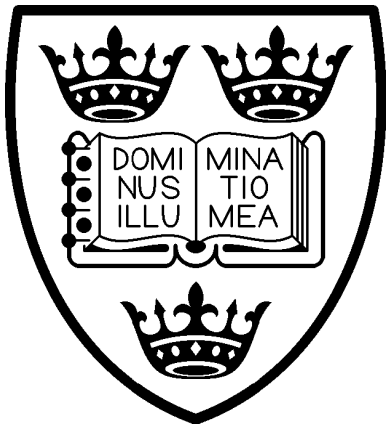

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LAND ACCESS INEQUALITY AND EDUCATION IN PRE-INDUSTRIAL SPAIN

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Land Access Inequality and Education in Pre-industrial Spain

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Abstract: By collecting a large dataset in mid-19th century Spain, this paper contributes to the debate on institutions and economic development by examining the historical link between land access inequality and education. This paper analyses information from the 464 districts existent in 1860 and confirms that there is a negative relationship between the fraction of farm labourers and literacy rates. This result does not disappear when a large set of potential confounding factors are included in the analysis. The use of the *Reconquest* as a quasi-natural experiment allows us to rule out further concerns about potential endogeneity. Likewise, by employing data on schooling enrolment rates and number of teachers, this paper explores the mechanisms behind the observed relationship in order to ascertain to which extent demand or supply factors are responsible for it. Lastly, the gender composition of the data, which enables distinguishing between female and male literacy levels, together with boys and girls schooling enrolment rates, is also examined.

1. Introduction

The relationship between inequality and human capital formation is at the core of recent research linking institutions and economic development. Glaeser et al. (2004), for instance, claim that the literature linking institutions to economic development is actually mostly capturing the effect of human capital[1]. Acemoglu et al. (2014), on the contrary, argue that a distinct effect of institutions, proxied by the rule of law index, persists even when educational levels are included in the analysis. In addition, extractive institutions are generally depicted as those that generate an unequal distribution of resources and therefore concentrate economic and political power in the hand of the elite (Acemoglu and Robinson 2012). In this regard, growing research evidences that land access inequality negatively impacts educational attainments, implying that institutions, apart from other potential channels, would be affecting long-run economic prosperity through its impact on human capital accumulation. An unequal distribution of resources is associated with extractive institutions which, in order to perpetuate the status quo, restricted the masses from accessing education (Engerman and Sokoloff 2000; Lindert 2003; Easterly 2007).

The industrialization process seems to have reinforced the link between land inequality and education by gradually increasing the return to education and the demand for human capital, especially in later stages of development (Galor 2011). Industrialization fostered migration from rural to urban areas and, while the emerging capitalist elite was in favour of supporting educational policies that would promote human capital accumulation, the interests of large landowners lay precisely on reducing the mobility of their rural labour force to keep wages low and therefore would oppose educating the masses. Where an unequal distribution of land ownership prevailed, economic and political power disproportionately accumulated in the hands of the landed elites, thus constituting a limitation to the implementation of educational policies.

This institutional account of the link between inequality and human capital has found wide empirical support[2]. Research focusing on the United States during the second half of the 19th and early 20th century evidences that land

[1] This view is shared by Gennaioli et al. (2013).

[2] There are also exceptions. Clark and Gray (2014) do not find that the rural social structure played a role in explaining variation in literacy levels in mid-19th century rural England.

inequality had an adverse effect on public investment in education (Galor et al. 2009; Ramcharan 2010; Go and Lindert 2010; Vollrath 2013). Similarly, while the Prussian landed elites seem to have opposed to mass education, the interests of upper-castes in British India appear to have contributed to low public spending on primary schooling (Cinnirella and Hornung 2013; Chaudhary 2009). Mariscal and Sokoloff (2000) also show that inequality in political power in Latin America is associated with lower levels of schooling enrolment and literacy rates. These authors argue, together with Acemoglu and Robinson (2000) and Gallego (2010), that the extension of the suffrage promoted mass schooling.

However, there has been less work done on a less institutional, and more demand-based, account of the historical link between land access inequality and education. Galor and Zeira (1993) highlight that an unequal distribution of resources, exacerbated by the presence of credit constraints present in developing economies, limits the lower classes' capacity to invest in human capital. Explaining, for instance, the disparities in educational levels across early modern Europe, Reis (2005) does not consider that the powerful landed nobility acted as a constraint to the spread of literacy. Instead, this author refers to the heavy burden that the cost of education imposed to the bottom part of the population. Employing data from 19th century Prussia, Cinnirella and Hornung (2013) find that the supply of schools and teachers was not the key mechanism explaining the link between landownership concentration and schooling enrolment rates. Peasants with higher servile duties appeared to have had scarce resources and few incentives to invest in education.

This paper contributes to this debate using the Spanish case as a historical laboratory. By employing information at the district level, this paper shows that the degree of land access inequality, measured as the proportion of farm labourers over the population engaged in agriculture, has an adverse impact on literacy rates in mid-19th century Spain. The inclusion of a large set of potential confounding factors and the use of the *Reconquest* as source of exogenous variation confirms the existence of a causal relationship between these two variables. In addition, by employing data on schooling enrolment and the number of teachers, this paper also explores the mechanisms behind the observed relationship in order to ascertain to which extent demand or supply

factors are responsible for it. While both mechanisms matter, an important part of the link between inequality and education cannot be attached to the formal educational system. Lastly, the gender composition of the data, which enables distinguishing between female and male literacy levels, together with boys and girls schooling enrolment rates, is also examined. Given that the value attached to men's and women's education, as well as the opportunity cost of boys' and girls' labour, were significantly different, examining differences by gender provides crucial insights about the mechanisms at play. Regardless of other plausible channels that we do not explore, land access inequality affected economic development via its adverse impact on education. This influence however does not only run through "institutions", as understood by the "extractive institutions" hypothesis, but also via demand effects.

The rest of the paper is organized as follows. The next section reviews the literature. While Section 3 presents the data and the methodology employed, Section 4 reports the results of the empirical analysis. Section 5 exploits the *Reconquest* as a source of exogenous variation in order to better identify the causal relationship between access inequality and education. Section 6 examines the potential mechanism behind that link and Section 7 incorporates the gender information to shed further light on the mechanisms at play. Section 8 provides some concluding remarks.

2. Conceptual framework

In pre-industrial societies, investing in education was motivated by a wide array of factors. Given that human capital had a limited role in the economy[3], Galor (2011, 473) argues that disparities in educational levels were mostly driven by social, cultural, political and institutional factors such as "religion, enlightenment, social control, moral conformity, socio-political stability, social and national cohesion, and military efficiency". As industrialization progressed throughout the 19th century, individuals and governments realized that literacy was an important skill and massively invested on it. However, the idea that

[3] Mitch (1992) shows that only a tiny fraction of the English labour force was employed in occupations demanding literacy skills during the first stages of the Industrial Revolution.

economic factors, including inequality, did not matter for education during the pre-industrial period seems at odds with historical evidence.

Households in early modern Europe were increasingly allocating resources to education and this substantial rise in literacy came hand in hand with long-term economic growth (Houston 2002; Reis 2005). By 1800, more than 60 per cent of the male population in North-Western Europe were able to read and write[4]. These skills were crucial in urban areas where complex market interactions were prevalent (De Vries and Van der Woude 1997). In rural areas, literacy was a vehicle for upward social mobility and a means to decipher official documents, such as legal charters, leases, titles of ownership, among others[5] (Reis 2005, 204-205). In addition, being able to read and write was considered an appreciated article of consumption (Mitch 1992)[6]. The increase in literacy was not the result of efforts concerted by the state or the church but arose from a bottom-up spontaneous process (Reis 2005). Although public support to mass schooling would only take place from the 19th century onwards, schools were nonetheless quite important in early modern Europe. They were financed either by local councils, the church or the families themselves by paying a fee (or a combination of the three). Private tuition at home and self- or family-education were also important vehicles for acquiring literacy skills. Literacy rates in southern Europe were much lower, in line with its relative economic standing[7]. Higher incomes therefore appear not only to have provided incentives to invest in education, but also the means to do so.

The Spanish case fits the experience of countries in Southern Europe. Although Spain enjoyed a period of prosperity during the 16th century, it was subsequently surpassed by the more dynamic regions of North-Western Europe (Allen 2003; Álvarez-Nogal and Prados de la Escosura 2013). Real wages

[4] While in England and Scotland male literacy rates were 60 and 65 per cent respectively, figures in the Netherlands, northern France and parts of Germany reached even higher values (Reis 2005, 202).

[5] The farmers' possibilities to face the threat, or the opportunity, open by enclosure, for instance, crucially depended on their ability to read the legal documents that accompanied the process (Nilsson et al. 1999). Literacy was also relatively high in rural areas where local decisions were made collectively via local assemblies (Reis 2005).

[6] Having the ability to read and write 'was an indispensable means to deriving enjoyment through their consumption for its own sake', either for one-self or as a collective activity (Reis 2005, 212).

[7] In Piedmont (Italy), for instance, average literacy was around 25 per cent (Reis 2005, 202).

stagnated during the 17th and 18th centuries and, by mid-19th century, the Spanish economy clearly lagged behind other European regions. Educational levels accordingly remained low: in 1860, only 20.1 per cent of the population was able to read and write[8], a figure in sharp contrast to what was happening in other European regions (Pamuk and Van Zanden 2010, 229). The means to acquire reading and writing skills were analogous to those in the rest of Europe: the school, the parish and the family. In this regard, the school was not the only alternative but it was the most important. In her analysis of Inquisition trials' records between 1540 and 1661, Nalle (1989, 75) finds that around two thirds of the defendants reported having become literate at school. Only 14 and 16 per cent of the respondents testified they had been taught by a village priest or by a family member (or a friend), respectively[9].

