Colonial Agricultural Estates and Rural Development in 20th-century Mexico

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Abstract

This study documents that municipalities in central Mexico closer in the past to an agricultural estate (hacienda) are associated with higher literacy and lower poverty throughout the 20th century than municipalities similar in other respects but farther away from a hacienda. The results are robust to various specifications, neighbor matching analyses, and a placebo-type test. The complementarities between late-colonial haciendas in central Mexico and mining and trade appear to have set municipalities close to a hacienda on a distinct development path. The evidence points to local scale economies in hacienda locations that coordinated new investments away from agriculture and toward the new industrial and commercial sectors. The 20th-century land reform and the railroad play a small role in explaining hacienda legacy. Our findings highlight the role of landed estates as centers linking rural economic activity to the main colonial economic activities, mining and trade.

Colonial haciendas were "the central institution of Mexican rural life" (Van Young 2006, *xxii*). These country houses with agricultural lands and breeding pastures for cattle, horses and sheep relied on native labor for the cultivation of crops and grew from encroachments on native land (Gerhard 1975; Simpson 1952). In central Mexico, late-colonial haciendas functioned as hubs of rural economic activity linking the countryside to the colonial economy that profited from mining and trade with Spain and the rest of the world.

By the early 20th century, the hacienda lost its grip on the rural scene and ceased to function as an agricultural production unit. Nonetheless, the agglomeration effects from the late-colonial hacienda in central Mexico —as a dynamic and market-oriented rural enterprise (Gibson 1964; Van Young 2006; Tutino 2011)— might have altered the path of development of Mexican municipalities in the 20th century. We focus geographically on the central highlands where haciendas developed first: the central Mesa, east and west (Figure 1). Our main objective is to study the long-lasting economic disparities between municipalities in central Mexico close and far from colonial haciendas.

We build an original dataset of late colonial haciendas and identify the present-day location of the hacienda headquarters (*casco*). To our knowledge, this is the first attempt at a comprehensive list of geolocated late-colonial haciendas in central Mexico. Our sample does not represent the whole of rural life in central Mexico, nor can we assume that haciendas were homogeneous. Rather, our emphasis is on the hacienda as the geographic point of contact between the colonial economy and the rural economy and society. We obtain two measures of hacienda: a dichotomous variable that takes the value of 1 if the municipality has at least one hacienda, and 0 otherwise; and the distance from the centroid of each municipality to the nearest hacienda locality. We study the time-disaggregated differences in literacy and poverty between municipalities close and far from colonial haciendas with information from the 20th-century available censuses.

We implement two main empirical strategies: (i) we analyze the variation in each census cross-section; and (ii) we pool the census data to account for time trends in the outcome variables and cluster errors at the municipality level. It is possible that we identify only haciendas that were large enough to become a locality in themselves or with characteristics that allowed them to survive the 19th century. To account for this poten-

tial selection bias, we include geographic and socioeconomic controls to ameliorate the possibility of unobserved characteristics that could confound inference (e.g. agricultural potential of the land, closeness to economic activity, differential access to labor) and also restrict our analysis to municipalities within 100 kilometers of hacienda headquarters.

We find that municipalities closer to a hacienda in the late 18th century have on average higher rates of literacy and a lower poverty index throughout the 20th century compared to municipalities similar in other respects but farther away from a colonial hacienda, in both the cross-section and pooled specifications. Municipalities within 30km to a hacienda have literacy rates that are 9% higher than the mean literacy rate, on average, during the first half of the 20th century, and around 5% higher after 1960; the marginalization index is 6.3% smaller than the mean index, on average, for 1970-1990. The increases in literacy are statistically significant for all years, except 1900, and reach a peak between 1940 and 1960. The results hold restricting the sample to municipalities without a late-colonial hacienda.

