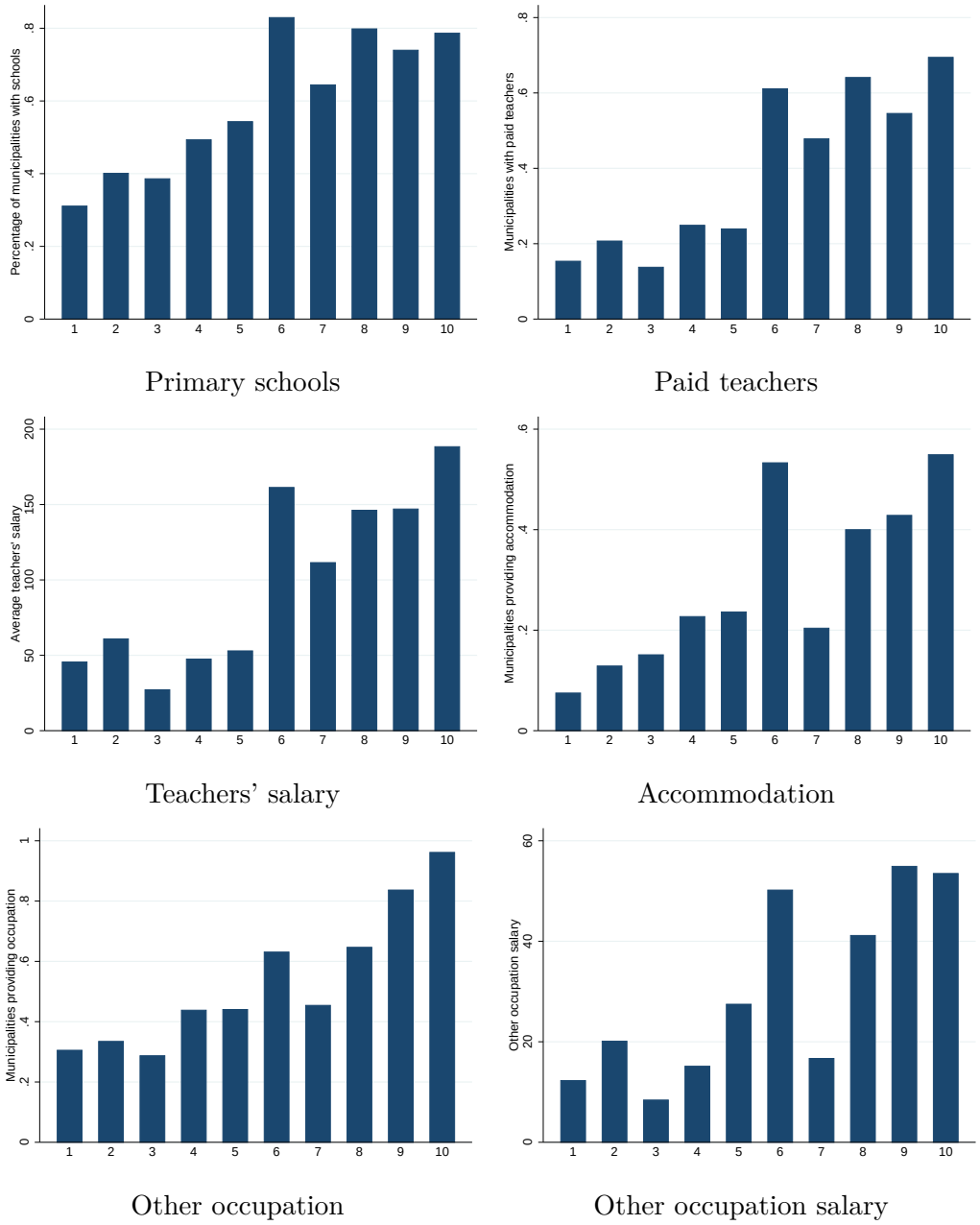


Figure B5: Deciles of the percentage of high heights among conscripts and primary schooling. Municipality level

Source: Military data on conscripts from [Aron et al., 1972], Guizot survey.