The literature has extensively analysed the causes behind Spanish backwardness in terms of literacy (Viñao 1990, 1999; Núñez 1992, 2003, 2005; Sarasúa 2002). The lack of institutional support, either religious or public, appears to have been crucial. On the one hand, and in contrast to Protestantism, the Catholic Church prevented the diffusion of literacy by rejecting popular reading of religious texts until mid-19th century[10]. In addition, religious orders did not develop a network of schools as they did in other Catholic countries such as France (Viñao 1990, 582). On the other hand, the state and municipal councils generally failed to foster schooling. In 1797, only around 23.3 per cent of the population aged 6-13 attended school (Viñao 1990, 581). During the Old Regime, schools were funded by the local council budget and the contributions of the

[8] The historical evidence indicates that literacy grew during the 16th century but it languished or even deteriorated during the 17th century (Kagan 1981; Benassar 1985; Nalle 1989; Viñao 1999). Although figures should be taken with caution, literacy rates, measured as the ability to sign one's name, were around 9 per cent in 1500 and increased to 40 per cent in 1600. By 1700, however, only 20 per cent of the population was literate, a figure which hardly changed until the late 18th century (Allen 2003).

[9] Neither the influence of religious orders or the working context seems to have had any influence. Autodidacts were also extremely rare.

[10] The Spanish Inquisition prohibited the printing, selling or possession of vernacular versions of the Bible, catechisms or other religious summaries between 1551 and 1782 (Viñao 1990, 581).

families[11]. In was only in mid-19th century when the liberal government began to timidly intervene on the educational sphere[12].

The *Moyano Act* (1857) established compulsory schooling, an education that would be free for those who could not afford it[13]. Its results, however, were disappointing. Compliance to compulsory schooling was rather limited[14]. Moreover, the funding of schooling continued to be left in the hands of local councils, so their financial difficulties, together with their attitudes to education, contributed to inadequate levels of schooling expenditures (Núñez 1991; García and Comín 1995; Sarasúa 2002)[15]. Notwithstanding other factors, such as the prevailing social, cultural and political attitudes to literacy, the low level of development also clearly constrained both the supply and the demand for education. Interestingly for our purposes in this paper, the literature has also considered the concentration of land ownership as a factor hindering the spread of education.

Spain in mid-19th century was a predominantly agrarian society. If we leave aside the cities of Madrid and Barcelona, 80 per cent of the total active population was employed in the primary sector. In this type of society, access to land was the key factor driving social stratification. Having access to a plot of land, however tiny, allowed cultivating potatoes, beans, vegetables and fruit, as well as sustaining a few animals, for home consumption. This is relevant because it not only provided a crucial income for sustaining a household but also expanded the farmers' bargaining power in their daily negotiations with the local notables.

Given a certain level of income, land access inequality can affect education through two mechanisms. Firstly, a more unequal distribution of resources

[11] Student fees were paid in cash or in kind (Sarasúa 2002). The contribution of local councils to teachers' wages was usually in cash but it could sometimes be in kind, usually board and keep.
[12] This public stimulus was partly moral and political. Public authorities (including the Church) started to see the school as a handy vehicle to indoctrinate civic and religious virtues to the masses (Viñao 1990; Sarasúa 2002).
[13] Compulsory education was restricted to children aged 9-12. The *Rivas* and *Pidal Acts* in 1836 and 1845 respectively preceded the *Moyano Act*. However, they were short-lived and hardly effective (Núñez 1992, 208-229).
[14] Given that the Act did not consider establishing fines and that labour regulation did not limit child labour, this result should not be surprising (Borrás 2002, 538). Spanish legislation only started to regulate child labour in 1873 and only in industrial occupations (Borrás 2002, 541).
[15] The number of schools and teachers was insufficient, teachers' salaries were low and material conditions poor. This also attracted less qualified and motivated professionals (Núñez 2005, 130).

pushes a larger part of the population down to subsistence levels. In this situation, the cost of education plays a key role in households' decision to invest in education. Families have to consider not only the direct cost of providing education, in form of fees, but also the opportunity cost of child labour. Child labour during this period was widespread and its contribution, either within the household or as waged-work, was indeed a crucial element as part of the reproductive strategies of Spanish households until the first decades of the 20th century (Borrás 2002; Sarasúa 2002). The need to resort to children's work, especially in rural areas, continuously appears in the contemporary reports addressing the low levels of school attendance. It is telling that, despite that the *Moyano Act* (1857) had made primary education compulsory between the ages of 6 and 9, in 1885, thirty years after the *Act* was enacted, still only around 48 per cent of children aged 6-9 was enrolled at school (Borrás 2002, 518)[16].

It is true, however, that education was not only a matter of resources but of interest. Núñez (2005, 132) argues that, while small and middle size farmers positively valued education, landless labourers, due to the lack of prospects, did not see any economic advantage from investing in it. In 1872, for instance, the minutes of the council of Belmonte de los Caballeros, in the province of Zaragoza, attached the poor attendance of boys and girls to the school to their own apathy and that of their parents (Lisón Tolosana 1966, 105)[17]. In this regard, Viñao (1990, 584) also notes that schooling provoked certain rejection in rural areas. Gabriel (1990), in contrast, argues that these attitudes were promoted by the local elites, so as schooling was perceived as the main cause behind high local taxes. Sarasúa (2002, 568) contends that, given that the sources usually describe the opinion of 'enlightened' informants and not that of the peasants themselves, it is very difficult to know whether those reports actually reflected the prejudices of these notables. The fact that attendance to school was significantly higher in winter, when the agricultural demand for work decreased is however a clear sign

[16] Absenteeism was also prevalent and it was considered a serious problem by teachers and education inspectors (Borrás 2002). However, it should be noted that, although child labour is likely to have constrained attendance to school, both were not incompatible. The combination of child labour and schooling was nonetheless easier in rural areas where the working time was more flexible and the concentration of tasks in certain seasons allowed for more free time in others.

[17] This author argues that, while the lower classes did not value it, the local notables regarded education as necessary.

of peasants' interest in sending their children to school, especially if we bear in mind that attendance usually required having to pay a fee (Sarasúa 2002, 569, 572).

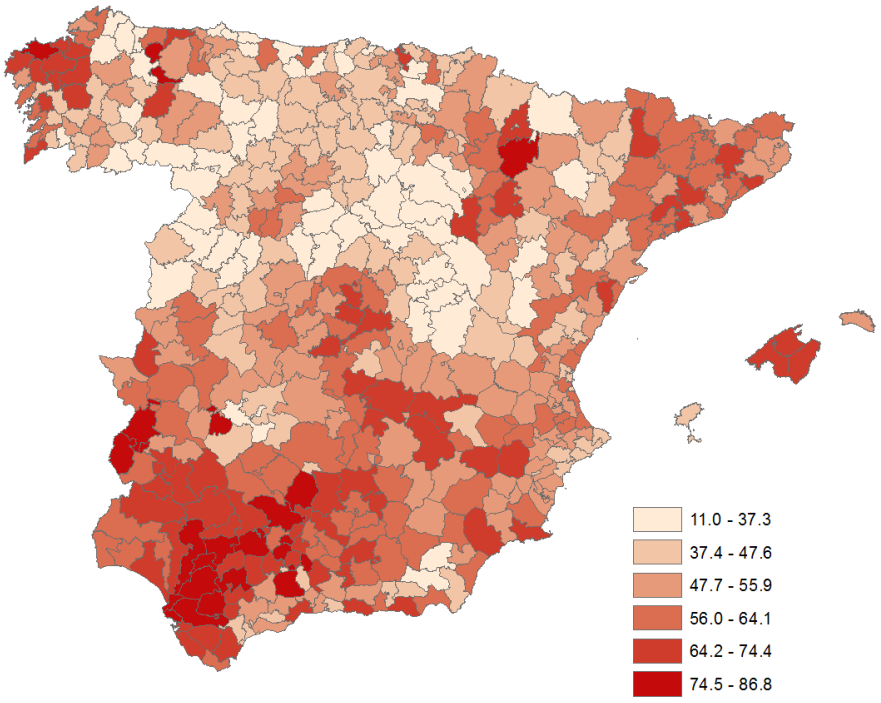
Secondly, given that the poor and working classes generally lacked the resources to invest in education, the possibility of relying on a subsidized education that would reduce the cost of schooling probably mattered. The ability and willingness of local councils were crucial when it came to support local schools. In this regard, Kagan (1981) argues that municipal councils actively funded local schools in 16th century Castile (Kagan 1981, 60; Benassar 1985, 156-159). However, the 17th century witnessed not only how households' and municipalities' finances deteriorated, but also how elites altered their attitude towards educating the masses. This coincided with a gradual proliferation of negative attitudes towards literacy (Viñao 1999, 42). Reading and writing was seen as endangering society's religious and moral health, as well as encouraging social mobility (Nalle 1989, 124). Large landowners exerted a crucial influence on the Spanish political process (Moreno-Luzón 2007; Curto-Grau *et al*. 2012), so it is thus plausible that an unequal land ownership structure affected the willingness of municipalities to fund schooling. In mid-19th century, the public support for schooling greatly varied across municipalities and regions (Núñez 1991; Sarasúa 2002, 571). Several authors have stressed the elites' lack of interest for educating the masses (Núñez 1992; Pérez Moreda 1997; Reher 1997a). Moreover, Núñez (1991) argues that those regions where landowning elites were powerful enough gave priority to secondary schooling, thus reducing the resources available for primary education.

3. Data and methodology

In order to examine whether land access inequality affected educational levels and explore the potential mechanisms behind that relationship, we have collected information at the district level using the 1860 Population Census (Dirección General del Instituto Geográfico y Estadístico 1863). Excluding the Canary Islands, this data set comprises information on 464 districts. This source provides the number of landowners, tenants and farm labourers but it does not include information on the size of the holdings. Therefore, the more adequate

measure of our variable of interest is the fraction of farm labourers over the total agricultural population. Map 1 shows the substantial geographical variation of this variable. While in some regions landless peasants were relatively rare, they constituted the majority of the agricultural population in others. The highest figures can be found in Eastern Andalusia, Extremadura and some areas of central Spain. This picture basically mirrors the contours of the *latifundia* regions described by the literature (Carrión 1932; Malefakis 1970). Parts of Galicia, the Ebro valley, Catalonia and some areas in Eastern Spain also show relatively high numbers of landless labourers.

