European
Historical
Economics
Society

EHES Working Paper | No. 173 | December 2019

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Abstract

This study provides new evidence on the advance of literacy in Spain during the period 1860-1930. A novel dataset, built with historical information (over 8,000 municipalities) from the Spanish population censuses, enables us to describe this process in detail from the end of the *Ancien Régime* to the Second Republic. The study thus presents stylized facts at a very low level of geographic aggregation, thereby permitting a closer examination of the main patterns. Overall, spatial differences in literacy were sizeable during the whole nineteenth century. Furthermore, these disparities were only significantly reduced between 1900 and 1930 when the growing demand for these basic skills were met by a stronger government intervention.

JEL Codes: I20, N33, N93, 015

Keywords: Literacy, Regional Disparities, Nineteenth Century, Spain

* We are grateful to the Bank of Spain for funding this research and to Eter Burduli for her invaluable assistance.

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1. Introduction.

In economics, human capital investment is key for economic growth and development. This relationship, which was already discussed by classical economists, was further developed in the second half of the twentieth century.[1] Eventually, and in spite of its complex nature, economic theory has placed human capital at the core of innovation, technological change, and hence economic growth (Lucas, 1986; Romer, 1988). In recent decades, several studies, using distinct approaches and data, have attempted to empirically test the validity of this logic (Hanushek and Woessmann, 2012; Barro, 2013; Gennaioli et al., 2013). Additionally, and as a result of the rapid digitisation of historical information, another strand of the literature has explored the long-term effect of institutions on economic development.[2] With this in mind, some researchers have pondered how human capital endowments in the distant past affect present outcomes (Waldinger, 2017; Valencia, 2019).

The role played by education and training, among other factors, in human capital formation has been a recurrent topic in historical studies. Similarly, it can be argued that human capital, understood as skills and knowledge, has been fundamental for the profound socioeconomic change witnessed since the Industrial Revolution. Still, the existing evidence seems somewhat inconclusive. Based on the relatively low levels of literacy (around 60% for males) in England at the onset of the Industrial Revolution, compared with that in the Netherlands or Sweden (Mitch, 2004; Reis, 2005), several studies discarded the idea that literacy was fundamental for such transformation (Mitch, 1993, 1999, 2004; Allen, 2003; McCloskey 2010). In a way, these studies provide evidence in support of the *literacy myth*. Notwithstanding this, some scholars have stressed the complementarity between human capital and technology, thereby focusing on the acquisition of specific skills in secondary education or training centres (Goldin and Katz, 1998; Galor, 2011), while others have argued that what mattered was the human capital embedded in the elite or upper-tail knowledge (Mokyr, 2009; Mokyr and Voth, 2010).[3]

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[1] Schultz (1960: 571), for instance, proposed to "*treat education as an investment in man and to treat its consequences as a form of capital*". Equally, Schultz (1961:1) argued that "*investment in human capital accounts for most of the impressive rise in the real earnings per worker*". See also Mincer (1958) or Becker (1962).

[2] See, Acemoglu et al. (2001), Engerman and Sokoloff (2002), Nunn (2008), Dell (2010) or Michalopoulos and Papaiannou, 2016), among others.

[3] Likewise, Squicciarini and Voigtlander (2015) argue that the endowment of human capital of the French elites in the eighteenth century was a key element enabling industrial take-off. There is also another strand of the literature that looks at the effect of industrialisation on human capital. That is to say, whether

Therefore, it seems that one of the main challenges lies in the complexity of human capital (Goldin, 2015). Empirical studies have, for the sake of simplicity, reduced human capital to a quantitative measure, literacy rates, average years of schooling or test scores. In a historical context, however, data are scarcer. Population censuses, for example, provide consistent and somewhat reliable self-reported literacy for some European countries as far back as the mid-nineteenth century (Ciccarelli and Weisdorf, forthcoming). When census or administrative data are not available, historians have often relied on other measures, such as people's ability to sign official documents, such as marriage registers (Cipolla, 1969; Stone, 1969; Allen, 2003; Reis, 2005). Alternatively, other indicators (book production, libraries…) have been used to proxy for human capital (Baten and Van Zanden, 2008).[4]

Spain has historically lagged behind its Western European counterparts as regards to literacy. By 1870, while in Germany and the United Kingdom around 80% of the adult population could read and write, the literacy rate in Spain was around 30% (Crafts, 1997; Pamuk and Van Zanden, 2010). This figure, however, hides substantial territorial disparities. The existing literature has already documented a duality, where northern provinces exhibited higher rates of literacy than southern ones (Núñez, 1992). In 1860, only 14% of the population aged 10 years old or above were able to read and write in Almeria, while in Alava more than a half (53%) could.[5] Such differences were not only noticeable then, but they have persisted over time. In fact, there appears to be a strong correlation between literacy in the mid-nineteenth century and educational attainment today (Beltrán Tapia et al., 2019).[6]

Despite its importance, this area of research has been slightly understudied, especially from a quantitative perspective. The historiography has focused on provinces (Núñez, 1991, 1992), thereby ignoring what the provincial aggregates comprise.[7] Although these studies have been, and still are, fundamental for understanding Spanish history, a more detailed

industrialisation led to a process of skill-acquisition or deskilling (Franck and Galor, 2017; De Pleijt and Weisdorf, 2017).

[4] Much of the recent literature has proposed increasing the number of indicators through the construction of historical numeracy indexes as a complementary measure of human capital, focusing on age-heaping by exploiting historical data on ages (e.g. Crayen and Baten, 2010a, 2010b; Tollnek and Baten, 2016).

[5] It has been argued that the existence of marked differences in the regional availability of human capital in the past could be one of the main reasons for their varying economic success (Núñez, 1992; Núñez and Tortella, 1993). On the long-term evolution of regional economies, see Díez-Minguela et al. (2018).

[6] This argument can be found in Palafox (1997), for example.

[7] Only a few local and regional contexts have been explored in greater detail. See for instance Mayordomo (1988), Terrón Bañuelos and Mato Díaz (1996), De Gabriel (2006) and, more recently, Jaraíz Cabanillas et al. (2017), among many others.

approach will allow scholars to gain further knowledge. In this regard, this study introduces, for the first time, literacy rates at the municipal level for Spain from 1860 to 1930. Our study thus goes from the early years of the liberal State to the Second Republic. The period of study was an important historical episode, not only in Spain but in Europe as a whole. Until the eighteenth century, much of the advance in literacy that came about in Europe took place in a context where formal education was decentralised, or depended upon local communities. Eventually, and in a changing socioeconomic context, there arose a stronger desire to supply instruction (or education) for the masses. Prussia led the way (Cinnirella and Hornung, 2016). Other countries followed, and during the nineteenth century literacy rapidly spread. Under these circumstances, whether there should be a more, or less, centralized national education system was a subject of debate (Mitch, 1986, 2013; Go and Lindert, 2010; Westberg et al., 2019).

As far as Spain is concerned, socioeconomic and political change prevailed during the period that goes from 1860 to 1930. In particular, the early years witnessed the transition, not always smooth, to the liberal State (Calatayud et al., 2016). The liberal State faced several challenges, and one of them was education. The Public Instruction Act of 1857, known as the Moyano Act, established a hierarchical national education system with three levels (higher, secondary, primary) of education. Yet, the liberal State only took full control of the higher education, leaving the funding of the secondary, and above all, primary education in the hands of the local community (municipal councils, religious orders, families…). Eventually, and after the creation of the Ministry of Public Instruction and Fine Arts in 1900, the State played a more active role in primary education. By 1902, teachers' wages had been included in the national budget.

Therefore, an in-depth study of the spread of literacy between 1860 and 1930 will enable us to explore (i) the legacy of the *Ancien Regime*, (ii) the evolution of literacy between the passing of the Moyano Act in 1857 and 1900, and (iii) whether any progress can be observed from 1900 to 1930. In this respect, of particular interest to our work is the analysis undertaken for the case of Italy, a country characterized by a relatively similar situation in terms of both its institutional framework and the timing of the reforms. As Cappelli (2016) and Cappelli and Vasta (forthcoming) have shown, the passing of the Casati Law in 1859 and the subsequent Daneo-Credaro reform in 1911, which led to a

more centralized system, had a positive effect on education.[8] These authors argue that, when the central government was not in charge of primary schooling, some regions did not have enough financial resources to fund it. In general terms, these findings go in line with the evidence provided below.

The paper is structured as follows. Section 2 presents a brief description of the institutional framework and the reforms that guided the process of providing primary education in Spain. Section 3 gives details about how we constructed a literacy dataset at municipal level. While Section 4 provides some initial results, Section 5 offers detailed evidence on the evolution of territorial inequality in terms of literacy at the municipal level. Finally, Section 6 concludes.

2. Schooling and literacy in Spain, 1797-1930.

During the eighteenth century, there were various attempts to count the population. In one of these, the Godoy-Larruga Census of 1797, the census takers also collected information, for the first time, on the number of elementary schools and teachers, and school attendance by gender.[9] According to Guereña and Viñao (1996, p.45): "*the data for 1797 provide an approximate measurement of the network of schools and students in Spain at the end of the Ancien Régime*". The figures show that the first level of the educational infrastructure had 11,007 primary schools (8,704 for boys and 2,303 for girls), 8,962 male teachers and 2,575 female teachers.[10] Since this early approximation was geographically disaggregated, it also enables us to appreciate the territorial differences. For example, Figure 1 shows the number of teachers per 10,000 inhabitants.[11] These disparities anticipate an uneven transition towards universal literacy in the following centuries.