An important concern for our analysis is that the location of colonial haciendas was not random, which implies potential endogeneity in our hacienda variable. We undertake tests of sensitivity to unobservables and implement two quasi-experimental techniques to corroborate our findings. First, we restrict the sample to municipalities with haciendas and their neighboring municipalities. Conditional on geographic and socioeconomic controls, we assume that neighboring municipalities are a valid counterfactual (proxy-control group), and we replicate our main analysis. The results are similar and larger in magnitude but with a larger variance.

In addition, we estimate an Average Treatment Effect on the Treated (ATT) using nearest-neighbor matching (NNM). We define our treatment group by proximity to hacienda, using both the full and restricted-neighbor sample. The estimations corroborate our findings. On average, municipalities within 29km to an hacienda have between 1.8 and 3.8 percentage points higher literacy than their counterparts; and between 2.7 and 4.5 index points lower marginalization. This represent an 8.8% increase in the mean literacy rate and a 5.3% decrease in the mean poverty index.

Finally, we perform a placebo-type test by replicating the empirical analysis with another major ecological zone in Mexico: the south mesa, where haciendas did not play an important role linking rural economic activity to the colonial mining and trade. We find that in the south mesa closeness to hacienda headquarters in the late colonial period is not related to higher literacy or less poverty in the 20th century.

We find no empirical support for a path-dependence explanation based on location fundamentals (Ellison and Glaeser 2010; Gallup, Sachs and Mellinger 1999; Easterly and Levine 2003). Hacienda locations may have remained centers for agricultural economic activity after the hacienda demise in the early 20th century, due to, for instance, the suitability of land and climate for agriculture. However, we find that proximity to hacienda is related to a lower proportion of workers in agriculture, more urban localities, and a higher proportion of workers in manufactures and services throughout the second half of the 20th-century. This supports, rather, an agglomeration effects and local scale economies explanation for path dependence (Krugman 1991; Comin, Easterly and Gong 2010; Bleakley and Lin 2012). During the colonial period, haciendas attracted population, both permanent and temporary workers, who sometimes preferred the 'perhaps more predictable economic authority of the landlord' to the 'arbitrary political will of the *cacique* and *corregidor*' (Knight 2002, 89)—the political authorities of native pueblos and towns.

Capital investments and links to the mining and commercial economies during colonial times appear to have attracted commercial and non-agricultural entrepreneurs years later, facilitating the 20th century transition from the old agricultural order to the growing industrial and commercial sectors. By means of a mediation analysis, we find that a reduction in the proportion of agricultural workers mediates between 20 and 36 percent of the increase in literacy, and up to 70 percent of the fall in the poverty index. An increase in the proportion of workers in manufactures and services mediates up to 24% of the legacy of haciendas for literacy and 48% for poverty in the second half of the 20th century. Areas close to market-oriented haciendas remained more economically dynamic, and kept attracting population and services over time.

Proximity to railroads and land redistribution in the early 20th century may have resulted in a more efficient allocation of resources in municipalities close to haciendas,