Map 1. Land access inequality (% of farm labourers), 1860



The 1860 Population Census also contains information about the reading and writing skills of the population. Literacy in pre-industrial Spain was mostly a male and urban phenomenon (Viñao 1999; Núñez 2005). Incentives to acquire education mainly existed in urban areas where a higher number of occupations attached economic value to literacy skills (Núñez 1992; Viñao 1990). In addition, the urban environment not only offered a better access to schools, but also

provided a favourable environment for the written word (Reis 2005)[18]. In contrast, it is likely that only the local notables were able to read and write in rural areas. As we will examine later on, women were further disadvantaged in this dimension. The figures collected for 1860 Spain mostly confirm this view. Table 1 reports Spanish literacy rates by gender in 1860 distinguishing between urban and rural areas.

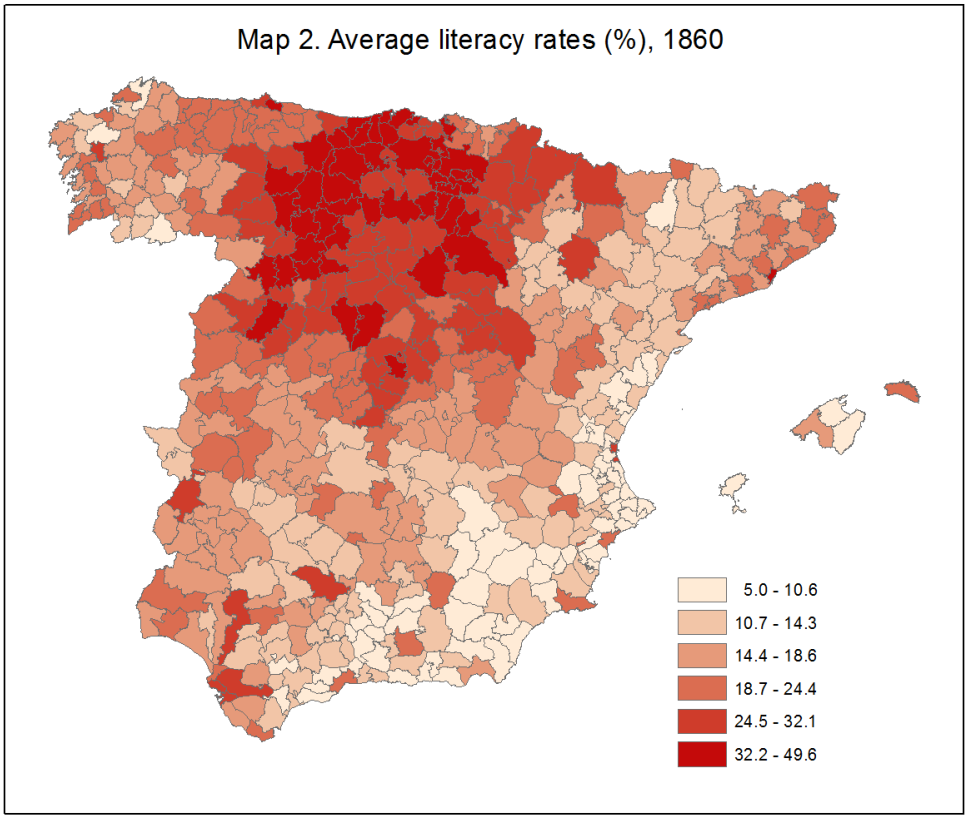
TABLE 1. LITERACY IN SPAIN, 1860

	Literacy (%)				
	All	Men	Women	Population	Manufacturing (%)
Rural districts	18.7	30.7	7.1	1,680	8.8
Madrid	50.6	64.1	37.0	298,426	25.1
Barcelona	38.8	53.3	24.3	189,948	40.5
Valencia	35.2	43.9	26.5	118,298	29.2
Sevilla	33.4	46.6	21.4	107,703	31.4

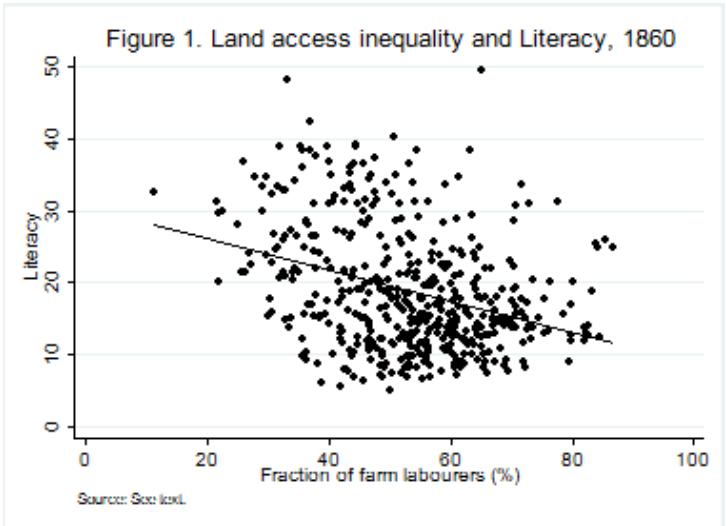
Rural districts refer to those where there are no towns larger than 10,000 inhabitants (323 rural districts in total). The figure for the population of these rural districts is the village median size. Manufacturing reflects the percentage of the active population working in manufacturing in the whole district. Source: see text.

As Núñez (1992) has already stressed by using provincial-level data, regional variations were nonetheless pronounced. Map 2, which portrays average literacy rates by districts, corroborates that picture at a more disaggregated level. In spite of having a similar legal framework across the country, educational attainment was clearly higher in Northern Spain. Remarkably, that area was not urban at all but was rather composed of dispersed small villages. The lowest levels of literacy were found in the south-eastern part of the Iberian Peninsula and in Galicia in the North West. Catalonia, the more industrialized region by far, did not enjoy especially high literacy rates.

[18] In contrast to rural areas, towns and cities enjoyed a more frequent contact with written documents as a result of continuous market exchanges and regular encounters with the authorities and the law (Reis 2005, 207).



Our hypothesis is that the degree of land access inequality is related to the level of human capital. A preliminary exploration of the data confirms that a negative association exists, as indicated by Figure 1, which plots the share of farm labourers over total agrarian population against literacy rates. This simple correlation can obviously be driven by the presence of other factors that are related to both variables. Next section therefore attempts to clarify this link by including other variables in the analysis.



4. Empirical exercise

In order to test whether land access inequality is negatively associated with education, we estimate the following model:

$$educ_i = \alpha + \beta\, land\_ineq_i + x'_i\, \gamma + \varepsilon_i \qquad \text{[Equation 1]}$$

where $educ_i$ is the district literacy rate and $land\_ineq_i$ refers to the percentage of farm labourers. While ε_i is the error term, X_i is a set of covariates that allows controlling for other factors that may challenge our identification strategy. These variables capture other dimensions of the demand and supply of education that might also be associated with land inequality. Population density, the share of urban population and the fraction of the active population employed in the manufacturing sectors aim to capture demand factors[19]. In order to further control for access to markets and urban areas, we control for distance to big cities, to provincial capitals and to the sea[20].

There are other dimensions that may also affect education. As well as in the rest of North-western Europe, the nuclear family, associated with partible inheritance, was the prevalent form of household organisation in Spain. The presence of stem family types, however, linked to impartible inheritance systems, was notable in Northern Spain. Todd (1987, 1990) argues that the family structure is crucial to understand the expansion of literacy, so a variable proxying the level of household complexity is computed[21]. Likewise, although *castellano* was the language in which education was conventionally provided, we control for the possibility that educational attainments were affected in regions where Spanish coexisted with other native languages (Catalonia, the Balearic Islands, the Basque Country, Galicia and parts of Navarra and Valencia).

A higher share of young population is likely to have put more pressure on the education system. Also, if households' resources were limited, a larger offspring limited the possibility that every child was enrolled at the school. The fraction of the population aged 0-15 over the labour force is thus included in the

[19] A higher population density also allows exploiting economies of scale in the supply of schooling.

[20] Distance is measured in kilometres and included as logs. Big cities refer to those larger than 100,000 inhabitants, namely Madrid, Barcelona, Valencia and Seville. Changing this threshold does not alter the results of the analysis.

[21] Following Reher (1997b, 31), the degree of household complexity is measured as the number of female adults (aged 26-80) per household.

model. It is nonetheless possible that the provision of education enjoyed economies of scale, thus counteracting the demographic negative effect. A more dispersed population, together with deficient communications, also militated against the extensive provision of schools. The problems derived from geographic isolation were accentuated in the rugged terrain typical of mountainous regions (Viñas 1990; Borrás 2002)[22]. In order to capture this factor, we compute the number of settlements per 100 square kilometres, as well as a measure of ruggedness.

Although the Catholic Church did not actively encourage education, as noted in section 2, it is true that in a context where scarcity of teachers prevailed, local priests usually played that role (Viñao 1999; Sarasúa 2002, 604). It is thus important to include their relative importance to understand the variation in human capital within Spain. Moreover, Beltrán Tapia (2013) has shown that the persistence of common lands, by sustaining the supply and demand for education, was related to higher level of schooling expenditures and literacy rates. The relative importance of these collective resources is therefore also considered in the model.

In addition, a dummy for the districts belonging to the Kingdom of Aragon is also taken into account. Despite the marriage of the Catholic Kings and the subsequent unification of the Crowns of Castile and Aragon (1469), both regions maintained their institutional and legal system until 1714. Aragon's home rules (*fueros*) were abolished at the end of the War of Spanish Succession due to the support that part of this region gave to the contending's candidate to the throne. This territory's own history could therefore have influenced the dimensions examined here. Similarly, the region that belonged to the old Kingdom of Navarra was also able to keep the *fueros* even longer than Aragon, so an additional dummy variable has been created to capture Navarra's peculiarities[23].

Lastly, land concentration has also been related to climate and geographical variables. The large estates characterising the *latifundio* system are prevalent in Southern Spain where rainfall is scarce and heat intense. Although

[22] In mountainous areas where population lived in disperse settlements, having to walk between 2 and 5 kilometres through impassable roads to the nearest school was discouraging to say the least, especially in times of harsh weather (Borrás 2002, 529).
[23] See Grafe (2012) for a detailed account of the legal peculiarities of these historical territories.

this is a controversial issue, it is argued that, in these conditions, land can only be efficiently cultivated in large, capital-intensive, farms[24]. A similar reasoning can be applied to the terrain: a flat terrain facilitates economies of scale. In order to account for these potential confounders, measures of altitude, ruggedness and aridity are included in the analysis. Table A.1 in the Appendix presents summary statistics of all variables employed and Table A.2 describes how these variables have been computed.