[FIGURE 1 HERE]

[8] Although Lindert (2004, 88) shows that a decentralized system worked well in Prussia and the US in the nineteenth century (Go and Lindert, 2010) – as did Goldin (2001) – he generally argues that in those countries where there are marked social and economic differences between areas, a centralized system could ultimately work better (Lindert, 2004, 104-105). Hanushek et al. (2013) argue that in poor countries decentralization can have a negative effect, whereas with higher levels of development the benefits of decentralization can be positive by giving schools greater autonomy.

[9] Following the Royal Order of 6 May 1790, the Godoy-Larruga Census took a special interest in the state of education (Guereña and Viñao, 1996). For a qualitative approximation see Laspalas Pérez (1991).

[10] The Godoy-Larruga Census of 1797 provided information on the number of boys (304,613) and girls (88,513) in these schools. The total population was estimated at around 10.5 million.

[11] The territorial configuration of the Kingdom of Spain is considered throughout the text as corresponding to the sum of the territories situated on the Iberian Peninsula, the Balearic Islands and the Canary Islands.

In the first half of the nineteenth century, efforts to quantify the educational infrastructure continued (Guereña and Viñao, 1996).[12] In 1833, for example, the Madrid Gazette (No 24, issued 23 February) published official school statistics covering all levels of the education infrastructure. From then onwards – and with the passing of the Royal Decree of 30 November 1833, which established the administrative division of the territory into 49 provinces – a series of school surveys and official statistics (1846, 1848, 1850) implemented by inspectors and provincial committees was undertaken with varying levels of success.

Nevertheless, it was the publication of Statistics on Elementary Education *(Estadística de la Primera Enseñanza de la Península e Islas Adyacentes correspondiente al Quinquenio de 1850 a 1855)* in 1858 that paved the way for modern official school statistics (Guereña and Viñao, 1996). These official figures focused on education infrastructure (schools, teachers, methods…) and provided aggregate information for each province. However, this detailed information poses two problems. First, it does not tell us the proportion of the population that could read and write, and second, the fact that the information is aggregated at provincial level makes it difficult to carry out an in-depth analysis of territorial inequalities.

The need to have more information on the socioeconomic characteristics of the population led in 1856 to the creation of the Royal Statistical Commission (*Comisión de Estadística General del Reino*), which a year later would carry out another population count, published in 1858. However, it was not until the census of 1860 that information on literacy appeared for the first time. This was presented for each municipality and divided the population into three groups: 'can read but not write', 'can read and write' and 'cannot read'. Eventually, this was systematized in later censuses (1877, 1887, 1900, 1910, 1920 and 1930), thus making it possible to study this issue at a greater level of disaggregation than in surveys and official school statistics.

Based on census information, Table 1 shows the evolution of literacy from 1860 to 1970. Although universal literacy would not be achieved until the last quarter of the twentieth century, the period between 1860 and 1930 is fundamental for understanding the challenges faced by the State. A gradual improvement can be observed over the period: while in 1860 only one in four inhabitants over age 10 could read and write, this figure had risen to three in every four by 1930. We should nonetheless bear in mind that Spain was clearly lagging behind the most advanced European countries: the literacy levels achieved in

[12] A number of different questionnaires (1800, 1801) and surveys (1803, 1820, 1821) were administered after the Godoy-Larruga Census of 1797.

Spain in 1930 had already been exceeded by 1870 in countries such as Great Britain, Holland, Germany and Sweden. Thus, the advance of the literacy process over the period served, at best, to narrow the gap that existed between Spain and other more developed European countries.

[TABLE 1 HERE]

Regarding the institutional framework that modelled elementary education in Spain, it is worth noting that Jovellanos, the well-known Enlightenment reformist, wrote in his 'Memorandum on Public Education' of 1802 that "*the sources of social prosperity are many; but all spring from the same origin, and this origin is public instruction"*. These words indicate that the country's intellectuals and elites were perfectly aware of the importance of education for the economic development of a society. However, the reality was that Spain, as in many other areas, was lagging behind other countries at the time. The reluctance (or straight opposition) to supply education to the masses can be summarised by the opinion of Juan Bravo Murillo, a leading Parliamentary member and crucial figure in different Spanish Governments during the 1840s and 1850s, who stated that "*Spain does not need educated men, but oxen that work*". School funding and budget allocations for teachers under the *Ancien Régime* were the responsibility of local councils, religious foundations and the parents of the children who attended the schools.[13] Under these circumstances, the level of education in Spain presented a bleak picture.

Neither did the conditions under which primary education was provided make it possible to imagine a particularly hopeful future in which this reality might be corrected. Except for the children of the poorest families, attending school was not actually free.[14] Moreover, child labour was widespread, which meant that the opportunity cost of sending children to school was rather high, especially for families with fewer resources who relied on child labour for their subsistence. Also, many teachers had no qualifications and most schools lacked suitable facilities and materials (insufficient equipment, overcrowded classes, insanitary conditions, etc.). By the mid-nineteenth century, surveys and official school statistics were already warning about the shortage of schools, the precarious situation of

[13] Student fees were paid in cash or in kind. The contribution of local councils to teachers' wages was usually in cash but it could sometimes be in kind, usually board and keep.
[14] The Moyano Act (Art. 9) established that primary instruction would be free for children whose parents or tutors could not afford it. Still, a certificate issue by the local authority was required.

teachers, the deficiencies of teaching methods and the differences that existed between boys' and girls' education.[15]

The deficient schooling system was the outcome of decades of institutional paralysis. Article 366 of the Constitution of 1812 (Item IX. On public education) set out that *"all the towns in the Kingdom shall establish elementary schools, in which children will be taught reading, writing and counting, and the catechism of the Catholic religion, which will also include a brief outline of civil obligations*". It also aimed to create a uniform education system (Art. 368) and a Ministerial Education Board in charge of inspections (Art. 369). These ideas were given shape in the Quintana Report of 1814 (*Report and Draft Decree on the Ordering of Public Education*), but the plans were halted due to political and social instability.[16] During the first half of the nineteenth century, primary schools therefore followed no specific education plan and were left to their own devices as far as funding was concerned. In other words, primary education was a municipal responsibility.

It was not until 1857, in an international context where various countries were taking their first steps towards mass schooling, that the Public Instruction Act (PIA), commonly known as the Moyano Act, was passed. This law regulated the education system from 1857 to 1970, when it was replaced by the General Education Act (GEA).[17] Indeed, the Moyano Act was one of the great reforms introduced in Spain in the nineteenth century.

Primary education was split into elementary and higher education (Art. 1), with a curriculum being established for both.[18] At the same time, primary education would become "*compulsory for all Spaniards*" (Art. 7) between the ages of 6 and 9, and free for those

[15] Surveys and official school statistics were not the only sources of information. The property register (*Cadastro*) compiled between 1749 and 1760 in the Crown of Castile provided information on schools and teachers which, according to Guereña and Viñao (1996, p.27), made it possible to "*reconstruct the school network of a particular area*". Other authors have taken literacy to mean the ability of the head of the family to sign the declaration for the property register (Álvarez and Ramos Palencia, 2018). See also Nalle (1989) and Soubeyroux (1996) for the modern era. Another important source is the *Geographical, statistical and historical dictionary of Spain and its overseas possessions* by Pascual Madoz, which includes information on the education infrastructure in the mid-nineteenth century.

[16] 1821 saw the establishment of General Regulations for Public Instruction, following the Quintana Report, which were not pursued further. From then and until the Public Instruction Act (PIA) of 1857 there was a succession of different plans and endeavours such as the Duque de Rivas Plan of 1836 and, notably, the creation of the Ministerial Board of Public Instruction in 1846.

[17] Although the PIA continued until 1970, successive changes were introduced during the 113 years that it remained in force. Compulsory education, for example, in principle from age 6 to age 9, was extended to age 12 in 1909 and age 14 in 1964.

[18] According to Art. 2 of the PIA, primary education comprised 6 subjects: Christian doctrine and basic scripture, reading, writing, principles of Spanish grammar, principles of arithmetic, and basic knowledge of agriculture, industry and commerce, this latter subject depending on location.

whose parents or guardians could not afford it (Art. 9).[19] Thus the Moyano Act aimed to give structure and organization to every level of education. Nevertheless, public schools, i.e. those that were "*fully or partly maintained by public funds or by religious or other similar foundations*" (Art. 97), continued to be the responsibility of local councils and religious organizations.[20] Therefore teachers in primary education were not civil servants. Indeed, Art. 185 established that positions involving financial allocations that did not exceed 3,000/2,000 *reales* (i.e. teachers) required no civil service entrance exam.