Notes: The deciles are related to the percentage of high heights among conscripts. It means that the percentage of municipalities where at least one primary school was present or a teacher was paid, ... is given for every decile of the percentage of high heights. For example, a primary schools was present in around 80% of the municipalities in districts belonging to the top decile of high heights.

Schooling Fees and Enrolment Rates

Table A6: Descriptive statistics, schooling fees and wages

	Average value	
Schooling fees (districts)	1.21	Monthly
Schooling fees (municipalities)	0.96	Monthly
Minimum schooling fees (municipalities)	0.9	Monthly
Industrial male workers	1.97	Daily
Industrial female workers	0.93	Daily
Industrial child workers	0.65	Daily
Agricultural male day-worker	1.4	Daily
Agricultural female day-worker	0.9	Daily
Agricultural child day-worker	0.6	Daily

Source: Guizot, industrial and agricultural surveys.

Notes: The average schooling fees amount at the district level was 1.21 francs. This corresponds to what was paid to teachers each months by families so that their children could attend primary schools.

Table A7: Subsidised primary schools and schooling fees - District level

	Average schooling fees				
	(1)	(2)	(3)	(4)	(5)
Percentage of municipalities with primary schools	-0.006*** (-3.628)	–	–	–	–
Public schools per 100 municipalities	–	-0.005*** (-3.607)	–	–	–
Percentage of public schools	–	–	-0.007*** (-4.066)	–	–
Paid teachers per 100 schools	–	–	–	-0.004*** (-3.225)	–
Accommodation or allowance per 100 schools	–	–	–	–	-0.001 (-1.016)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department wealth controls	Yes	Yes	Yes	Yes	Yes
District clusters	74	74	74	74	74
Observations	247	249	249	244	247
R^2	0.718	0.721	0.728	0.718	0.701

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: Average schooling fees are defined in francs.

In Table A8, I use the 1851 Census to approximate the number of children in each district in 1833. To do so, I take the number of pupils between 5 and 15 years old within departments. I consider these age bounds since, in 87% of the cases, the admission age reported in the data coming from the Guizot survey was superior or equal to five. The length of primary instruction was also always lower than 10 years.

Then, I take the proportion that a given district represented in the department population to be equal to what it represented in the children population. This assumes the age distribution between adults and children to have been the same for a department and its districts. In districts with a more urban and young population that the average department level, the two distributions may have differed. However, there is a correlation of *0.97* between the number of children and single people in 1831 and the approximated number of children in 1851. This tends to confirm that the computation is actually quite close to the real number of children within districts. This measure has a mean of 24.6%, with a median enrolment value of 19%.

Table A8: Schooling fees and enrolment rates - District level

	Pupils per 100 children			
	(1)	(2)	(3)	(4)
Average schooling fees	-8.806***	-6.637***	-5.044***	-4.699***
	(-5.875)	(-3.806)	(-3.473)	(-2.798)
Demographical and geographical controls	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes
Ratio of public schools	No	Yes	No	Yes
Department wealth controls	No	No	Yes	Yes
Department clusters	81	81	74	74
Observations	266	266	245	245
R^2	0.795	0.798	0.872	0.872

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: Average schooling fees are defined in francs.

Table A9: Population Deciles - Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
First decile	177.54	43.12	30	239	809
Second decile	287.37	27.07	240	331	812
Third decile	376.25	26.84	332	420	800
Fourth decile	466.11	26.83	421	512	809
Fifth decile	569.95	35.07	513	631	806
Sixth decile	702.37	41.63	632	777	804
Seventh decile	869.04	56	778	975	805
Eighth decile	1114.38	89.7	976	1283	808
Ninth decile	1548.59	185.12	1284	1935	805
Tenth decile	3791.35	4749.73	1938	75895	806

Source: *Statistique générale de la France.*

Notes: The average municipal population in the first population decile was 178 inhabitants. The minimum value was 30 inhabitants and the maximum 239 inhabitants. The standard deviation was around 43.