Table 2 reports the results from estimating equation 1 via OLS. While column (1) presents the baseline specification, columns (2) to (4) add the set of controls described above. These results strongly support the existence of a negative relationship between land access inequality and literacy levels. It is worth stressing that the coefficient on our variable of interest hardly changes as other potential confounders are added into the model. According to column 4, which includes the complete set of controls, a 10 percentage points increase in land access inequality implies a reduction of 1.7 percentage points in literacy rates. If we consider that literacy in the median district is 16.9 per cent, this is a sizable effect. In other words, moving from a hypothetical district occupying the 25th percentile of the distribution (43.8 per cent of farm labourers) to one in the 75th percentile (62.0 per cent of farm labourers) would reduce literacy levels by 3.1 percentile points, almost one fifth of the median literacy.

A review of the coefficients of the other variables included in the model also provides interesting insights. In this regard, a dynamic manufacturing sector appears to foster human capital. Although this is consistent with the idea that industrialists lobby to provide education for the masses, it may also point to industrial regions offering higher incomes and/or more incentives to invest in human capital[25]. While the coefficient on population density points to similar considerations, the opposite effect shown by urbanisation is likely to reflect the peculiar structure of many Spanish towns during this period. The existence of relatively large agro-towns, especially in the south of the country, appears to act against education although its effect is rather small. The interpretation of the

[24] On this debate, see Martínez Alier (1971, 23-27) and Malefakis (1970, 35-50).
[25] Becker et al. (2011) and Cinnirella and Hornung (2013) also find that Prussian industrial districts enjoy higher schooling enrolment. The British experience, on the contrary, shows a negative relationship (Mitch 1992).

variables that proxy for the distance to the market (either distance to coast, to big cities or to the provincial capital), all showing negative signs, also points to the importance of demand factors.

TABLE 2. LAND INEQUALITY AND LITERACY. OLS

	Dependent variable: Literacy (%)			
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.21***	-0.17***	-0.17***	-0.17***
	(0.03)	(0.02)	(0.02)	(0.02)
Industrialisation (%)		0.34***	0.24***	0.24***
		(0.06)	(0.05)	(0.05)
Urbanisation (%)		-0.01	-0.02**	-0.02**
		(0.01)	(0.01)	(0.01)
Population density		0.00***	0.00***	0.00***
		(0.00)	(0.00)	(0.00)
Priests (%)		12.38***	12.26***	11.58***
		(1.12)	(1.13)	(1.34)
Population aged<16 (%)		-0.14***	-0.12***	-0.11***
		(0.01)	(0.01)	(0.02)
Family type		7.52***	10.90***	11.91***
		(2.73)	(2.94)	(3.05)
Settlement pattern		-0.01	-0.01*	-0.02**
		(0.01)	(0.01)	(0.01)
Commons (%)		0.07	1.08	2.37**
		(1.18)	(1.14)	(1.18)
Non-Spanish language		-5.84***	-6.05***	-6.43***
		(0.81)	(0.78)	(0.80)
Aragon Crown		-4.89***	-5.82***	-5.21***
		(0.68)	(0.72)	(0.72)
Kingdom of Navarra		3.21	3.48	3.56
		(2.42)	(2.22)	(2.47)
Distance to coast			-0.15	-0.35
			(0.28)	(0.27)
Distance to big cities			-1.62***	-1.39***
			(0.46)	(0.48)
Distance to provincial capital			-1.65***	-1.59***
			(0.34)	(0.34)
Altitude				0.00
				(0.00)
Ruggedness				-0.01***
				(0.00)
Aridity index				0.02
				(0.02)
District area (km2)				-0.00
				(0.00)
Observations	464	464	464	464
R-squared	0.12	0.63	0.66	0.68
F test	63.26	61.27	67.53	54.31

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; For simplicity, the intercept is not reported.

As expected, a relatively large young population increases the pressure over the system and, given scarce resources, limits human capital accumulation. Interestingly, the higher presence of priests significantly fosters literacy levels. This result highlights the role that local parishes had on supplementing the supply of teachers, especially in isolated areas. Similarly, the persistence of the commons also seems to confirm recent research that shows that these collective resources provided municipalities with a crucial source of revenue to sustain schooling expenditures (Beltrán Tapia 2013)[26]. A more dispersed settlement pattern, on the contrary, limited education.

It is worth stressing that, as shown by the coefficient on family type, more complex families play a positive role. The presence of different generations within the same household may have facilitated the acquisition of literacy. Work-sharing arrangements or the transmission of knowledge within the household is likely to have increased the possibilities for children to become literate. By contrast, belonging to the old Kingdom of Aragon exerts a negative impact. Likewise, districts where Spanish coexisted with another language suffered lower literacy rates. Lastly, geographical variables, such as the aridity index, altitude, or the district area do not seem to independently affect literacy levels. Only a rugged terrain appears to be detrimental to education by increasing the costs to attend school in rural areas.

The signs of the coefficients above mostly confirm long-standing views about the reasons behind the disappointing diffusion of literacy in Spain. The literature however does not agree in ranking these variables by their relative importance (Núñez 1992). The standardised coefficients, reported in table A.3 in the Appendix, allow us to tentatively explore their relative importance. In this regard, apart from land access inequality, the presence of the Church appears to have been crucial for attaining higher literacy rates in pre-industrial Spain. On the other hand, being a non-Spanish language district, having belonged to the Kingdom of Aragon or possessing a large share of young population show a substantial negative association with educational attainments.

[26] This author also argues that the commons, by complementing household incomes, also contributed to sustain the demand for education.

Returning to the impact of our variable of interest, there exist however some issues that prevent considering the previous estimate as causal. Despite having controlled for many potential confounding factors, there is a possibility that some unobserved variable is driving both land access inequality and literacy rates. It is also plausible that the relationship runs the other way around and that literacy rates may have influenced the degree of concentration of land ownership, thus biasing the coefficient of interest. In order to overcome these concerns, next section employs the *Reconquest*, a crucial episode in Spanish history, as a source of exogenous variation.

5. The Reconquest as an instrument

In 711, a Muslim army invaded the Iberian Peninsula. The Visigothic Kingdom hardly opposed any resistance and the Muslim forces rapidly occupied the whole territory, except some mountain strips in the North. The *Reconquest* refers to the long process of expansion carried out by the Christian Kingdoms at the expense of the Muslims between the 9th and the 15th centuries. This historical episode provides a source of exogenous variation that allows identifying the causal effect of land access inequality on human capital. The Christian expansion was characterised by 'a slow and intermittent advance from one river frontier to another and was accompanied by the colonization or repopulation of the occupied territory' (O'Callaghan 2002, 19)[27]. We argue that the timing of the *Reconquest* is crucial for the type of institutions implemented in each region of the Crown of Castile, which in turn influenced the distribution of land.

It is important to stress that, although a lengthy process, the *Reconquest* was not 'a slow, steady and gradual one', but instead it 'took great leaps forward, to the Duero, the Tagus, the Guadalquivir and the south coast, and after each leap [the Christians] waited for centuries to consolidate their position before making the next one' (Lomax 1978, 175-176). The institutions defining the social appropriation of the territory in each stage depended on a complex and changing mix of factors including demographic factors, the relative power of the Crown

[27] Detailed accounts of the *Reconquest*, to whom we rely on, can be found in Lomax (1978), Moxó (1979), García de Cortázar et al. (1985), O'Callaghan (2002) and Valdeón (2006). As explained below, the characteristics of the *Reconquest* differed between the Kingdoms of Castile and Aragon.

and the nobility, the size of the conquered territory, the scale of war effort and the density and assimilability of the Moorish population. This idea is not original and can be traced back to Carrión (1932), Vicens Vives (1969) or Malefakis (1970), among others. Oto and Romero (2015) have also recently applied this reasoning using data at the provincial level. These authors argue that the conditions associated with each stage of the *Reconquest* determined the type of political and economic institutions established in each area, which in turn influenced long-run regional economic development[28].

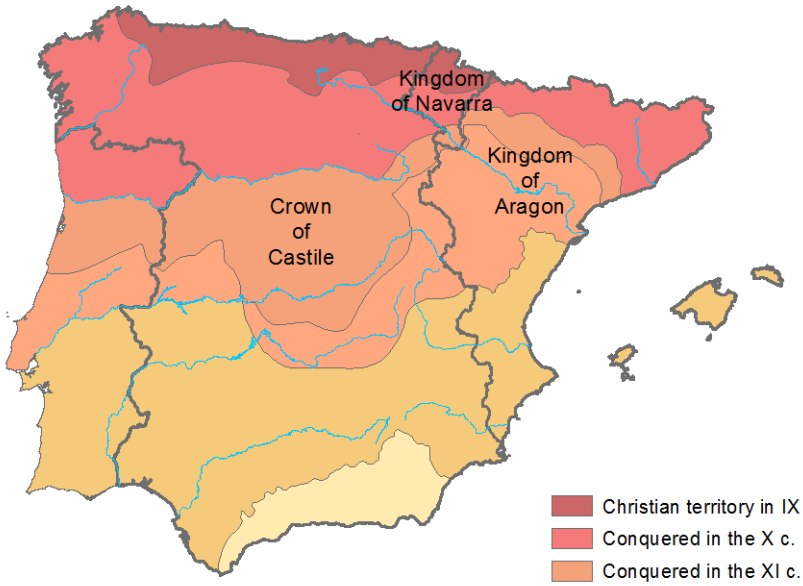
The *Reconquest* originated in a mountainous strip along the Biscay Coast in northern Spain (see Map 3). These highlanders, who were never conquered by the Muslim forces[29], possessed a rural egalitarian social organization based on local assemblies of freemen. A no-man's land stretching from the mountainous northern regions to the Duero River separated Christian and Muslim territory. During the 9th and 10th century, as the Christian population increased, the frontier slowly expanded southward to the Duero Valley. This depopulated area was resettled as a result of official initiatives and spontaneous settlements that made use of the *presura*, a legal instrument granting settlers the possession of the lands they occupied. This initial stage created both a wide layer of small holders and large domains depending on the type of settlers who exercised these rights, either small farmers, nobles or religious lords.