Mass schooling, and then universal literacy, faced a variety of problems. A traditional setback, and one of the motivations of the Moyano Act, was the poor infrastructure. In this regard, the passing of the Moyano Act laid down a minimum requirement of number of schools for each pueblo, or population entity, according to its size. Communities of over "*500 souls*", for example, should have at least one public primary school for boys and another for girls, even if the latter were 'incomplete' (*escuelas incompletas*) (Art. 100).[21] Communities of at least "*2,000 souls*" should have two complete schools each for boys and girls, while those with "*4,000 souls*" should have three, and so on (Art. 101). It was also recommended that communities of fewer than "*500 souls*" should form districts so that they could have a complete primary school (Art. 102). Should this not be possible, then the establishment of an incomplete or seasonal school was allowed.[22]

A further effort to foster education was the creation of the Ministry of Public Instruction and Fine Arts in 1900.[23] From the mid-nineteenth century and during the early twentieth century, the Spanish economy and society underwent a number of important changes. With a rapid population growth came structural change (Pérez Moreda et al., 2015; Prados de la Escosura, 2017). It was in this context of far-reaching socioeconomic change that the Ministry of Public Instruction and Fine Arts was created, followed two years later by the

[19] The compulsory nature of education was not absolute, since pupils could ask to be excused when they were "*sufficiently provided with this type of education in their homes or in a private establishment*" (Art. 7). And to obtain free elementary education, it was necessary to provide a "*certificate issued by the relevant parish priest and endorsed by the town mayor*" (Art. 9).

[20] Art. 97 stipulated that every year there would be an allocation of "*one million reales, at least, to help those towns and villages that are unable by themselves to cover the cost of primary education*".

[21] An incomplete school was one in which not all the subjects on the curriculum were taught.

[22] It should be remembered that some municipalities comprise a single town or village, while others are made up of various population centres. This is one of the peculiarities of the Spanish case. Thus, municipalities along the Cantabrian coastline (Galicia, Asturias, Cantabria) are composed of various "*pueblos*", while in other regions there tends to be greater equivalence between towns and municipalities.

[23] With the Finance Act of 31 March 1900 came the reorganization of the Ministry of Public Works, and after the Royal Decree of 18 April 1900 came the creation of the Ministry of Agriculture, Industry, Trade and Public Works and the Ministry of Public Instruction and Fine Arts (1900-1936). The Ministry of Agriculture, Industry, Trade and Public Works would revert to being called the Ministry of Public Works from 1905 onwards.

central government taking over the funding of primary education. Furthermore, several efforts were made to improve the infrastructure. In 1903 a school census was carried out to assess the situation. Based on that report, several schools were built in the following years. Furthermore, compulsory education was extended to age 12 in 1909 and the Department of Primary Education was created in 1911. Finally, the Royal Order of 8 March 1910 guaranteed the right of women to enrol freely in any official education centre.

3. Data and sources.

This article relies on the Spanish Population Censuses of 1860, 1900 and 1930. The first half of the nineteenth century was marked by great political instability. The transition from the *Ancien Régime* to the liberal State coincided with frequent internal as well as external conflicts. In this context, population counts were hampered by serious obstacles, thus interrupting the efforts that had been made by the State during the eighteenth century.[24] The situation began to change towards the middle of the nineteenth century when a certain level of political and economic stability was achieved that enabled the State to resume the collection of statistics. This, in turn, led to the creation of the Royal Statistical Commission (*Comisión de Estadística General del Reino*), established by Royal Decree dated November 3, 1856. This Commission compiled the 1860 Population Census, the first modern population census.[25] After various changes in the name of the organization and bodies that would be responsible for carrying out the work, the 1900 population census – the second of those covered by this article – was published in 1902 by what was then known as the Institute of Geography and Statistics (*Dirección General del Instituto Geográfico y Estadístico*). In 1932, shortly after the Second Republic was proclaimed, the Institute of Geography, Property and Statistics (*Instituto Geográfico, Catastral y de Estadística*) published the third population census covered by this article, corresponding to 1930.

[24] The first population censuses that were modern insofar as they counted people instead of the number of families date back to the eighteenth century, which saw the successive publication of the Aranda Census (1768), the Floridablanca Census (1787) and the Godoy-Larruga Census (1797). A brief description of the population counts for the first half of the nineteenth century can be found in Durán-Herrera (2007) and in the introduction to the population census of 1860.

[25] A population census for 1857 was also published. However, the result of this first attempt was unsatisfactory and it was recommended that those responsible for carrying it out should undertake a new count, which came out in 1860.

The basic information presented in these three population censuses (1860, 1900 and 1930) enables us to obtain literacy rates at the municipality level. The different censuses provide figures for the population's level of elementary education, municipality by municipality, categorizing the 'total population' according to those who 'can read', 'can read and write' and 'cannot read'.[26] This information on levels of education was reported directly by the families themselves on the basis of registration cards (*cédulas de inscripción*). Using this information, we have calculated the literacy rate as the share of literates (those who could read and write) over the total population. This measure differs from that normally used in the literature, because our literacy rate includes children. Sadly, the population censuses do not publish information by age-group at the municipal-level. For this reason, we cannot exclude those aged 10 years old or less.

Likewise, using three population censuses introduce a territorial-consistency issue. During the period of study, the number of municipalities changed. In Spain, the municipalities are a "*historical product with medieval roots and in constant evolution*" (Burgueño and Guerrero Lladós, 2014, p.14). The Constitution of 1812 laid down the foundations for the liberal reforms that followed suit, "*the towns there will be Ayuntamientos* (councils)" (Art. 309) and stipulated that "*an Ayuntamiento will be established in those towns that do not have one but need one, with one having to exist in towns which alone or with their district area contain at least one thousand souls*…" (Art. 310). Then, the nearly 20,000 population entities reported in the Census of 1787 eventually became about 11,300 *ayuntamientos* in the 1840s when the 'Geographical, statistical and historical dictionary of Spain and its overseas possessions' by Pascual Madoz was published. This was when, as a result of the Council Organization and Functions Act (*Ley de Organización y Atribuciones de los Ayuntamientos*) of 1845, those councils representing fewer than 30 residents were abolished (Art. 70), leaving a total of 9,342 and 9,364 municipalities in the population censuses of 1857 and 1860 respectively. As for the number of municipalities today, we use the population census of 2001 comprising 8,106 municipalities, with their respective codes from the *Instituto Nacional de Estadística (INE*).[27]

[26] The population censuses for 1900 and 1930 contain an additional category covering those people whose level of education could not be determined, who are included in the category 'Not known'. However, this category represents a very small proportion of the total: 0.11% in 1900 (20,217 people) and 1.15% in 1930 (269,901 people). One characteristic of the 1860 population census is that it only presents the 'de facto' total population (*población de hecho*), i.e. omitting the 'de jure' population (*población de derecho*), the former being the population considered in this article. In addition, the censuses break down all this information into men and women.

[27] 2001 has been chosen by various studies that, on the basis of the current distribution, have analysed the evolution of the Spanish population at municipal level for the twentieth century as a whole (Goerlich et al., 2006; Franch Auladell et al., 2013). Ceuta and Melilla are excluded from the analysis, which means that the

The fact that there are differences in the numbers of municipalities means we have to convert the historical figure into today's figure. To homogenize the data, we need to assign a current INE code to all the municipalities that appear in the three censuses. To put it another way, we have to match the more than 9,000 municipalities that appear in the censuses to the municipalities they would belong to today and assign them the corresponding current INE code. This homogenization with the municipalities of today is also necessary because – as far as we know – there are no georeferenced maps showing the historical borders of the municipalities of 1860, 1900 and 1930. In order to be able to illustrate the information for literacy rates at municipal level, we have therefore carried out a two-step procedure to homogenize the municipalities.

First of all, following Goerlich et al. (2006: *Apéndice 2. Alteraciones de los municipios entre los censos de 1900 y 2001*) and the information provided in the document entitled "*Variaciones de los municipios de España desde 1842*" (Ministerio de Administraciones Públicas, 2008), the 9,364 municipalities of 1860 have been transformed into the 8,106 of 2001. The same procedure was followed for 1900 and 1930. These sources enabled us to assign a current INE code to the vast majority of the historical municipalities in the population censuses, following their historical pathways. However, in some cases complications arose. We should bear in mind that most changes in municipalities between these dates are the result of mergers or separations. The causes vary greatly: towns absorbing neighbouring municipalities, municipalities that were merged together, municipalities that were split from each other, etc.[28]

For these reasons, in the second step, decisions had to be made regarding a whole series of municipal changes that took place between 1860 and 1930. In order to deal with the fusions and separations that do not have a perfect correspondence to the 2001 municipal distribution, we created «pseudo-municipalities» that comprise various current municipalities. In this case the problems that the homogenization process encounters are varied – as are the solutions – and are best illustrated through the use of specific examples.

In 1930, for example, the municipality of Torremolinos was abolished following its incorporation into Malaga (merger). This meant that both the 1860 and 1900 censuses

addition of these two autonomous cities would bring the total up to the 2001 figure of 8,108 municipalities. Since then there has been another census (2011) which, in this case, showed a total of 8,124 municipalities, i.e. sixteen more than in 2001.

[28] There were also numerous changes in place names, many of them caused by the existence of different languages in Spain and their evolution over time.

provide data for both Torremolinos and Malaga, but the 1930 census does not, since Torremolinos was then a part of Malaga.[29] To solve this problem we created a «pseudo-municipality» known as Malaga-Torremolinos. The same case in reverse would be Junciana, which separated from Gilbuena in 1930. We therefore only know the population (and education level) of Junciana and its characteristics for that year, and not for 1900 or 1860 when the data were included under Gilbuena. To overcome this problem, we created the «pseudo-municipality» of Gilbuena-Junciana.