Table A10: Minimum schooling fees and enrolment. Municipality level

	Dependent variable : Pupils per 100 inhabitants								
	(1) Population ≤631 (Med)	(2) Population ≤631	(3) Population ≤631	(4) Population ≥631	(5) Population ≥631	(6) Population ≥631	(7) Population ≤2 000	(8) Population ≤2 000	(9) Population ≤2 000
Minimum schooling fees	-0.033***	-0.011	-0.010	-0.022***	-0.009***	-0.011***	-0.030***	-0.006	-0.006*
	(-3.944)	(-1.462)	(-1.480)	(-7.599)	(-3.197)	(-3.733)	(-6.413)	(-1.665)	(-1.718)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department wealth controls	No	Yes	No	No	Yes	No	No	Yes	No
Department fixed effects	No	No	Yes	No	No	Yes	No	No	Yes
District clusters	52	45	52	70	61	70	68	59	68
Observations	1152	1021	1152	1184	971	1184	2170	1853	2170
R^2	0.503	0.562	0.556	0.739	0.718	0.781	0.605	0.640	0.661

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: The minimum level of fees is defines in cents of franc.

Table A11: Teaching certificates and public primary schooling - Logit, odds-ratios

	(1) Subsidised school	(2) Fixed salary	(3) Accommodation	(4) Classroom	(5) Other municipal occupation
First-degree certificate	0.775	2.720**	1.787	1.408	2.061*
	(-0.397)	(2.053)	(1.509)	(0.681)	(1.889)
Second-degree certificate	2.109***	2.662***	2.029***	1.550**	1.774***
	(3.927)	(5.511)	(3.934)	(2.331)	(3.166)
Third-degree certificate	1.726***	1.585***	1.118	1.160	1.662***
	(3.595)	(3.105)	(0.726)	(0.931)	(3.155)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	74	74	73	73	74
Observations	4052	4098	3604	3604	4076
Pseudo-R^2	0.345	0.243	0.272	0.295	0.287

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: Certification degrees' impact is evaluated compared to the situation in which the teacher had no certificate. The salary amount is in francs per year.

Table A12: Public primary schooling and teaching characteristics - Logit, odds-ratios

	(1) Order	(2) Discipline	(3) Work	(4) Teaching	(5) Progress
Subsidised school	1.415**	1.455**	1.671***	1.543***	1.341***
	(2.107)	(2.408)	(3.684)	(3.164)	(2.704)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	73	71	73	74	74
Observations	3703	3377	3371	3570	3544
Pseudo-R^2	0.036	0.038	0.048	0.053	0.042

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *Subsidised school* is a binary variables which is equal to one if the municipality was investing in the school at stake. *Order, Discipline, Work, Teaching* and *Progress* are all binary variables taking the value to one when the school was controlled by the teacher for what regards order, discipline and work, when his teaching was deemed satisfactory and when pupils were making progress.

Table A13: Public primary schooling and teaching characteristics

	(1) Order	(2) Discipline	(3) Work	(4) Teaching	(5) Progress
Fixed salary	0.100***	–	–	–	–
	(4.200)				
Salary amount	–	0.035***	–	–	–
		(3.459)			
Accommodation	–	–	0.110***	–	–
			(5.326)		
Classroom	–	–	–	0.089***	–
				(3.701)	
Other municipal occupation	–	–	–	–	0.005
					(0.200)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	74	69	73	73	74
Observations	3599	2347	3146	3146	3562
R^2	0.060	0.069	0.067	0.064	0.053

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: All independent variables, except the salary amount, are binary which equal one when the schools was provided with grants. The *salary amount* is defined in tens of francs to facilitate the interpretation. *Order, Discipline, Work, Teaching* and *Progress* are all binary variables taking the value to one when the school was controlled by the teacher for what regards order, discipline and work, when his teaching was deemed satisfactory and when pupils were making progress.