Some authors have argued that the *Reconquest*, understood as a conscious and planned incorporation of occupied territories, only started in the 11th century (Lomax 1978, 96; García de Cortázar et al. 1985, 91). During this second stage, when the frontier reached the Tagus River, the resettlement process was conducted by the monarch (or his agents) who offered the new settlers better legal conditions than for those settled down north the Duero. This is explained partly because of the difficulties to attract new colonists and partly because the royal intervention limited the need to resort to seigniorial contracts. Instead, the Crown delegated the resettlement task to newly established municipal councils (*concejos*). The role of these relatively democratic institutions, together with the

[28] Tur-Prats (2015), on the other hand, also argues that the timing of the *Reconquest* led to diverse land ownership structures but, given that these systems required different inheritance systems, this author uses this variation to instrument for family types.
[29] Barbero and Vigil (1988) argue that, apart from the Muslims, neither Romans nor Visigoths could effectively dominate this area.

generous privileges granted to the settlers, favoured the creation of a wide layer of small farms, which facilitated the emergence of a fairly egalitarian peasant society.

Map 3. Stages of the Reconquest



In contrast, the conquest of the vast territories between the Tajo and the Guadiana rivers was extremely fierce. After the capture of Toledo in 1085, the *Reconquest* came to a halt and, up to the early 13th century, that region was subject to continuous military operations from both sides[30]. The Christian subjugation of this territory only thus took place after a significant increase in the scale of war effort. Furthermore, partly due to the lack of urban entities and council militias in this region, the nobility and the Military Orders had the leading role in the military campaigns and the repopulation process[31]. These social groups subsequently received vast tracts of land in compensation for their

[30] The Muslims kings were helped by two successive waves of North African invaders, the Almorads and Almohads, which contributed to keep the frontier in a relative equilibrium (García de Cortázar et al. 1985, 126-127).

[31] This epoch witnessed the birth and rise of the military orders. Although some foreign military orders also participated in the *Reconquest* (Hospitallers and Templars), the process was dominated by Iberian Military Orders (the *Orden de Santiago*, the *Orden de Calatrava* and the *Orden de Alcántara*). The *encomienda* was the legal tool through which the Crown entrusted these territories to the different Orders.

services, which also included the responsibility of defending the frontier. Moreover, instead of councils, the social organization of the territory was then left to these seigneurs, either secular or religious. All these factors contributed to creating a highly stratified society.

The occupation of Andalusia, except for the Kingdom of Granada, mainly carried out in the second third of the 13th century, followed similar traits. The fighting during this stage was even fiercer than in the previous one and necessitated even more complex planning. The main difference, however, with the previous period is that the area seized in such a relatively short span was immense. The Royal Crown was unable to organize the repopulation of these territories and resorted again to the nobility and the military orders, which accumulated enormous extensions of land, especially in the countryside[32]. Also, the process of expansion stopped there for more than a century and this territory remained a frontier zone. It was not until the end of the 15th century that the Catholic Kings led a campaign that put an end to the Muslim presence in the Iberian Peninsula by conquering the Kingdom of Granada in 1492. Although the resettlement process resembles the one carried out in the rest of Andalusia, the Catholic Kings were aware of the excessive power that nobles enjoyed and subsequently tried to limit their ascendance in this last stage.

In order to incorporate the *Reconquest* as an instrumental variable for our analysis, we have created a dummy variable for each stage with a value of 1 if the district geographical centre falls within it. This strategy adds up to five stages, having the mountainous area stretching along the Biscay Coast in northern Spain as the reference category. By instrumenting land access inequality with the timing of the *Reconquest* we are assuming that each period only affected literacy levels via its effect on the land ownership structure. This is obviously a strong assumption. Apart from land access inequality, the timing of the *Reconquest* certainly shaped other dimensions of the economic and social body. Firstly, each stage resulted in different settlement patterns. While a dispersed habitat, characterized for a dense network of small villages, dominated in the North, a concentrated settlement pattern, where the population lived in large villages quite distant from each other, prevailed in the Southern part of the Peninsula

[32] The major cities, on the contrary, stayed under royal control.

(García de Cortázar et al. 1985). Secondly, Tur-Prats (2015) uses the timing of the *Reconquest* to instrument for different family types. According to this author, the small- and medium-size holding typical of the first stages of the *Reconquest* required impartible inheritance so as to secure family's continuity, which led to stem families. Farm labourers, on the contrary, were less concerned with inheritance rules, thus resulting in the predominance of nuclear family households. Lastly, some authors have argued that the downward expansion throughout the Peninsula closely matches the transition from humid to arid Spain[33]. In order to take these concerns into account, our analysis will incorporate the set of controls employed in the previous section, which include the population settlement pattern, the prevailing family type and the climatic conditions, as well as other potential confounding factors.

As mentioned above, the mechanisms that relate the different stages of the *Reconquest* with the land ownership structure only applies to the Crown of Castile. The expansion of the Kingdom of Aragon comprised the eastern part of the Iberian Peninsula and the Balearic Islands (see Map 3). The institutional context, and subsequently the way the conquered land was distributed, differed because the Crown closely managed the repopulation process, thus leaving less room to the nobles' ambitions (Vicens Vives 1969; Sobrequés 1972; Casado 2002). In addition, the area conquered by Aragon was much smaller, thus facilitating the kings' task. As a further test of our research strategy, we estimate the model separately for both Kingdoms. We expect that while the instrument will hold for the Castilian case, it will not for Aragon.

Table 3 shows the results of estimating equation 1 using the stages of the *Reconquest* as instrument. First and second stage estimates are presented in Panel B and A respectively. While column (1) reports the baseline specification, columns (2) to (4) subsequently add the set of controls explained above. Columns (5) and (6) retain the full set of controls but estimate the model only for the Crowns of Castile and Aragon respectively. As shown in Panel B, the first stage regressions confirm that the timing of the *Reconquest* is significantly related to the land ownership structure. Both the F test and the Angrist-Pischke F test evidence that the model is not weakly identified. Examining the individual

[33] On this issue, see Malefakis (1970) and Martínez Alier (1971).

coefficients of each stage is reassuring because their relative size mostly confirms the distinct effect that, as described above, the literature has attached to the institutional mechanisms underlying the social appropriation of the land in each period of the *Reconquest*. Interestingly for our purposes, the instrument does not work when applied to the Kingdom of Aragon sample in column (6)[34].

TABLE 3. LAND INEQUALITY AND LITERACY. 2SLS

	Dependent variable: Literacy (%)					
PANEL A	All	All	All	All	Castile	Aragon
	(1)	(2)	(3)	(4)	(5)	(6)
Farm labourers (%)	-0.76***	-0.56***	-0.58***	-0.65***	-0.51***	0.80**
	(0.09)	(0.06)	(0.07)	(0.08)	(0.06)	(0.39)
Socio-economic controls	NO	YES	YES	YES	YES	YES
Distance controls	NO	NO	YES	YES	YES	YES
Geography/Climate controls	NO	NO	NO	YES	YES	YES
Observations	464	464	464	464	353	111
F test	71.15	43.93	51.27	34.63	68.15	3.509
Angrist-Pischke F test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.1454

PANEL B	FIRST STAGE					
	Dependent variable: Farm labourers (%)					
Stage 1	6.25***	10.60***	9.79***	11.67***	9.48***	
	(2.20)	(2.04)	(2.21)	(2.30)	(2.36)	
Stage 2	2.69	8.62***	6.11**	9.89***	4.95	-4.53
	(2.47)	(2.69)	(3.02)	(3.04)	(3.25)	(4.38)
Stage 3	6.18**	14.15***	13.64***	15.53***	9.70***	-6.56
	(2.54)	(2.88)	(3.16)	(3.07)	(3.54)	(4.44)
Stage 4	16.25***	21.25***	19.07***	20.66***	19.47***	-9.87**
	(2.11)	(2.58)	(2.62)	(2.67)	(2.99)	(3.89)
Stage 5	10.72***	14.88***	14.58***	20.34***	14.37***	
	(2.59)	(2.88)	(2.91)	(3.10)	(3.58)	
Observations	464	464	464	464	353	111
R-squared	0.19	0.35	0.37	0.45	0.56	0.24
F test (Stage 1-5)	107.60	96.96	87.34	90.63	93.19	6.71

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; for simplicity, the intercept is not reported.

The coefficient on farm labourers in the second stage is highly significant in all first five specifications. Remarkably, as evidenced by the F test statistic, the model performs much better when the analysis focuses exclusively in Castile, which further testifies in favour of this specification. According to column (5), a

[34] Note how, in this specification, the F test collapses below the standard threshold value of 10 and the Angrist-Pischke F test cannot reject the null that the endogenous variable is weakly identified. Therefore, given that using the *Reconquest* as an instrument does not work in the case of the Kingdom of Aragon, the positive and statistically significant coefficient of farm labourers in column (6) cannot be trusted.

ten-point increase in land access inequality reduces literacy rates by 5.1 percentage points. The IV estimation is three times larger than the OLS result, which is in line with what has been found in similar analysis employing instrumental variables (Easterly 2007; Ramcharan 2010; Cinnirella and Hornung 2013). Returning to our previous hypothetical situation, moving from the 25th to the 75th percentile of the land inequality distribution (from a 43.8 to a 62.0 per cent of farm labourers) would imply a literacy rate 9.3 percentile points lower, well above half of the median literacy at that time which was 16.9 per cent. It appears that Sánchez Albornoz (1977, 723-726) was indeed right in considering the *Reconquest* as the key to the history of Spain[35], at least regarding the structure of land ownership that arose from it. However, did the high concentration of land ownership negatively influence the provision of education because the rural oligarchies blocked the expansion of schooling or, alternatively, did land inequality just limited the demand for education among the lower classes? The next sections attempt to disentangle the mechanisms behind the observed relationship.

6. Mechanisms: Supply or demand?

As explained in section 2, an unequal land property structure may have affected education via different channels. On the one hand, higher levels of inequality broaden the bottom part of the population, a social class who possess fewer resources, and possibly less incentives, to invest on education. On the other hand, an unequal land structure also implies a more concentrated economic and political power in the hands of large landowners. These local notables, who control municipal offices, may limit schooling so as to preserve their privilege status.