On other occasions it may come about that one of today's municipalities did not exist in the past but was created more recently out of other municipalities. This would be the case of Mendaro, created in 1983 by incorporating part of the former territory of both Elgoibar and Mutriku. Given that none of the population censuses from 1860 to 1930 provided data for the municipality of Mendaro (which did not yet exist), we created a «pseudo-municipality» that covered all three of the municipalities involved (Elgoibar-Mendaro-Mutriku). Along similar lines, in some cases the problem lies in the disappearance of a municipality, when one part of what used to be a municipality is incorporated into another and another part into a second. The most extreme case can be found in the province of Huesca, where various municipalities – Aínsa-Sobrarbe, Biescas, Boltaña, Caldearenas, Jaca, Las Peñas de Riglos and Sabiñánigo – incorporated areas of territory (former municipalities) abolished between 1860 and 1930. To deal with this we created a «pseudo-municipality» that joined them all together. Thus, we obtain a dataset of pseudo-municipalities that is consistent over time.[30]

After these adjustments were carried out, a total of 255 «pseudo-municipalities» had been created. Then, the dataset comprised a total of 7,851 municipalities for each year.[31] Each of the «pseudo-municipalities» covers a minimum of two and a maximum of seven municipalities. With the creation of the «pseudo-municipalities», these 7,851 municipalities form the basis upon which we carried out the analysis of the evolution of literacy in Spain, using the information provided in the population censuses of 1860, 1900 and 1930.

[29] The municipality of Torremolinos was re-established in 1988, becoming separate from Malaga.
[30] There are various strategies for the homogenization of municipalities. Franch-Auladell et al. (2013, p.47), for example, opt to "*allocate populations according to the municipal boundaries from the 2001 census*" whenever there is some alteration, whatever the reason. In our case we follow a different procedure. When an alteration affects two or more municipalities, we create a «pseudo-municipality» that covers all parties.
[31] This figure results from subtracting the 255 «pseudo-municipalities» we created from the 8,106 municipalities of 2001.

4. A first exploratory analysis: the main stages in transition to universal literacy.

In this section, we describe how literacy evolved across Spanish municipalities between 1860 and 1930. While the historical information contained in the 1860 population census reflects the legacy of the *Ancien Régime*, it is worth remembering that the Moyano Act was passed in 1857 but primary education was essentially funded by the local community until 1902. In this study we explore two main stages: 1860-1900 and 1900-1930. That said, it is worth stressing that population grew during the whole period of study, but it did so more rapidly in the early twentieth century, as Figure 2 shows. This is indeed important because a growing population put further pressure on the provision of elementary schooling.

[FIGURE 2 HERE]

Table 2 presents some descriptive statistics. As Table 1 previously illustrated, literacy in Spain improved over the period of study, but especially from 1900 and 1930. While barely a fifth of the population of Spain could read and write in 1860, this had increased to more than a third by 1900. By 1930, almost 60% of the population was literate.[32] Table 2 also introduces how different was literacy across municipalities. Although these disparities were still sizeable in 1930, as shown by a simple and a population-weighted coefficient of variation, territorial inequality declined, especially between 1900 and 1930.

[TABLE 2 HERE]

To complete this overview, Figure 3 shows histograms (frequency of municipalities by the % of population that could read and write) for each of the population census. It can be seen that between 1860 and 1900 literacy improved in certain municipalities, but not in all. In this regard, it appears that, from 1860 to 1900, literacy improved in municipalities where literacy was somewhat widespread in the *Ancien Régime*. In fact, at the turn of the twentieth century a large number of municipalities still exhibited literacy rates below the 20-30% threshold. However, this pattern radically changed by 1930.

[FIGURE 3 HERE]

In brief, out of a total population of almost 16 million it is estimated that only around 20% could read and write in 1860. As Núñez (1992) pointed out, Castile-Leon and the territories around Cantabria, Alava and Navarre presented the highest levels of literacy in the mid-

[32] Note that, given the nature of the information provided by the population census, we calculate the global literacy rate. If this rate were instead calculated for the population above age 10, the literacy levels would increase to 26.5% (1860), 44.8% (1900) and 74.4% (1930) respectively.

nineteenth century. At the other extreme were the southern provinces (in the regions of Andalusia, Castile-la Mancha, Murcia and the Valencian Community) along with those in the extreme north-west of the peninsula (Galicia and Asturias).

Map 1 shows the percentage of people in each municipality who could read and write according to the population census of that year, confirming the spatial patterns that had already been anticipated in studies carried out at the provincial level (Núñez, 1992). The municipal information thus enables us to identify and study territorial inequalities in greater depth, revealing that while some areas enjoyed literacy rates around 50-60% (in the centre-north and north of Spain), other locations had figures below 10% (in the south and south-east). If we consider the notion of "*literacy thresholds*", according to which a literacy rate below 30-40% slows down a society's development and progress (Bowman and Arnold Anderson, 1963), we can only conclude that the legacy of the *Ancien Regime* constituted an obstacle to the advance of Spanish society.

[MAP 1 HERE]

Map 2 shows literacy in each municipality in 1900. Interestingly, the spatial patterns identified in 1860 were reinforced during this first stage. It seems that the Moyano Act, passed in 1857, could not offset the existing imbalances. Indeed, it could be argued that the opposite scenario is the case. Territorial or municipal differences were reinforced or more pronounced at the turn of the twentieth century. That is to say, literacy mainly improved in municipalities where a relatively large share of men could read and write. In sum, the legacy of the *Ancien Régime* remained until the early years of the twentieth century.

[MAP 2 HERE]

During the early twentieth century the Spanish economy and society underwent a number of important changes. Population growth accelerated and over the early decades of the century the rate of structural change increased (Prados de la Escosura, 2017).[33] The relative importance of agriculture, livestock and fishing, which until then had been the main economic activities, began to decline. There was also a slow but gradual industrialization. Socioeconomic change stimulated internal migrations from agrarian regions to those where industrial (manufacturing, extractive) activity flourished (Silvestre, 2005).[34] This, in turn, led

[33] This was partly because the crude mortality rate decreased notably after 1900 (Pérez Moreda et al., 2015).
[34] International emigration also increased. Sánchez Alonso (2000) noted the disparity in external emigration from Spanish provinces. Between 1911 and 1913 almost a third of emigrants were from Galicia, although that region was home to only 10% of the Spanish population. At the other extreme, emigrants from Aragon and

to a greater spatial concentration of economic activity (Díez-Minguela et al., 2018). Advances in transport and communication infrastructures (railways, telegraph…) made the movement of goods, people and information easier. In an increasingly urban society in which the press and media were growing in significance and where population counts and administrative procedures were progressively more frequent, knowing how to read and write became more and more necessary. Indeed, illiteracy could have become a social stigma that could have changed the existing incentives structure.

In this context of far-reaching socioeconomic change, the need or desire to learn to read and write was accompanied by improvements in the education system. Although it is extremely difficult to disentangle the effects of all these changes, the evidence shows that literacy rapidly improved between 1900 and 1930. Map 3 shows how literacy evolved at the municipal level.

[MAP 3 HERE]

In short, this first exploratory analysis suggests that the early efforts made with the passing of the Moyano Act in 1857 had no immediate impact. Indeed, the municipal data show that literacy levels improved during this stage in those very municipalities that already had higher levels in 1860. It is only with the start of the twentieth century that convergence can be somewhat observed. It would therefore seem that the legacy of the *Ancien Régime* contributed decisively to determining the different levels of literacy within Spain.

5. Geographical differences in the transition to universal literacy.

The literature, using provincial data, usually points out that territorial inequality in literacy tended to decrease during the period analysed here, or to put it another way, that literacy levels in Spanish provinces were in the process of convergence. Thus Reher (1997) notes that the gradual growth of the Spanish education system boosted literacy levels in the south (an area that started from low education levels), whereas there was a more moderate improvement in the north (an area characterized by more widespread literacy). Certainly, the spread of literacy caused the distance between extremes to narrow. However, the literature has not carried out a detailed analysis of how regional inequality evolved taking into account the distribution as a whole. From this standpoint the narrowing gap between

Extremadura accounted for less than 2% of the total, while their respective populations represented around 5%.

regions may not have been so intense if, as Reher (1997) himself notes, the setting-up of the education system was carried out to a greater degree and was more effective in those regions that were already developing (like Catalonia, for example, which occupied an intermediate position in the Spanish literacy ranking) than in those that were lagging behind (like Extremadura and Galicia, for example, which occupied the bottom positions).

In this section, we explore in greater depth the evolution of territorial inequality in literacy using the new set of information at municipal level. Specifically, we discuss the possible existence of a pattern of territorial convergence in literacy levels and the potential impact of the changes made in the primary education on inequality in education between territories. In this regard Table 2 above, which presented information on the levels and evolution of territorial inequality, provides a series of stylized facts. The first and possibly the most striking is that, in parallel with the advance of the literacy process, territorial inequality showed a downward trend. The simple coefficient of variation (SCV) for the distribution, which includes literacy rates for the population of Spain as a whole, falls from a value of 0.52 in 1860 to 0.24 in 1930. Inequality falls by 54% between both dates.[35]

Nevertheless, this decrease in the average literacy gap must not hide an additional fact, which is that the distance between the tails does not fall continuously. The ratio between maximum and minimum municipal literacy rates (columns 4 and 5) fell considerably between 1860 and 1900, but then increased between 1900 and 1930. Although average literacy levels along with their maximum values grew rapidly, some municipalities did not participate in the process and the distance between the tails of the distribution widened. Later we will provide new evidence about how far this was true in terms of the municipalities affected.