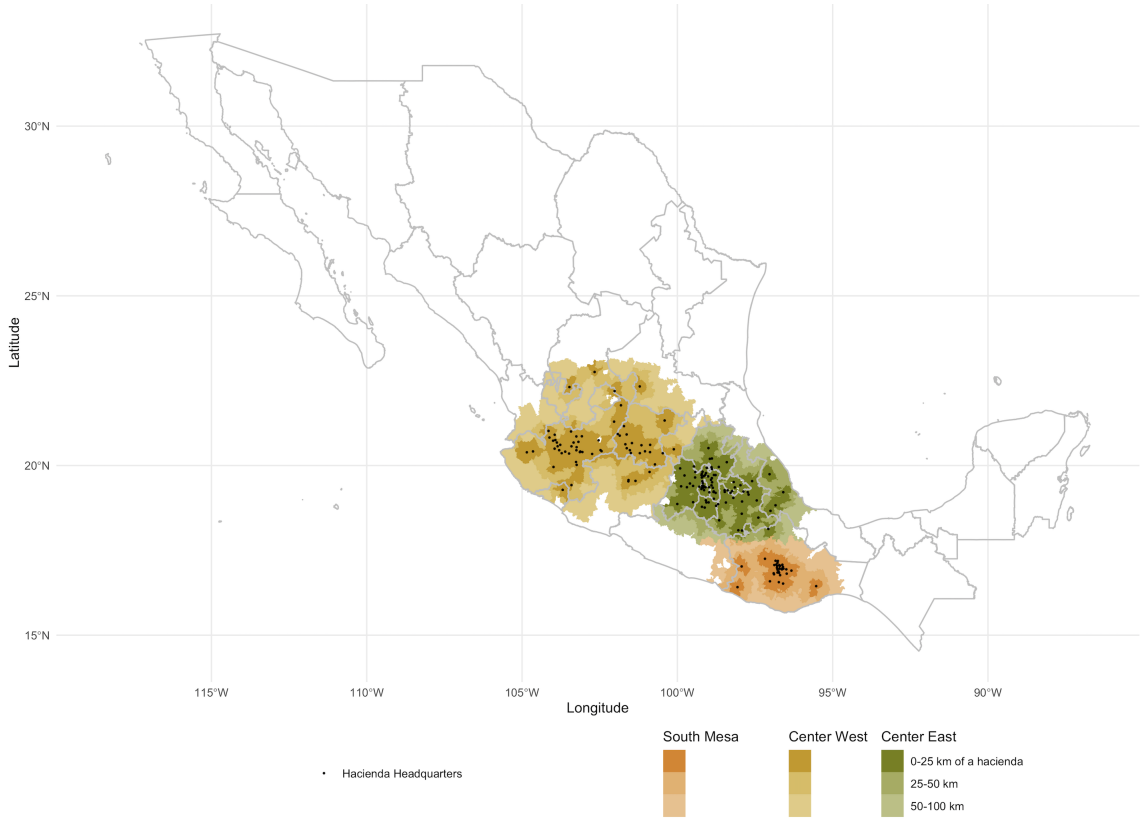
and thus higher literacy and less poverty (Sellars and Alix-Garcia 2018; Garfias 2018). Yet, while we find that the proportion of railroad stations and of land redistributed closer to hacienda headquarters is higher on average, the variables mediate less than 10% of the hacienda-proximity difference.

Our findings are in line with others who find links between colonial land inequality and economic development outcomes, such as Acemoglu, Bautista, Querubín and Robinson (2008), Dell (2010), and Nunn (2008). The mechanism we propose, however, is distinct. While Acemoglu et al. (2008) and Dell (2010) highlight the importance of landowners for guaranteeing government investment in public goods, we point to the role of landed estates as centers linking rural economic activity to the main colonial economic activities, mining and trade. Our analysis relates also to the larger literature studying historical legacies and long-term development in Latin America and beyond.[1] Our results suggests that the initial native population density, land quality and availability, native migration and epidemics, and mineral and other resource potential combined in colonial Mexico to shape economic activity and the rural environs during the colonial period and years later.

Our main contribution is to underscore the role of economic complementarities for understanding path dependence and long term development. The complementarity between late-colonial haciendas and mining and trade in central Mexico appears to have set municipalities close to haciendas on a path of industrialization, urbanization, and the rise of the proletariat. Hacienda headquarters remained focal centers for the location of markets, population, and services after hacienda demise due to the importance of late-colonial haciendas as hubs of economic activity in the region. In this way, our work highlights the role of economic geography and historical rural development for understanding current regional disparities in Mexico.

[1]See Colmenares (1969); Mahoney (2010); Bleakley and Lin (2012); Fergusson, Larreguy and Riaño (2015); Waldinger (2016); Faguet, Matajira and Sánchez (2017); Valencia Caicedo (2019); Fujiwara, Laudares and Caicedo (2019), among others.