In order to explore the channels through which land access inequality affected educational attainments, we first re-estimate equation 1 by adding an interaction term of our variable of interest with urbanisation levels. Given that the instrumental variable strategy is only suitable for the Castilian Crown, we restrict the analysis to that particular sample of districts. Table 4 reports the

[35] Also in Mackay (1977, 1-3) and Lomax (1978, 1). These authors however rather stress the role of the *Reconquest* on creating the economic, social and political structures that would allow Spain to build a global empire after 1492.

results of this exercise. Our baseline specification, in column 1, employs the timing of the Reconquest as an instrument and includes the complete set of controls[36]. Column (2) adds the interaction term. The estimated coefficients show that the negative relationship between land inequality and literacy is higher in rural areas and weakens as urbanization proceeds. It is interesting to note that although the impact of living in cities appears to be somewhat small, the negative impact of land access inequality would actually disappear if all the population lived in cities larger than 10,000 inhabitants[37].

TABLE 4. LAND INEQUALITY, LITERACY AND URBANISATION. 2SLS

	Dependent variable: Literacy (%)	
	(1)	(2)
Farm labourers (%)	-0.51***	-0.59***
	(0.06)	(0.08)
x Urbanisation (%)		0.006***
		(0.001)
Observations	353	353
F test	68.15	74.03
Angrist-Pischke F test (p-value)	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include the whole set of controls.

This exercise in itself does not provide enough distinct support for any of the mechanisms referred to above. On the one hand, by offering a wider range of working opportunities, more urbanized regions not only increase the incentives to invest in education but it may also provide the means to do so by providing higher incomes and securing a less seasonal source of employment. On the other hand, in more developed areas, landowning status is not the only way to acquire political power, so political competition may imply that more resources are devoted to educate the lower classes.

In order to further examine these links, we have collected information on the rates of schooling enrolment and the number of teachers. Although these variables attempt to proxy for demand and supply considerations respectively, both are however endogenous: a larger supply of teachers may encourage more children to attend school and, alternatively, higher schooling enrolment rates

[36] It is therefore the same specification as in column (5) in Table 3. The direct effect of urbanization levels on literacy is thus already accounted for.

[37] A 100 p.p. increase in the urbanization rates would wholly overcome the negative impact of land concentration.

may push for more teachers. Nevertheless, including them in the analysis, and examining how the coefficients change depending on whether these variables are considered or not, is highly informative. If the effect of inequality on literacy rates worked through differences in schooling enrolment or the supply of teachers, including these variables in the analysis would make the coefficient on inequality tend to zero. If, on the contrary, the effect persists, it would evidence that the formal education system was not the mechanism through which land inequality influenced education. Table 5 repeats the previous analysis but controlling for these variables. In contrast to the baseline specification in column (1), columns (2) and (3) include schooling enrolment and the number of teachers respectively, and column (4) considers both variables at the same time. To further investigate differences between rural and urban districts, Panel B replicates the exercise but adding a term that interacts our variable of interest with urbanization rates.

TABLE 5. LAND INEQUALITY AND LITERACY. SUPPLY AND DEMAND. 2SLS

PANEL A	Dependent variable: Literacy (%)			
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.51***	-0.26***	-0.41***	-0.25***
	(0.06)	(0.05)	(0.06)	(0.06)
Schooling enrolment (%)		0.26***		0.24***
		(0.03)		(0.03)
Teachers (‰)			1.02***	0.35
			(0.29)	(0.26)
Observations	353	353	353	353
F test	68.15	88.47	70.42	83.34
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable: Literacy (%)			
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.59***	-0.30***	-0.45***	-0.29***
	(0.08)	(0.06)	(0.08)	(0.07)
x Urbanisation (%)	0.006***	0.003***	0.004***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Schooling enrolment (%)		0.27***		0.26***
		(0.03)		(0.03)
Teachers (‰)			0.92***	0.16
			(0.31)	(0.27)
Observations	353	353	353	353
F test	74.03	91.11	70.33	85.81
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include the whole set of controls.

The first conclusion from this exercise is that, when schooling enrolment rates and the stock of teachers are considered, the coefficient on land access inequality on literacy rates fall but only by around a half and remains highly statistically significant[38]. In other words, once the effect of formal schooling is taken into account, more unequal districts also suffered lower literacy rates. This implies that inequality did not only affect human capital accumulation via formal schooling, but also through other channels. Apart from other channels, this finding crucially points to the importance of demand factors to explain this relationship and is consistent with research done on this issue for early modern Europe (Reis 2005). It is likely that in more equal regions, families had more room, and perhaps more interest, to devote time to learn reading and writing skills within the household, a process that would reinforce itself over time. As evidenced in Panel B, the effect of land access inequality after having controlled for the effect of the formal educational system is stronger in rural areas and gets reduced as districts become more urbanized. In this regard, compared to column (1), the coefficient on the interaction term is also cut by half in column (4), evidencing that urbanization affected the relationship between inequality and education through two different channels: fostering, on the one hand, schooling enrolment and/or the supply of education and via, on the other hand, more informal mechanisms.

Instead of using literacy rates as the dependent variable, we now test whether land access inequality directly affected schooling enrolment rates and the supply of teachers. Results are reported in Table 6, which again includes a second panel to separate its effect on rural and urban regions. Panel B is actually highly revealing. The fraction of farm labourers is shown to have a significant negative impact on both schooling enrolment rates and the stock of teachers. The effect is actually quite large. In relative terms, a one standard deviation increase in land access inequality reduces schooling enrolment and the stock of teachers by 0.90 and 0.74 standard deviation respectively (see table A.7 in the Appendix). This effect is reduced, but it does not disappear, when either schooling

[38] This reduction appears to be largely driven by the inclusion of schooling enrolment. When both schooling enrolment and teachers are included in column (4), the coefficient on farm labourers is almost identical to the one in column (2) when only schooling enrolment was considered. The reduction caused by the inclusion teachers, as shown in column (3), is smaller. Standardised coefficients are reported in table A.6 in the Appendix.

enrolment or teacher's supply are included as controls. It seems however that while an important fraction of the effect of inequality on schooling enrolment is not explained by supply factors, the impact on the number of teachers mostly rests on its relationship with the numbers of students enrolled in primary education.

TABLE 6. LAND INEQUALITY, SCHOOLING ENROLMENT AND TEACHERS. 2SLS

Panel A	Dependent variable			
	Schooling enrolment (%)		Teachers (‰)	
	(5)	(6)	(7)	(8)
Farm labourers (%)	-0.84***	-0.58***	-0.08***	-0.03
	(0.13)	(0.11)	(0.02)	(0.02)
Schooling enrolment (%)				0.06***
				(0.01)
Teachers (‰)		2.96***		
		(0.450)		
Observations	353	353	353	353
F test	20.89	34.74	27.78	37.92
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

Panel B	Dependent variable			
	Schooling enrolment (%)		Teachers (‰)	
	(5)	(6)	(7)	(8)
Farm labourers (%)	-0.94***	-0.57***	-0.11***	-0.05*
	(0.16)	(0.14)	(0.02)	(0.03)
x Urbanisation (%)	0.007***	0.003	0.001***	0.001***
	(0.002)	(0.002)	(0.000)	(0.000)
Schooling enrolment (%)				0.06***
				(0.01)
Teachers (‰)		2.97***		
		(0.47)		
Observations	353	353	353	353
F test	19.22	33.76	27.87	38.08
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include the whole set of controls.

Examining the coefficients on the interaction term is also instructive. As with literacy rates, the relationship between land access inequality and these educational variables is larger in rural areas and weakens in more urban districts. Interestingly, the mechanisms through which urbanization seems to have affected schooling enrolment and the number of teachers varied for each variable. In the case of schooling enrolment, including teachers as controls

eliminates its positive influence, thus suggesting that urbanization is exerting an effect primarily via supply factors. This is confirmed when analysing its effect on the number of teachers: the interaction term continues to have the same impact on the dependent variable even when schooling enrolment is included in the model. Apart from demand considerations, which have been shown to be extremely important, this result evidences the importance of supply factors in rural areas, a role that significantly declines in more urban districts. Large cities clearly helped breaking the power of local notables to affect the supply of education. Living in these same cities however did not significantly facilitate school attendance for the lower classes in comparison to their rural peers.

7. Land access inequality, gender and education

Women were substantially less literate than men everywhere in early modern Europe (Houston 2002, 21). The value attached to educating boys and girls differed due to prevailing attitudes regarding the nature of the female sex and what girls should learn[39]. Subject to a subordinate position, the intra-household allocation of resources was therefore biased against girls, a situation that was exacerbated in case of scarcity. Discrimination against women was even more pronounced in Catholic countries (Benassar 1985; Houston 2002, 22)[40]. The literacy gender gap in Spain was actually larger than in other European countries (Nalle 1989; Núñez 1992; Viñao 1999). In this regard, while 30 per cent of men were able to read and write, only 8 per cent of women were literate in 1860. The differences in schooling enrolment rates for boys and girls were not that extreme but still show a considerable gender bias[41]. This disparity did not only pertain to the raw numbers, but also to the type of education that was traditionally taught.

[39] 'Men conventionally describe females as intellectually and morally inferior, endowed with less reason than men, easily influenced and thus in need of strong guidance' (Houston 2002, 21). Women's role in society was restricted to the domestic sphere as 'a dutiful daughter, obedient wife and careful mother'. Virginia Woolf's famous quote in *A Room of One's Own* reflects the narrow possibilities that were open to women outside her household: 'Any woman born with a great gift in the 16th century would certainly have gone crazed, shot herself, or ended her days in some lonely cottage outside the village, half witch, half wizard, feared and mocked at' (quoted by Howe, 2008, ix).

[40] In this regard, Praz (2006) finds that Catholic cantons in Switzerland showed lower levels of investment in girls' education between 1860 and 1930.

[41] By the end of the 18th century, the Census of Godoy (1797) estimates that around 35 and 9 per cent of school-aged boys and girls attended school respectively (Guereña and Viñao 1996). In 1860, the gender gap was less pronounced: schooling enrolments rates for boys and girls were 42.3 and 28.7 per cent respectively.