The third noteworthy fact is to do with the rate at which territorial inequality decreased. The speed of convergence increased between 1900 and 1930, i.e. with the transition to a model in which the State took over primary school funding. In comparative terms, it can be argued that the model in which primary education was funded by the local community, developed in the *Ancien Régime* and kept during the nineteenth century tended to preserve the existing territorial differences. Then, with the creation of the Ministry of Public Instruction and Fine Arts, followed by several policies and efforts aimed at encouraging literacy, territorial disparities rapidly declined. In order to visually illustrate the geography of

[35] The weighted indicator (WCV) follows the same trajectory, although its evolution records a slightly lower fall (50%).

this, Maps 4 and 5 provide evidence of the change in literacy levels (measured in absolute terms) in the 7,851 Spanish municipalities in both stages: 1860-1900 and 1900-1930.

[MAP 4 HERE]

As Map 4 shows, literacy growth, since the passing of the Moyano Act, concentrated mainly in municipalities that already had relatively high literacy rates in 1860, such as Castile-Leon, Navarre, La Rioja, Alava and Madrid. Significant increases (of between 10-20 points) are also revealed in different municipalities located in areas where literacy rates at the beginning of the same period were low, such as Andalusia (especially in the provinces of Cadiz and Seville), Extremadura, Castile-La Mancha and the coastal areas of the Valencian Community. In all these areas, however, the growth of literacy in some municipalities occurred in parallel to the slow growth in many other municipalities in the same region.

Yet, this map radically changes in the period 1900-1930. The municipalities that registered the greatest increases are no longer the traditionally ones, and it is in areas with intermediate levels of literacy that the most significant increases are observed. More specifically, it is worth stressing the advances of the municipalities of the Mediterranean coast, especially those in Catalonia, the Balearic Islands and the Valencian Community, together with those in Aragon, mainly along the River Ebro, and the Basque Country, especially in Gipuzkoa and Bizkaia. Furthermore, this pattern matches the areas that experienced greater economic dynamism (Reher, 1997; Díez-Minguela et al., 2018).

[MAP 5 HERE]

Given that literacy rates are bounded, ranges from 0.49% to 90.65% in the database, it would be reasonable to believe that absolute increases would tend to be more relevant in places that started from lower levels.[36] But this was not usually the case between 1860 and 1900. In fact, remarkable improvements are not found in municipalities with low literacy rates but in those with intermediate rates and characterized by greater economic dynamism. Increasing internal migratory flows, growing urbanization and rapid structural change is likely to have affected the expected return on investing in education more strongly than in

[36] In the database, and by construction, the highest literacy rate observed was 90.65%. It is worth remembering that literacy rates are computed as the proportion (%) of the total population that could read and write. That is to say, children or population aged 10 years old or less are included.

less dynamic areas of the peninsula. It could therefore be argued that there was a significant relationship between the uneven advance of literacy and socioeconomic change.[37]

In order to explore these hypotheses in greater depth, we provide below, Figure 4, evidence of the relationship between literacy levels and growth in both stages (1860-1900; 1900-1930). Figure 4 indicates that, over the long term, the period 1860-1930 saw a slow narrowing of the gap between municipal literacy levels in Spain. As Maps 4 and 5 suggested earlier, it seems that the process of convergence of literacy levels would only have come about to a significant degree as part of the spread of literacy during the early twentieth century. Bearing this in mind, Figure 4 clearly shows a strong negative correlation between the initial level of literacy and the absolute improvement over the period between 1900 and 1930, but not before. In fact, during the first stage a positive correlation arises.

[FIGURE 4 HERE]

6. Conclusions.

This study provides new evidence on the transition to universal literacy in Spain from 1860 to 1930. To this end we constructed a novel dataset with historical information at the municipal level, which enabled us to delve deeper into this matter. In sum, literacy in nineteenth-century Spain exhibited substantial variation. For example, municipalities located in the northern half of the peninsula, especially in Castile-Leon and Cantabria, had high levels of literacy, in some cases reaching the levels of those recorded in certain parts of Western Europe. In the south-east, however, illiteracy was rampant. Besides, the fact that regional differences were especially stark should not hide that disparities within provinces were also important.

Under the Moyano Act, passed in 1857, the proportion of people who could read and write increased. This, however, was not a steady process. Using municipal data several important issues arise. First, the *Ancien Régime* calls for further research and thought. By 1860, there seems to be sizeable differences in literacy across Spanish municipalities. Second, the Moyano Act had little, if any, effect, in offsetting these disparities, at least between 1860

[37] The method of constructing the variable presented here could upwardly bias the values obtained for those populations that received literate adult population, since this received population would have a lower proportion of people aged under 10 and a higher volume of adult-age literacy (Beltrán Tapia and Miguel Salanova 2016). However, the migration flows in Spain were concentrated in a limited group of populations and of low intensity at least until the 1920s (Silvestre, 2007).

and 1900. In fact, literacy essentially improved in places where a greater share of the population could read and write in 1860. Considered as a whole, these results do not bear testament to the effectiveness of the Moyano Act, but neither are they surprising given that the funding of primary education was left in the hands of the local communities in a time of severe financial restrictions. Moreover, although the Moyano Act established compulsory education between ages 6 and 9, its implementation was rather limited given the high levels of absenteeism.

By 1900, illiteracy was rampant in some parts of Spain which motivated a call to action on primary education. With the creation of the Ministry of Public Instruction and Fine Arts., further efforts were made to overcome several issues (low levels of spending on education, insufficiently qualified teachers, deficient infrastructures…). Eventually, the State took over primary education (in particular teachers' wages) and schooling was made compulsory up to age 12. Equally, socioeconomic change deepened. Although it is extremely difficult to single out a particular mechanism, it appears that supply and demand went hand-in-hand raising the average level of literacy within Spain.

As regards to territorial disparities, this study points out to the *Ancien Régime*. It is still not clearly understood what drove the sizeable disparities that existed in 1860. Besides, the uneven performance, in terms of literacy, proved to be very persistent, and the passing of the Moyano Act and the modest efforts made by the State in the second half of the nineteenth century were insufficient to offset these imbalances. Still, literacy seems not to be closely related with socioeconomic progress. Although the leading industrial territories (Catalonia, Basque Country) almost reached universal literacy by 1930, several territories that were relatively literate in 1860 did not undertake such a profound socioeconomic change. In any case, this study expects to stimulate further research interest on the history of education.

Acknowledgments: The authors would like to thank the Bank of Spain for its financial support through the "*Programa de Ayudas a la Investigación en Macroeconomía, Economía Monetaria, Financiera y Bancaria, e Historia Económica*" and Pablo Martin-Aceña for helping us. Eter Burduli did an excellent job as research assistant. A preliminary version of this paper was presented at the 'Conference on Schooling and Literacy in Spain, 1787-1930', which was held at the University of Valencia in January 2018, and at the 'Joint Seventh CEPR

Economic History Symposium and Fifth Banco de España Economic History Seminar', organized by the Bank of Spain in Roda de Berà (Tarragona) in May 2019. Financial support from the Spanish Ministry of Science and Innovation, Projects ECO2015-65049-C12-1-P, ECO2017-90848-REDT, PGC2018-095821-B-I00, HAR2015-64076-P, PGC2018-095529-B-I00 (MCIU / AEI / FEDER, UE), Generalitat Valenciana (AICO/2018/1930) and the Norwegian Research Council, Project 249723, is also gratefully acknowledged.

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TABLES, MAPS AND FIGURES

Table 1. Literacy rates (%) in Spain, 1860-1970.

	Literacy rate (%)		
Census	**Men**	**Women**	**Total**
1860	41.7	11.9	26.5
1877	46.7	19.3	32.5
1887	52.1	24.9	38.1
1900	57.1	33.3	44.8
1910	62.9	42.3	52.2
1920	70.1	52.9	61.1
1930	83.0	66.3	74.4
1970	95.1	88.0	91.4