Table A14: Public primary schooling and teaching characteristics - Logit, odds-ratios

	(1) Order	(2) Discipline	(3) Work	(4) Teaching	(5) Progress
Fixed salary	1.532***	–	–	–	–
	(4.121)				
Salary amount	–	1.200***	–	–	–
		(3.617)			
Accommodation	–	–	1.595***	–	–
			(5.322)		
Classroom	–	–	–	1.468***	–
				(3.677)	
Other municipal occupation	–	–	–	–	1.023
					(0.215)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	74	68	73	7	74
Observations	3599	2344	3146	3146	3562
Pseudo-R^2	0.046	0.053	0.051	0.049	0.041

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: All independent variables, except the salary amount, are binary which equal one when the schools was provided with grants. The *salary amount* is defined in tens of francs to facilitate the interpretation. *Order, Discipline, Work, Teaching* and *Progress* are all binary variables taking the value to one when the school was controlled by the teacher for what regards order, discipline and work, when his teaching was deemed satisfactory and when pupils were making progress.

Table A15: Teachers' characteristics and teaching certificates - Logit, odds-ratios

	(1) Order	(2) Discipline	(3) Work	(4) Teaching	(5) Progress
First-degree certificate	1.479	1.223	1.742	5.679***	3.874**
	(0.791)	(0.409)	(1.130)	(3.328)	(2.547)
Second-degree certificate	2.497***	2.302***	3.395***	4.926***	3.585***
	(4.985)	(4.201)	(7.034)	(8.396)	(7.356)
Third-degree certificate	0.880	0.835	1.093	1.784***	1.239
	(-0.833)	(-1.039)	(0.579)	(3.538)	(1.438)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes
District clusters	73	71	73	74	74
Observations	3787	3467	3457	3652	3621
Pseudo-R^2	0.067	0.066	0.082	0.088	0.078

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Notes: *Order, Discipline, Work, Teaching* and *Progress* are all binary variables taking the value to one when the school was controlled by the teacher for what regards order, discipline and work, when his teaching was deemed satisfactory and when pupils were making progress. All independent variables are binary, taking the value one if the teacher had a certificate.