Although the situation gradually improved during the 19th century, schools for girls were not supposed to teach reading and writing skills at the end of the 18th century, but only domestic skills and religious and moral values (Viñao 1999, 52; Sarasúa 2002, 552)[42]. The problem was even worse in earlier periods when schools were almost exclusively restricted to boys, thus confining girls' (scarce) education to the domestic realm[43]. This discrimination reflects the cultural atmosphere dominating the Spanish society at that time (Vollendorf 2005; Howe 2008)[44]. It is only at the end of the 18th century when some regions started to create public schools for girls[45]. In 1847, still more than half of the Spanish municipalities did not have a school for girls (or a mixed school otherwise), a problem which was especially severe in small villages (Sarasúa 2002, 558-559). In addition, public support for girls' schools was also lower in terms of funding[46].

The gender composition of the data, which enables distinguishing between female and male literacy levels, together with boys and girls schooling enrolment rates, sheds further light on the issues examined here. In order to exploit this information, we first analyse the effect of land access inequality on male and female literacy. This exercise does not only allows examining differences by gender, but it provides insights about the mechanisms at play because the value attached to men's and women's education, and the opportunity cost of boys' and girls' labour, were markedly different. As noted above, influenced by the dominant patriarchal system, many families that sent their sons to school did not

[42] The 19th century witnessed some changes in this regard but the general attitudes to what girls should learn remained highly retrograde (Sarasúa 2002, 598-604).

[43] Only the nobility and the administrative elites entrusted their daughters' education to convents (Viñao 1999; Howe 2008). Most literate women, however, had been educated at home (Nalle 1989, 75)

[44] The influential Juan Luis Vives' *Instrucción de la mujer cristiana*, published in the 16th century, became the principal conduct book for the education of women and girls during early modern Spain. This author prescribed women and girls to stay at home to protect their virtue and advocated that there is 'no need for eloquence in a woman since nature has dictated silence and subservience as her role' (Howe 2008, 101-102). See Howe (2008, 99-103) for a detailed account of this author's prescriptions. The submissive wife as the feminine ideal was also portrayed in Fray Luis de León's *The perfect wife* and other moralist writings of this period (Vollendorf 171-172).

[45] Segregating boys and girls was considered the morally acceptable way of schooling (Viñao 1990; Sarasúa 2002).

[46] In mid-19th century, while 18.2 per cent of the schools for boys completely relied on private funding, this figure reached almost half of the schools for girls (Sarasúa 2002, 579). This author estimates that only 15.5 per cent of the total municipal expenditures on primary education were devoted to the schooling of girls (582). In summary, gender discrimination resulted in either three possibilities: there was no school for girls; when there was one, it was private; and if there was a public school for girls, it received less funding than those for boys.

consider that doing the same for their daughters was worthy (Núñez 1992, 249; Sarasúa 2002, 591)[47]. Although sometimes boys and girls indistinctly helped with some agricultural tasks, a gendered division of labour was in place, especially at older ages (Borrás 2002; Sarasúa 2002). In rural areas, while boys were fully devoted to agricultural tasks, girls' involvement in agriculture was mostly part-time and seasonal[48]. They were mainly employed in housekeeping tasks, textile-related occupations and the service sector[49].

Table 7 reports the results of estimating the relationship between land access inequality and male and female literacy following the same structure as in previous exercises. Given that Panel B is more informative, we focus on the coefficients depicted there. Distinguishing by gender and taking into account the diminishing influence of urbanisation on the effect of land access inequality gives a still more powerful account of the processes at play. According to column (1) and (5), land access inequality negatively influenced men's and women's literacy levels, an effect that was reduced in rural areas. Hypothetically moving from the 25th to the 75th percentile of the land access distribution would reduce literacy rates by 18.4 and 2.5 p.p. for men and women respectively. Although the effect is almost seven times higher for men, this is partly due to higher male literacy rates[50]. In any case, the standardized coefficients also show that, in relative terms, the effect is almost three times larger (see Table A.8 in the Appendix). Urbanisation had a positive influence on the relationship between land inequality and literacy for both sexes but it seems that men actually benefited more from urban contexts than women[51].

[47] A report from 1900 complains about the widespread opinion that women do not need education to fulfil their mission: to serve God, housekeep and obey their husbands (Núñez 1992, 249). Women could not access many occupations or attend secondary and tertiary education (Sarasúa 2002, 608-609). They were not actually recognized as legal subjects by the law, so they did not have the legal right to make free use of their earnings, nor they could defend themselves in a trial, without permission of their fathers or husbands.

[48] Girls could also carry out cattle rearing tasks (Borrás 2002).

[49] Sarasúa (2002, 573-574) argues that girls enjoyed less flexibility because they also had to help their mothers at home, not only with housekeeping, but also by taking care of their siblings, thus increasing the girls' opportunity cost to attend the school.

[50] The district median literacy is 27.4 and 6.6 per cent for men and women respectively.

[51] According to columns (1) and (5), to wholly overcome the negative impact of land inequality on literacy, urbanisation had to increase by 101 p.p. for men and 140 p.p. for women (whose coefficient is only significant at the 10 per cent level).

TABLE 7. LAND INEQUALITY AND LITERACY BY GENDER. 2SLS

PANEL A	Dependent variable: Literacy							
	Men (%)				Women (%)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Farm labourers (%)	-0.85***	-0.34***	-0.66***	-0.33***	-0.13***	-0.05	-0.11***	-0.06
	(0.10)	(0.08)	(0.10)	(0.09)	(0.04)	(0.03)	(0.04)	(0.04)
School enrol., boys (%)		0.38***		0.33***				
		(0.04)		(0.04)				
School enrol., girls (%)						0.17***		0.17***
						(0.02)		(0.02)
Teachers (‰)			1.93***	0.88**			0.289	-0.128
			(0.42)	(0.34)			(0.18)	(0.18)
Observations	353	353	353	353	353	353	353	353
F test	60.64	98.59	66.38	92.50	73.54	111.0	72.10	100.1
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable: Literacy							
	Men (%)				Women (%)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Farm labourers (%)	-1.01***	-0.39***	-0.73***	-0.37***	-0.14***	-0.04	-0.11*	-0.07
	(0.13)	(0.10)	(0.13)	(0.10)	(0.04)	(0.04)	(0.05)	(0.05)
x Urban.	0.010***	0.004***	0.007***	0.004**	0.001*	0.001	0.001	0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
School enrol., boys (%)		0.39***		0.35***				
		(0.04)		(0.04)				
School enrol., girls (%)						0.17***		0.18***
						(0.02)		(0.02)
Teachers (‰)			1.75***	0.68*			0.29	-0.18
			(0.45)	(0.35)			(0.20)	(0.20)
Observations	353	353	353	353	353	353	353	353
F test	70.9	100.9	68.8	94.0	71.7	122.3	70.2	106.3
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include the whole set of controls.

Including schooling enrolment rates and the stock of teachers in the model provides further insights into the mechanisms at play. In the case of men, although accounting for these variables significantly reduces the impact of land inequality on literacy, it still leaves some room for a negative effect outside the formal educational system. For women, the effect disappears, thus implying that the negative influence of land access inequality takes place via its effect on formal education. This evidence suggests that, even where the situation of the working poor was better, those same demand factors that were promoting male literacy were not having an effect on female literacy due to women's status

within society. Only the spread of the public school system was slowly able to incorporate girls as well as boys by reducing the cost of education and encouraging attendance. In addition, the positive influence of the interaction term, which is still visible for men when the variables capturing the formal education systems are included, also vanishes in the women's case. Again, it seems that the role of urbanisation on the relationship between land access inequality and women's education was mainly channelled via the formal education system. In contrast, there still was some room for an effect on men's literacy outside the formal educational system.

Lastly, in Table 8, we test whether there are differences regarding the effect of the land ownership structure on schooling enrolments by gender. According to columns (1) and (3), both boys' and girls' attendance to school is influenced by land inequality. The effect is again higher for boys: in relative terms, while one standard deviation increase in land access inequality reduces schooling enrolment rates for boys by 1.04 standard deviations, the reduction is 0.55 standard deviations for girls (see Panel B in Table A.9 in the Appendix). Although taking into account the supply of teachers in columns (2) and (4) reduces both coefficients, the relative fall is larger for girls (whose coefficient is weakly statistically significant as well) [52] . This further suggests that demand considerations were relatively more important in the case of boys.

The differences do not end there because, while being a more urban district reduces the overall influence of land inequality on boys' schooling enrolments, urbanisation hardly had an effect on girls' school attendance. Furthermore, when the influence of teachers is added to the model, the positive effect of urbanisation does not completely disappear in the case of boys, an effect that was not significant for girls but that it gets reduced even more. This result points in the same direction: having a more equal land ownership structure helped fostering boys' and girls' school attendance but demand factors played a larger role in the case of boys.

[52] The estimated coefficients in columns (2) and (4) are 66.4 and 43.4 per cent of those in columns (1) and (3) respectively.

TABLE 8. LAND INEQUALITY AND SCHOOLING ENROLMENT. 2SLS

PANEL A	Dependent variable: Schooling enrolment			
	Boys (%)		Girls (%)	
	(1)	(2)	(3)	(4)
Farm labourers (%)	-1.17***	-0.85***	-0.50***	-0.29***
	(0.16)	(0.14)	(0.12)	(0.11)
Teachers (‰)		3.50***		2.43***
		(0.61)		(0.48)
Observations	353	353	353	353
F test	25.48	38.23	21.13	35.61
A-P F test	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable: Schooling enrolment			
	Boys (%)		Girls (%)	
	(1)	(2)	(3)	(4)
Farm labourers (%)	-1.34***	-0.89***	-0.53***	-0.23*
	(0.20)	(0.19)	(0.15)	(0.14)
x Urbanisation (%)	0.012***	0.006**	0.003	-0.001
	(0.003)	(0.003)	(0.002)	(0.002)
Teachers (‰)		3.41***		2.56***
		(0.65)		(0.49)
Observations	353	353	353	353
F test	23.40	36.71	20.05	36.03
A-P F test	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include the whole set of controls.