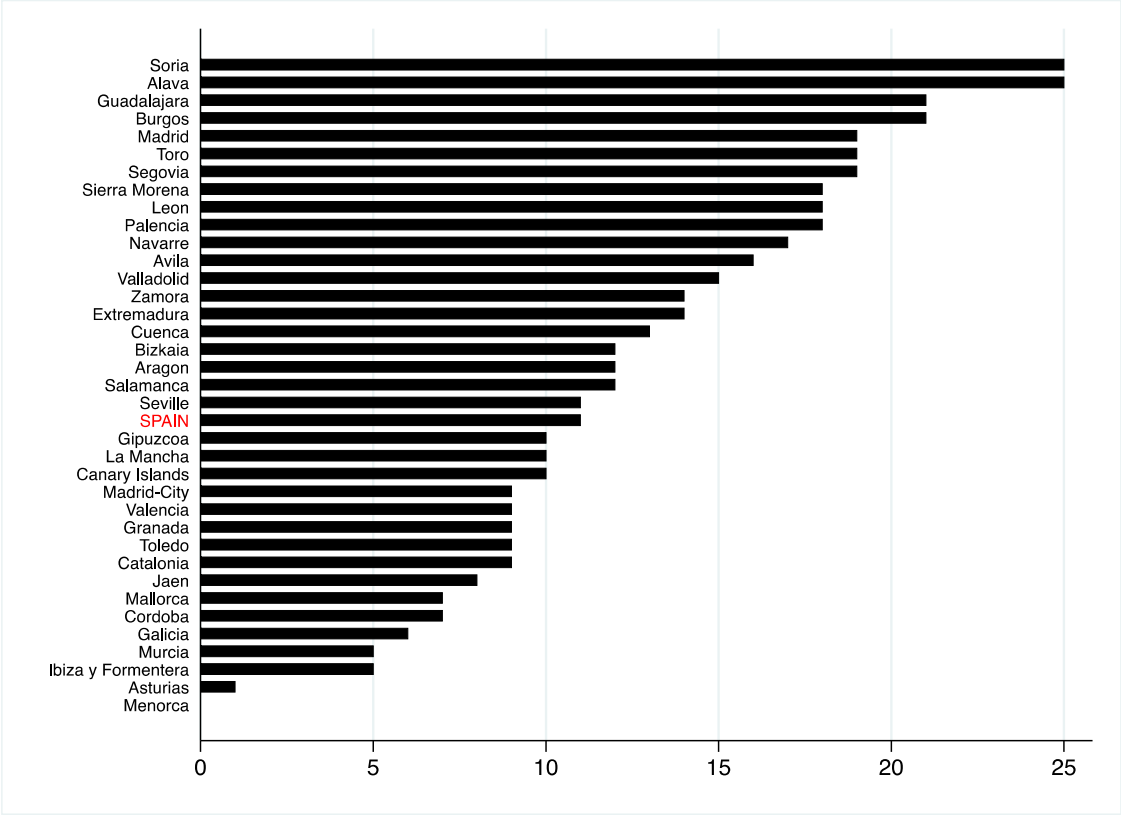
Note: Literacy rate calculated as the proportion of the population over age 10 that could read and write.
Source: Population censuses.

Table 2. Statistical summary (% of population that could read and write), by census, 1860-1930.

Census	S. Av.	W. Av.	Median	Max.	Min.	SCV	WCV	Municipalities	Population
1860	20.20	19.94	17.46	70.23	0.49	0.52	0.54	7,851	15,645,017
1900	35.53	33.47	30.65	83.40	2.44	0.43	0.46	7,851	18,594,405
1930	57.25	56.25	56.79	90.65	2.90	0.24	0.27	7,851	23,563,799

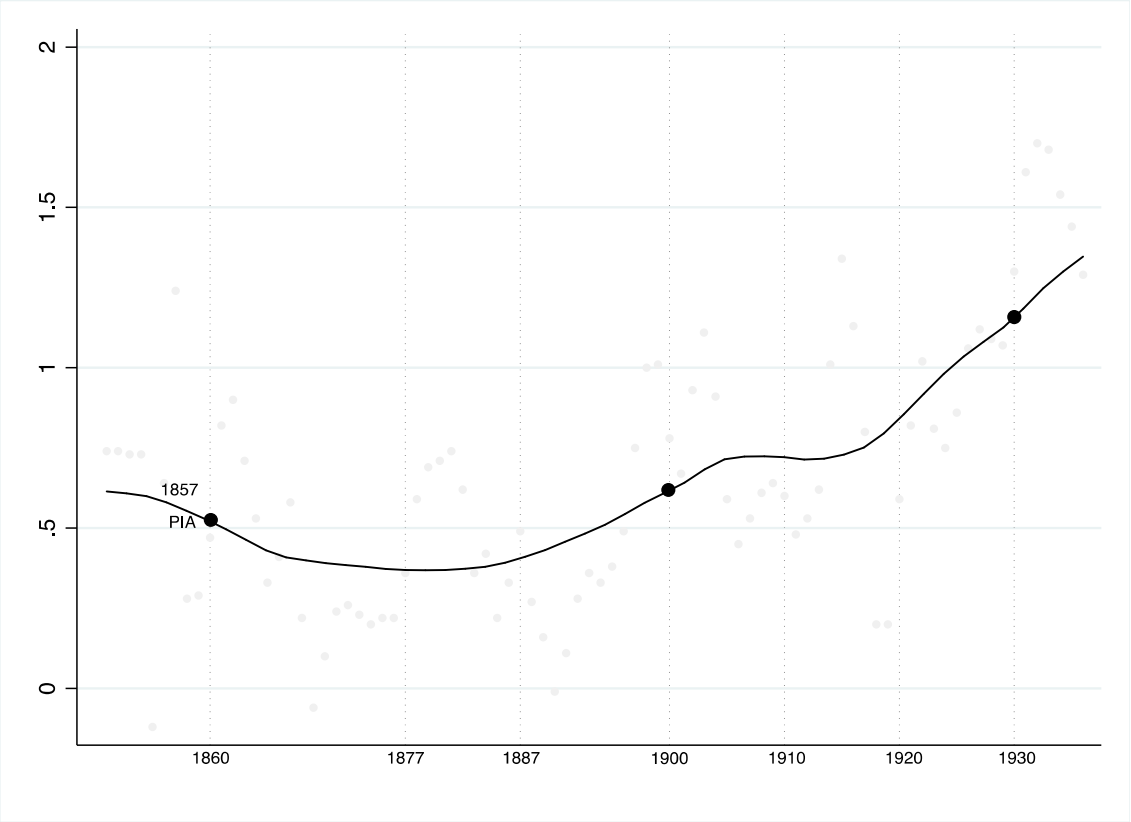
Note: S. Av.: simple average; W. Av.: weighted average; SCV: simple coefficient of variation; WCV: weighted coefficient of variation.
Source: Population censuses.

Figure 1. Schoolteachers per 10,000 inhabitants in Spain, 1797.



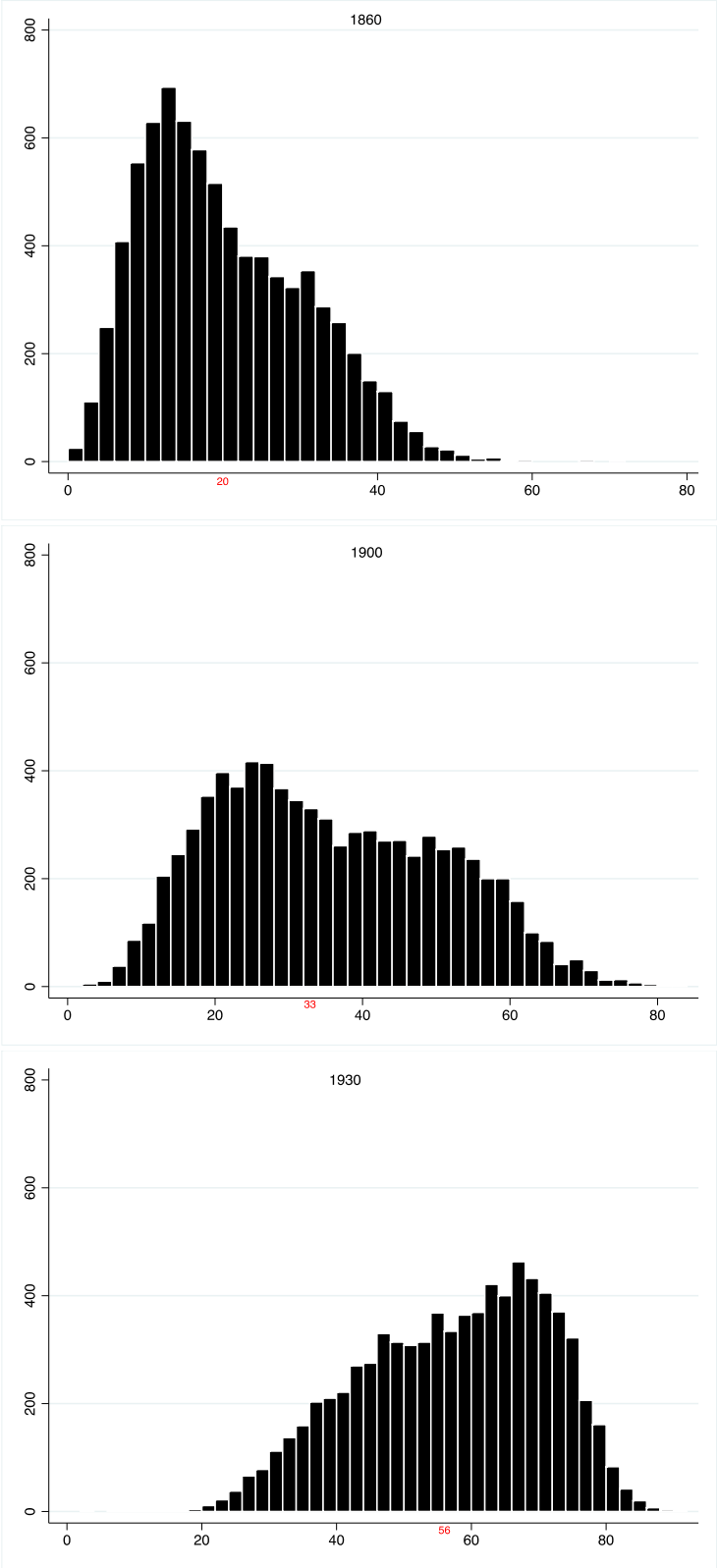
Note: The Godoy-Larruga Census of 1797 presents information on 19 provinces or lordships (Alava, Avila, Burgos, Cuenca, Extremadura, Guadalajara, Gipuzkoa, La Mancha, Leon, Madrid, Palencia, Salamanca, Segovia, Soria, Toledo, Toro, Valladolid, Bizkaia and Zamora), 9 kingdoms (Aragon, Cordoba, Galicia, Granada, Jaen, Murcia, Navarre, Seville and Valencia), 2 principalities (Asturias and Catalonia), the City of Madrid, the new settlements of Andalusia (Sierra Morena) and the islands (the Canary Islands, Ibiza and Formentera, and Mallorca and Menorca). Excluded are the royal sites (Aranjuez, El Pardo, San Lorenzo, San Ildefonso, Balsain and Riofrio), the fortress city of Ceuta and the garrison towns of Melilla, Alhucemas and Peñon.
Source: Godoy-Larruga Census of 1797.