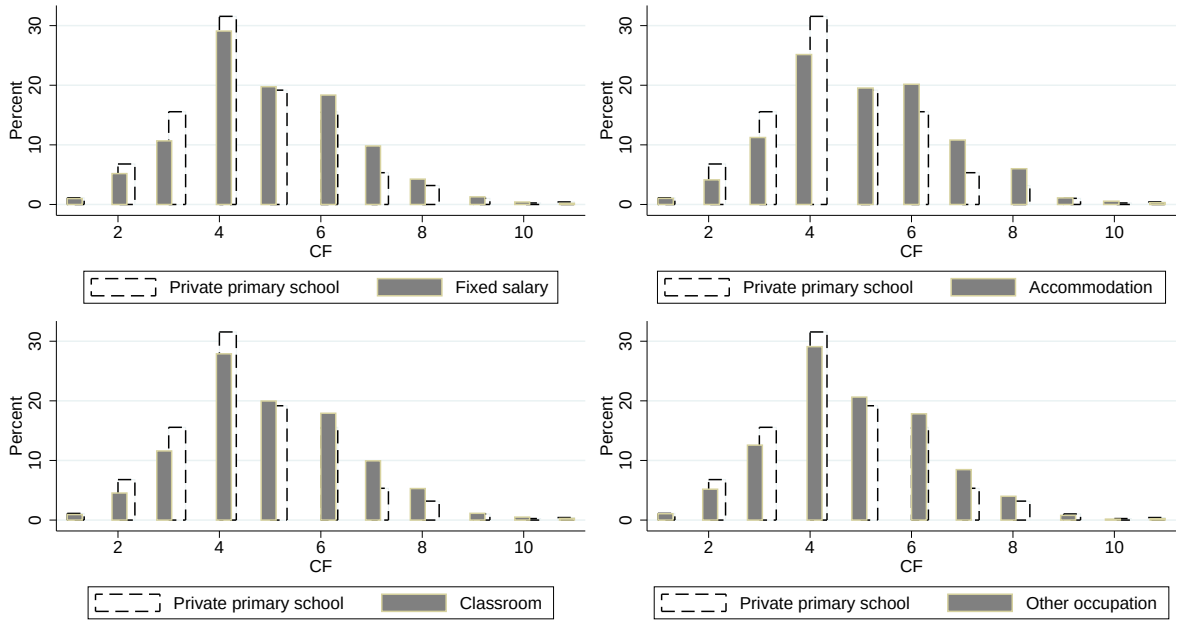


Figure B6: Public schooling and number of subjects - Histograms

Source: Guizot survey.

Notes: Each bar in the histograms represents the percentage of observations corresponding to a given number of subjects taught. Therefore, it represents the percentage of primary schools for each number of subject. The schools are divided between those which were granted with public subsidises and the private ones. Each subsidy histogram is therefore compared to the same histogram of subjects but drawn only for private schools.

Table A16: Public education and subjects taught. Mean t-tests

	N	Mean	N	Mean	p-value
	Private school		Public school		
Number of subjects	1163	4.56	4355	4.83	0.000
	No fixed salary		Fixed salary		
	2452	4.59	3128	4.89	0.000
	No accommodation		Accommodation		
	2614	4.57	2350	5.05	0.000
	No classroom		Classroom		
	2146	4.60	2818	4.94	0.000
	No other occupation		Other occupation		
	3010	4.74	2530	4.78	NS

Source: Guizot survey.

Notes: In private schools, there were around 4.6 subjects taught against approximately 4.8 in their public counterparts. The difference between the two is significant at a one-percent level.

Table A17: Public education and years of schooling. Mean t-tests

	N	Mean	N	Mean	p-value
	Private school		Public school		
Years of schooling	1116	3.92	4350	5.28	0.000
	No fixed salary		Fixed salary		
	2390	4.41	3157	5.43	0.000
	No accommodation		Accommodation		
	2554	4.28	2362	5.61	0.000
	No classroom		Classroom		
	2071	4.07	2845	5.54	0.000
	No other occupation		Other occupation		
	2936	4.37	2563	5.64	0.000

Source: Guizot survey.

Notes: In private schools, pupils spent on average around 4 years at school against approximately 5.3 years in their public counterparts. The difference between the two is significant at a one-percent level.

Table A18: Public education and subjects. Mean t-tests

	Private school		Public school		
	N	Mean	N	Mean	p-value
Arithmetic	1166	69	4344	61	0.000
Grammar	1166	38	4344	46	0.000
Spelling	1166	35	4344	53	0.000
Geography	1166	10	4344	7	0.000
Land surveying	1166	5	4344	11	0.000
Linear drawing	1166	4	4344	8	0.000
History	1166	4	4344	3	0.058
Music	1166	2	4344	4	0.010

Source: Guizot survey.

Notes: Arithmetic was taught in around 69% of the private primary schools for which information on subjects and subsidies is available. It was the case in 61% of the public schools. The difference between the two is significant at a one-percent level.

Table A19: Public schooling and human capital accumulation - Logit, odds-ratios

	(1) Arithmetic	(2) Grammar	(3) Spelling	(4) Geography	(5) Land surveying	(6) Linear drawing	(7) History	(8) Music
Subsidised school	1.569***	1.565***	1.635***	1.445	1.155	2.738**	1.824	0.708
	(2.982)	(3.788)	(3.488)	(1.379)	(0.505)	(2.489)	(1.603)	(-0.663)
Demographical and geographical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industrial controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District clusters	70	70	70	59	63	62	49	38
Observations	3732	3732	3732	3237	3613	3621	3050	2631
Pseudo-R^2	0.150	0.126	0.216	0.140	0.136	0.108	0.175	0.231

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: see main text.

Note: All subject names correspond to binary variables taking value one if the subject was taught in the primary school.