8. Conclusion

Land access inequality exerted a large negative influence on educational attainments in pre-industrial Spain. As well as a story of "extractive institutions" where landowning elites limited the provision of education, this paper shows that demand factors were also crucial. Where land ownership was highly concentrated, the economic situation of the rural poor was extremely precarious and investing on education was beyond the budget constraints of large segments of the population. Moreover, the incentives to acquire literary skills were limited because the possibilities of upward mobility were almost non-existent. In addition, by controlling local offices in rural areas, large landowners were able to restrict public support for education. In more urbanised regions, however, landowning elites faced the competition of other elites and the provision of primary education was consequently higher. Given the opportunity costs of acquiring education, demand factors nonetheless continued to be crucial in

urban contexts where the working poor was still disadvantaged. Furthermore, due to the prevailing attitudes towards women in general, and women's education in particular, the demand factors that help fostering boys' schooling had a much smaller effect on girls' access to education. Only areas where a relatively more balance land access fostered public support for primary schooling showed some improvements in the educational attainments of girls and women. This paper therefore adds another dimension to the 'agrarian question' as a fundamental problem for economic development. Apart from generating a dysfunctional structure of incentives that reduced investments on labour-saving technologies and fuelled social conflict in the countryside, the concentration of land ownership acted as a formidable barrier for human capital accumulation.

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Appendix

Table A.1. Summary statistics

	Obs.	Mean	St. Dev.	Min.	Max.
Farm labourers (%)	464	53.14	13.29	11.02	86.80
Literacy (%)	464	18.96	8.421	4.960	49.55
Literacy, men (%)	464	30.27	13.55	8.008	64.03
Literacy, women (%)	464	8.031	5.463	0.431	40.40
Schooling enrolment (%)	464	35.57	14.11	1.470	82.88
Schooling enrolment, boys (%)	464	42.31	17.44	2.511	95.75
Schooling enrolment, girls (%)	464	28.66	13.35	0.396	69.69
Teachers (‰)	464	3.645	2.017	0.377	18.51
Urbanisation (%)	464	16.43	27.67	0	100
Industrialisation (%)	464	10.37	6.461	0.965	64.37
Population density	464	63.42	283.3	3.730	5,502
Population aged<16 (%)	464	86.22	18.45	29.77	164.0
Settlement pattern	464	30.71	46.34	1.127	293.9
Family type	464	1.025	0.142	0.750	1.573
Commons	464	0.219	0.216	0	0.75
Priests (%)	464	0.637	0.330	0.182	2.125
Distance to big cities	464	197.8	122.2	4.360	537.0
Distance to provincial capital	464	44.05	23.88	1.080	129.6
Distance to coast	464	103.2	89.84	0.330	356.2
Aridity index	464	50.02	28.29	15.82	307.1
Altitude	464	571.0	343.4	2	1,915
Ruggedness	464	179.1	114.9	6.530	706.9
District area (km2)	464	1,079	686.0	13	4,225

Source: See text.

Table A.2. Description of the variables employed

Farm labourers (%)	Importance of farm labourers over the active agricultural population.
Literacy (%)	Percentage of population able to read and write.
Literacy, men (%)	Percentage of men able to read and write.
Literacy, women (%)	Percentage of women able to read and write.
Schooling enrolment (%)	Percentage of students enrolled in primary education over the schooling-age population (6-15).
Schooling enrolment, boys (%)	Percentage of boys enrolled in primary education over the schooling-age population (6-15).
Schooling enrolment, girls (%)	Percentage of girls enrolled in primary education over the schooling-age population (6-15).
Teachers (‰)	Fraction of teachers over the active population (per thousand)
Urbanisation (%)	Percentage of population living in towns larger than 10,000 individuals.
Industrialisation (%)	Fraction of the active population working in manufacturing.
Population density	Total population divided by district area.
Population aged<16 (%)	Percentage of population younger than 16 over the active population.
Settlement pattern	Settlements per 100 km2. Settlements are *Ciudades*, *villas*, *lugares*, *aldeas* and *caserios* taken from the 1860 *Nomenclator*.
Family type	Number of female adults (aged 26-80) per household.
Commons (%)	Fraction of common lands over the total district area. Taken from the *Catálogo de Montes Públicos* (1860).
Priests (%)	Percentage of priests over the active population.
Distance to big cities	Distance from the district centroid to the nearest city bigger than 100,000 inhabitants (in km). Four cities fulfil that criterion: Madrid, Barcelona, Seville and Valencia.
Distance to provincial capital	Distance from the district geographical centre to the provincial capital (km).
Distance to coast	Distance is computed from the district geographical centre (centroid) to the nearest coastline (in km).
Aridity index	Average rainfall divided by average temperature. The climate information refers average temperature and average rainfall during the period 1950-2000. The WorldClim 1 kilometre digital data can be found in Hijmans et al. (2005) (http://www.worldclim.org/).
Altitude	Median altitude in each district using the SRTM 90-meter resolution digital elevation data (http://srtm.csi.cgiar.org).
Ruggedness	Standard deviation of altitude.
District area (km2)	District area (km2).

Source: 1860 Population Census except when stated otherwise. The geographical data have been computed using ArcGIS.

TABLE A.3 LAND INEQUALITY AND LITERACY. OLS. STANDARDISED COEFFICIENTS

	Dependent variable: Literacy (%)			
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.34***	-0.26***	-0.26***	-0.27***
Industrialisation (%)		0.26***	0.19***	0.19***
Urbanisation (%)		-0.04	-0.07**	-0.07**
Population density		0.12***	0.09***	0.07***
Priests (%)		0.49***	0.48***	0.45***
Population aged<16 (%)		-0.31***	-0.27***	-0.24***
Family type		0.13***	0.18***	0.20***
Settlement pattern		-0.06	-0.06*	-0.09**
Commons (%)		0.00	0.03	0.06**
Non-Spanish language		-0.32***	-0.33***	-0.35***
Aragon Crown		-0.25***	-0.30***	-0.26***
Kingdom of Navarra		0.04	0.04	0.04
Distance to coast			-0.02	-0.05
Distance to big cities			-0.15***	-0.13***
Distance to provincial capital			-0.16***	-0.15***
Altitude				0.02
Ruggedness				-0.17***
Aridity index				0.05
District area (km2)				-0.03
Observations	464	464	464	464
R-squared	0.115	0.631	0.663	0.683
F test	63.26	61.27	67.53	54.31

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; For simplicity, the intercept is not reported

TABLE A.6. LAND INEQUALITY AND LITERACY. SUPPLY AND DEMAND. 2SLS. STANDARDISED COEFFICIENTS

PANEL A	Dependent variable: Literacy (%)			
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.84***	-0.43***	-0.68***	-0.41***
Schooling enrolment (%)		0.45***		0.41***
Teachers (‰)			0.25***	0.09
Observations	353	353	353	353
F test	68.15	88.47	70.42	83.34
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable: Literacy (%)			
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.98***	-0.49***	-0.74***	-0.48***
x Urbanisation (%)	1.26***	0.74***	0.89***	0.71***
Schooling enrolment (%)		0.47***		0.46***
Teachers (‰)			0.22***	0.04
Observations	353	353	353	353
F test	74.03	91.11	70.33	85.81
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include all the previous controls.

TABLE A.7. LAND INEQUALITY, SCHOOLING ENROLMENT AND TEACHERS. 2SLS. STANDARDISED COEFFICIENTS

PANEL A	Dependent variable			
	Schooling enrolment (%)		Teachers (‰)	
	(5)	(6)	(7)	(8)
Farm labourers (%)	-0.80***	-0.55***	-0.55***	-0.19
Schooling enrolment (%)				0.44***
Teachers (‰)		0.41***		
Observations	353	353	353	353
F test	20.89	34.74	27.78	37.92
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable			
	Schooling enrolment (%)		Teachers (‰)	
	(5)	(6)	(7)	(8)
Farm labourers (%)	-0.90***	-0.54***	-0.74***	-0.34*
x Urbanisation (%)	0.91***	0.35	1.17***	0.76***
Schooling enrolment (%)				0.43***
Teachers (‰)		0.41***		
Observations	353	353	353	353
F test	19.22	33.76	27.87	38.08
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include all the previous controls.

TABLE A.8. LAND INEQUALITY AND LITERACY BY GENDER. 2SLS.
STANDARDISED COEFFICIENTS

PANEL A	Dependent variable: Literacy							
	Men (%)				Women (%)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Farm labourers (%)	-0.87***	-0.35***	-0.67***	-0.33***	-0.33***	-0.11	-0.28***	-0.14
School enrol., boys (%)		0.50***		0.44***				
School enrol., girls (%)						0.41***		0.42***
Teachers (‰)			0.29***	0.13**			0.11	-0.05
Observations	353	353	353	353	353	353	353	353
F test	60.64	98.59	66.38	92.50	73.54	111.0	72.10	100.1
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable: Literacy							
	Men (%)				Women (%)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Farm labourers (%)	-1.03***	-0.40***	-0.75***	-0.38***	-0.35***	-0.11	-0.26*	-0.17
x Urban. (%)	1.34***	0.58***	0.90***	0.52**	0.49*	0.31	0.35	0.40
School enrol., boys (%)		0.51***		0.46***				
School enrol., girls (%)						0.42***		0.44***
Teachers (‰)			0.26***	0.10*			0.11	-0.06
Observations	353	353	353	353	353	353	353	353
F test	70.90	100.9	68.79	93.99	71.66	122.3	70.17	106.3
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include all the previous controls.

TABLE A.9. LAND INEQUALITY AND SCHOOLING ENROLMENT. 2SLS.
STANDARDISED COEFFICIENTS

PANEL A	Dependent variable: Schooling enrolment			
	Boys (%)		Girls (%)	
	(1)	(2)	(3)	(4)
Farm labourers (%)	-0.90***	-0.66***	-0.51***	-0.30***
Teachers (‰)		0.39***		0.37***
Observations	353	353	353	353
F test	25.48	38.23	21.13	35.61
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

PANEL B	Dependent variable: Schooling enrolment			
	Boys (%)		Girls (%)	
	(1)	(2)	(3)	(4)
Farm labourers (%)	-1.04***	-0.68***	-0.55***	-0.24*
x Urbanisation (%)	1.19***	0.63**	0.39	-0.09
Teachers (‰)		0.38***		0.38***
Observations	353	353	353	353
F test	23.40	36.71	20.05	36.03
A-P F test (p-value)	0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the district level; *** p<0.01, ** p<0.05, * p<0.1; All specifications include all the previous controls.