Figure 1: Colonial haciendas in the highlands of Central Mexico



1 Origins, demise, and path dependence

The central mesa, our focus region, has a combination of soil and climate conducive to productive agriculture. It has the characteristics of tropical highlands: long growing seasons that allow for at least two crops; temperate and rainy summers, and mild nights and winters except in the mountains (McBride 1923, 6-14). The eastern central mesa, including the valley of Mexico and surrounding areas, has allowed for dense populations in past and present. In this area began five hundred years ago the colonization of what is today central Mexico. Colonial settlements in the western central mesa began later. Except for some native communities close to lakes and depressions of ancient lakes in highland Michoacán and the Nayarit mountains, mostly semi-nomadic tribes populated the western central mesa (Van Young 2000, 158-59). Despite its agricultural potential (exploited later by the colonists) the west was less densely populated upon Spanish arrival than the settled environs of the valley of Mexico (Brading 1978, 14-15).

1.1 Colonial origins

During the first years, the colonists relied on the natives for foodstuffs. Most of the rural, arable land in the valley of Mexico and surroundings remained populated and cultivated by the natives. Through tribute in kind and labor services the natives provided the Spaniards with the essentials to secure their sustenance.[2] The conquest, however, fractured the pre-colonial confederate systems of storage put in place and organized by the defeated Aztec and that had functioned as a safety net in times of food shortages. The fracture and added pressure on native agricultural output set the stage for famines and epidemics later in the century (Florescano 1969, 155-156). Two large Cocoliztli epidemics, one in 1545-47 and another in 1576-80 decimated the native population and left land barren (Acuna-Soto et al. 2004). The food system could no longer be sustained, and the Spaniards had to venture into agriculture and livestock.

In this way, the Spanish estates—*estancias* or *haciendas*—developed in the late 16th century, as a colonial form of land tenure after the early *encomienda* and *repartimiento* institutions declined (Gibson 1967, 66-68; Knight 2002). These estates initially occupied areas close to the native population centers in the central mesa which had seen complex, politically-organized societies in pre-colonial times.[3] The arable land in the environs of the central Mexican basin was thus divided between the new colonists and the surviving natives. The Spanish congregated the natives into *pueblos de indios* (Indian towns) organized to resemble towns in Spain: a central plaza, a church, communal lands, and their own local political authorities and tribute-collecting administration.[4]

The expansion of Spanish estates to the Bajío and Nueva Galicia in the center west required the cooperation of the natives from the center east.[5] The Chichimec semi-

[2]The Spaniards had access to native labor and their produce through the *encomienda* and the *repartimiento*, early institutions that had declined by the late 16th century (Gibson 1967, 66-68; Knight 2002).

[3]Colonial settlement and early labor institutions were influenced by the pre-colonial political organization of the native societies encountered by the Europeans in the Americas (Arias and Girod 2014).

[4]Haciendas emerged as private estates yet the mendicant orders also acquired and managed landed estates. The Jesuits acquired large tracts of land in central Mexico and became skilled agriculturalists and cattle farmers: see Riley (1973) and Konrad (1981). The Dominicans owned land in the Oaxaca valley while Augustinians owned some estates in the Bajío. See Chevalier (1999) chapter VII.

[5]The Bajío encompasses the contemporary states of Guanajuato, Querétaro, San Luis Potosí and parts of Michoacán. Nueva Galicia, to the west of the Bajío, includes the contemporary states of Jalisco, Nayarit, Aguascalientes and parts of Zacatecas.

nomadic tribes resisted the expansion of Spanish colonists. The Crown thus encouraged the migration of the natives from the center east with the Spaniards by granting land endowments to create new pueblos and towns (Powell 1969). This allowed for small-holder cultivation of the land around the villages and towns, in tandem with the development of large estates (Brading 1978, 16-17). The Crown regularized rights over land throughout the 17th century by granting, through *composiciones*, property titles in exchange for a payment (Gibson 1967, 64) validating the possession of small and large tracts of land and limiting future expropriations (Hamnet 1999).