Figure 2. Population of Spain (% annual increase), 1850-1936.



Note: Smoothed average of the annual rates (%) of population growth.
Source: Prados de la Escosura (2016, Table 3); Population censuses.

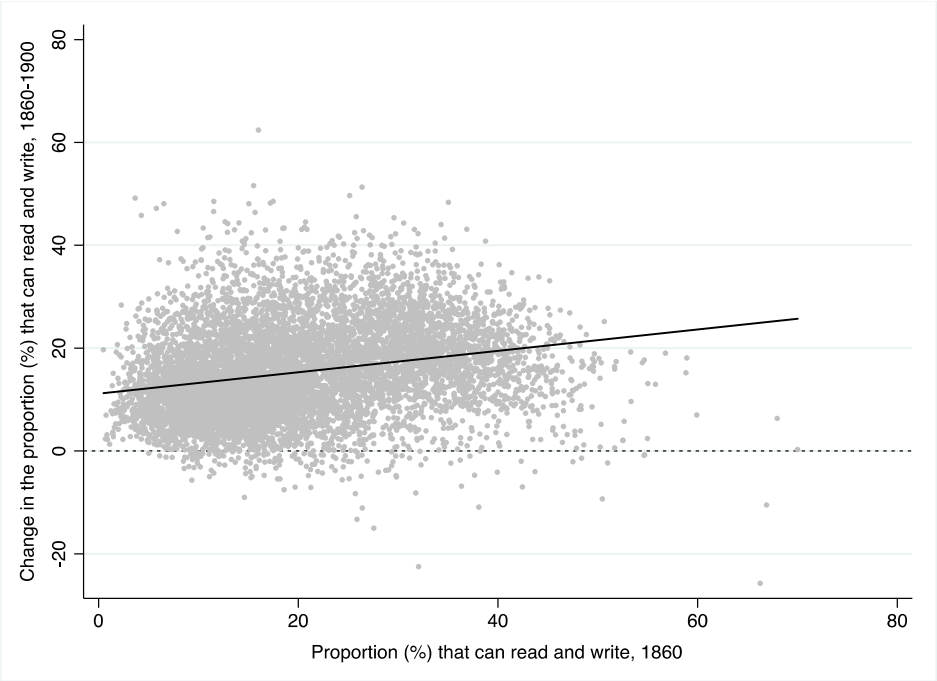
Figure 3. Histogram (% of population that could read and write), by census, 1860-1930.



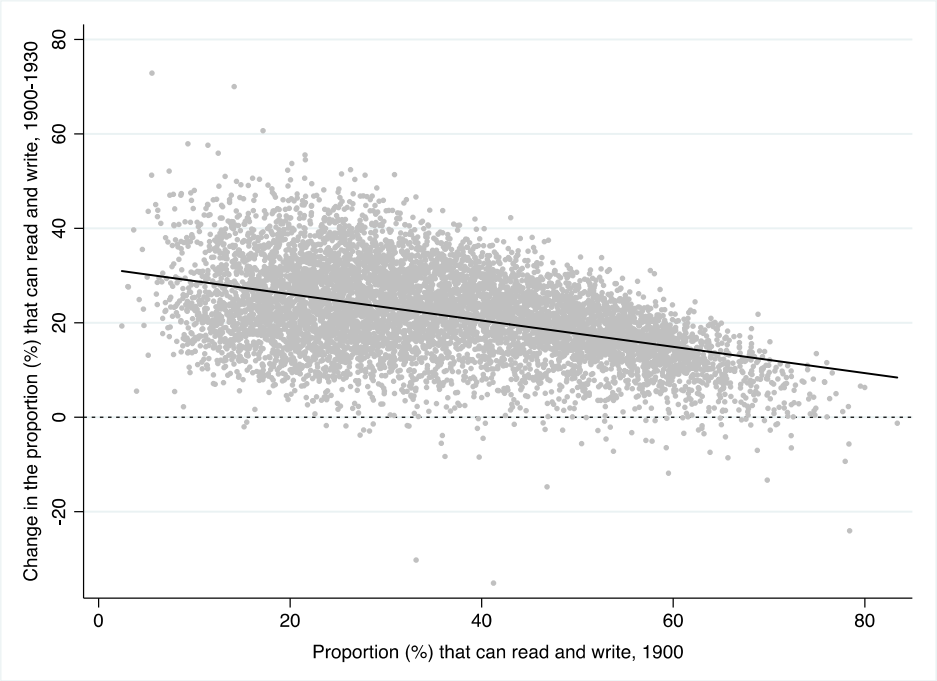
Note: The histogram distributes the municipalities into 2% bars. The weighted average for each census is marked in red.
Source: Population censuses.

Figure 4. Convergence of municipal literacy: (a) 1860-1900; (b) 1900-1930.

(a) 1860-1900



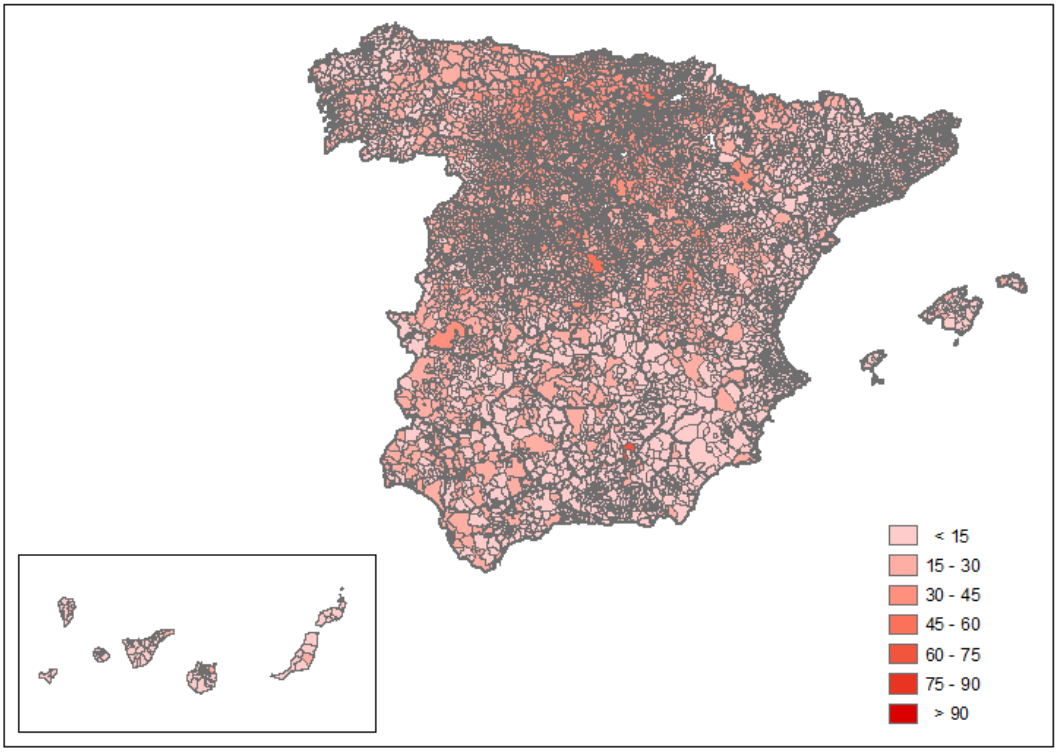
(b) 1900-1930



Note: The solid black line represents the linear fit.