By the 18th century, the colonial hacienda in the central mesa had become a rural economic institution associated with higher socio-economic status. Franciscan friar José Alejandro Patiño in 1778 described haciendas "[as] country houses belonging to people of more than average means, with lands for cattle, horses, and sheep, breeding pastures, and agricultural lands on which, more or less according to the capabilities of each owner, are produced various grains and livestock."[6] Yet, the colonial hacienda also became the institution around which rural economic, political, and social life evolved. Haciendas were residential communities and political enclaves, with quarters for administrators and permanent peons, a church, and subsistence farming plots. In this way, the hacienda provided an opportunity to make a living outside of the native villages and towns, and "served, over time, as the chief engine of Indian acculturation" into the Spanish language, economy, and culture (Knight 2002, 97).

In both the east and west central mesa, by the end of the 18th century haciendas had become important economic centers. Gibson's (1967) classic work on the valley of Mexico emphasizes the commercial nature of haciendas due in large measure to their closeness to the Mexico City market. Haciendas hired labor and relied on the market for the sale of their products, functioning in some cases as modern enterprises. The commercial importance of Nueva Galicia resulted from its trade with the mining centers to the north (Van Young 2006; Brading 1977). Mining and the manufacture of textiles helped the rapid development of agriculture and trade in the region during the 18th century (Brading 1978). In contrast to Chevalier's description of the oppressive, extensive, livestock hacienda to

[6]From the "Relación goeográfica" about Tlajomulco in Jalisco, cited in Van Young (2006, 107).

the north, haciendas in central Mexico mixed farming and livestock, varied widely in size, and many used irrigation.

Historians have pointed to the large variation in the nature of colonial haciendas across regions (Van Young 1983, 14). Size and quality of landholding, labor relations, capital and use of technology, specialization, access to markets, and ownership varied across regions and were influenced by demographic and geographic characteristics. We have described above some differences even within our region of study, the central mesa. Nonetheless, we want to highlight that agricultural potential together with proximity to the most profitable late-colonial economic activities—mining and trade—distinguish colonial haciendas in the central mesa from their namesakes in the north and south. By studying the central mesa, our analysis is focusing on haciendas with such characteristics and their implications for the long-run development of colonial rural Mexico.

1.2 Nineteenth century and structural change

Despite the upheaval sparked by the war of independence (1810-1821), the hacienda as an agricultural estate survived the colonial period and did not decline until the early 20th century. During the 19th century, land changed hands and in some regions land was even further concentrated in yet fewer hands. The creole's climb to political power appears to not have altered the underlying productive arrangements of rural life (Coatsworth 1978, 1999). The economic and social relations of production of the Mexican countryside were already in place by the late 18th century and change in rural society is typically slower than change in the political realm (Van Young 1983, 7).

Mexico underwent a structural transformation in the last two decades of the 19th century. Exports grew as the second industrial revolution increased the demand for minerals Mexico had to offer. Many investments in the export sector were undertaken by foreigners, but spilled over also to domestic economic activity and tax receipts. The development of public debt and financial markets made resources available for new productive activities (Marichal 1997). Mexican industrialization took off at the hands of local entrepreneurs who invested in the production of consumption (e.g textiles, soap, beer) and intermediary goods like cement, glass, iron, steel (Kuntz and Speckman 2011, 511-512).

Haciendas participated in the production of agricultural goods to satisfy the demand of the new sectors. The demand for labor in the agricultural and industrial sectors rose and was accompanied by other structural changes: urbanization and the rise of the proletariat (Williamson 2002). Yet, in 1910 the Mexican Revolution erupts and in the next two decades the hacienda as an agricultural estate and as the major institution dominating the rural areas, vanishes. Starting in 1916, the agrarian reform leads to redistribution and reorganization of land and landowners in the rural areas. The largest amount of land redistribution takes place in the 1930s with president Lázaro Cárdenas.