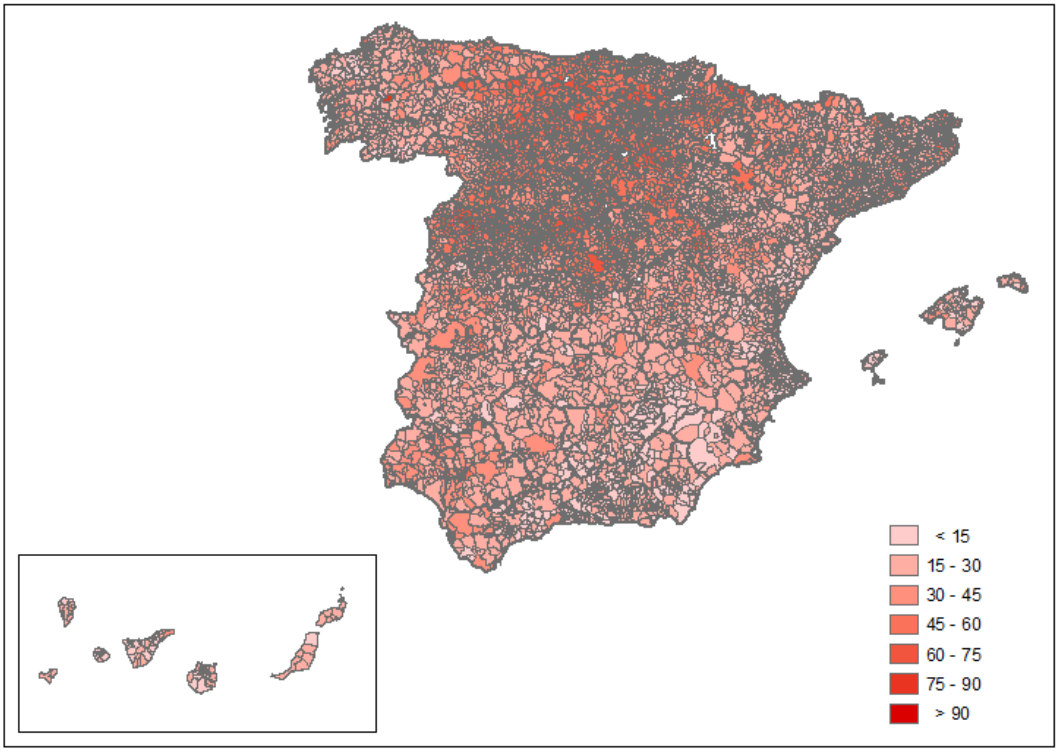
Source: Population censuses.

Map 1. Literacy rates in 1860.



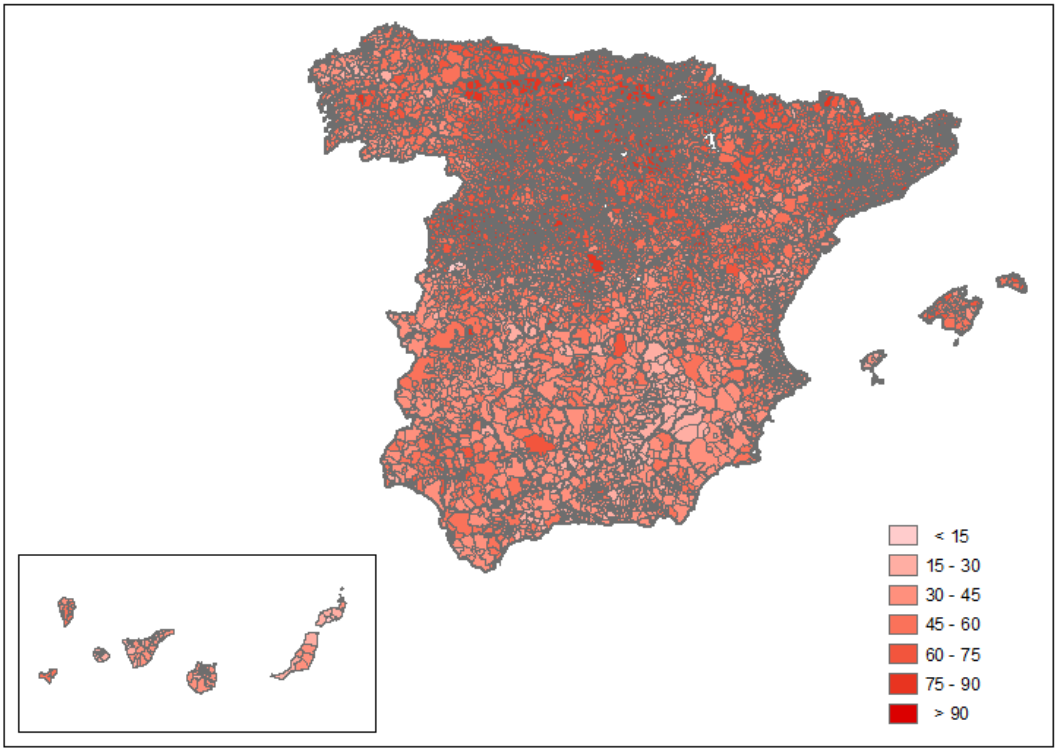
Source: Population census.

Map 2. Literacy rates in 1900.



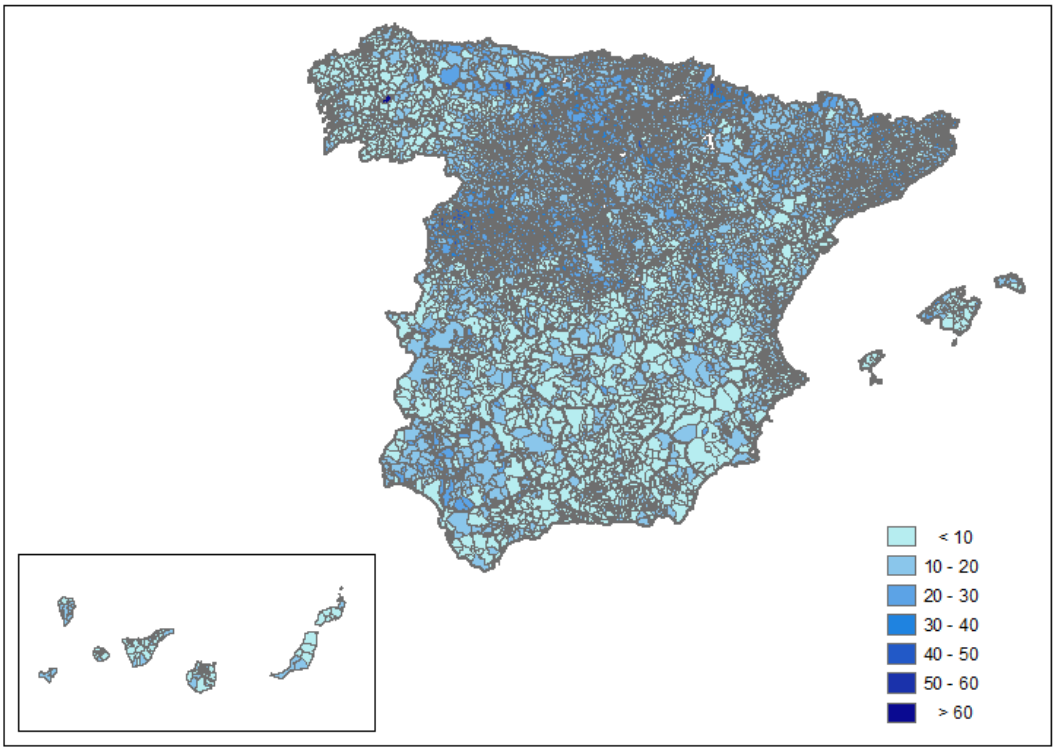
Source: Population census.

Map 3. Literacy rates in 1930.



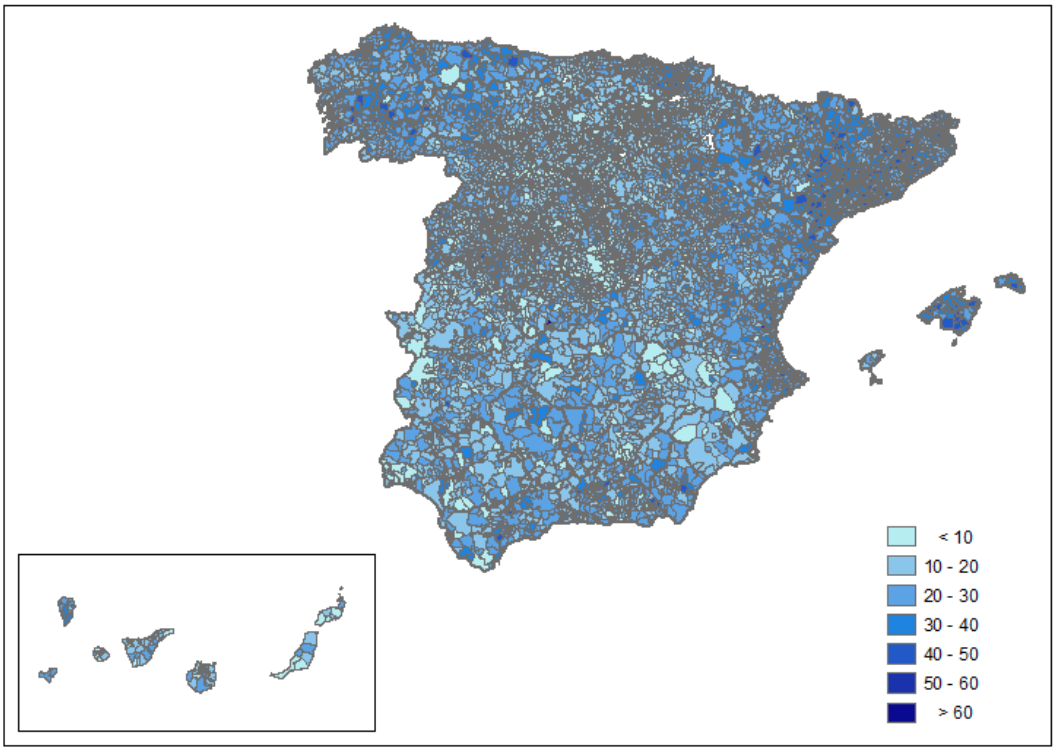
Source: Population census.

Map 4. Increase in literacy rates (percentage points), 1860-1900.



Source: Population censuses.

Map 5. Increase in literacy rates (percentage points), 1900-1930.



Source: Population censuses.

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