1.3 Path dependence

Haciendas in the central mesa played an important role as centers linking the rural areas to mining and colonial trade with Spain and the rest of the world during the colonial period and the 19th century. The hacienda provided foodstuffs for mines and towns, and attracted labor and markets. The hacienda *casco* (main house) included residential houses for owners and administrators and provided the central meeting place for the community, including a chapel or church and a local store (*tienda de raya*). There was a residential community that included permanent workers and peons. Nearby native villages also provided temporary workers developing a symbiotic relation with haciendas.

Municipalities with a legacy of colonial haciendas may have kept attracting economic activity, even after the demise of these agricultural estates. Models of economic geography provide two explanations for the spatial persistence of economic activity (Bleakley and Lin 2012; Valencia Caicedo 2019): (1) the presence of some fixed natural feature that keeps attracting households and firms, and (2) strong local economies of scale. For the case of haciendas, the first explanation implies that the agricultural potential of the land may have kept attracting agricultural economic activity, large or small, to those locations. The economies of scale explanation emphasizes, rather, sunk investments in hacienda locations that serve as focal points for economic activity not necessarily agricultural; that is, the sunk investments serve to coordinate new activity and attract economic migrants.

As already mentioned, the decline of the hacienda as an agricultural estate went hand in hand with changes in the structure of the economy that began circa 1900 and took full

force after the Mexican Revolution: the growth of exports, industrialization, and the rise of the proletariat, which led to urbanization and migration to urban areas. Locations close to a colonial hacienda may have attracted industrial and export activity due to local scale economies for three reasons. First, hacienda locations were relatively more integrated to the larger economy and markets in the 19th century than other rural locations. This integration likely reduced transportation and other transaction costs. Second, haciendas had attracted workers in the past who likely kept coming to those locations while adapting to the demands of the new economic activities. Third, economic integration promoted acculturation. A native or mestizo was more likely to speak Spanish and adopt Spanish ways if he or she had been an active participant in colonial economic exchange.

In this way, even after the demise of the hacienda, the site themselves may have been more likely to attract investments from industrial entrepreneurs and the growing exports sector to the north than other rural areas. Industrialization and modernization typically demand more educated workers than the agricultural sector. Municipalities closer to haciendas in the past may thus have kept attracting economic activity while also fostering social development in rural areas through an increase in the value of literacy.

In the next section, we focus on literacy and poverty as measures of development to study whether proximity to a colonial hacienda shaped municipal development paths after the hacienda ceased to be the central institution of Mexican rural life. Educational efforts by the state only began after 1867, when Benito Juárez declared primary schooling free and compulsory. Yet it is not until the tenure of Porfirio Díaz, between 1876 and 1910, that federal fiscal resources free up away from the military and toward public infrastructure, allowing public investment in schools to take off. Still, the urban areas were the beneficiares of most initial educational efforts (Presley 1963). Rather, we focus on incentives for schooling from below, resulting from a change in occupational specialization away from agriculture and toward industrialization and urbanization implied by the local scale economies argument. Did the focalness of haciendas as hubs of rural economic activity coordinate investments in new economic activities and in so doing influence the social development of rural areas after the hacienda's demise?

2 Data

Our municipal-level data comes from historical and geographic sources. The *municipio* is the smallest politico-territorial division for which we have historical information.[7] We measure our primary outcome of interest, social development, with information on literacy and marginalization from the available censuses between 1900 and 1990 in the Population Census Database (INEGI various years). See Tables B.2 and B.4 in the Appendix for the number of observations by census year and outcome.

We measure literacy as the proportion of the municipal population able to read and write, in Spanish or their native language (Appendix D). Starting in 1970, we also include a marginalization index as a proxy for the share of the population in poor living conditions. The index (0–100) incorporates: (i) educational backwardness, (ii) inadequate housing (dwelling, electricity, water) and (iii) insufficient income (CONAPO, 2000).

Colonial Haciendas

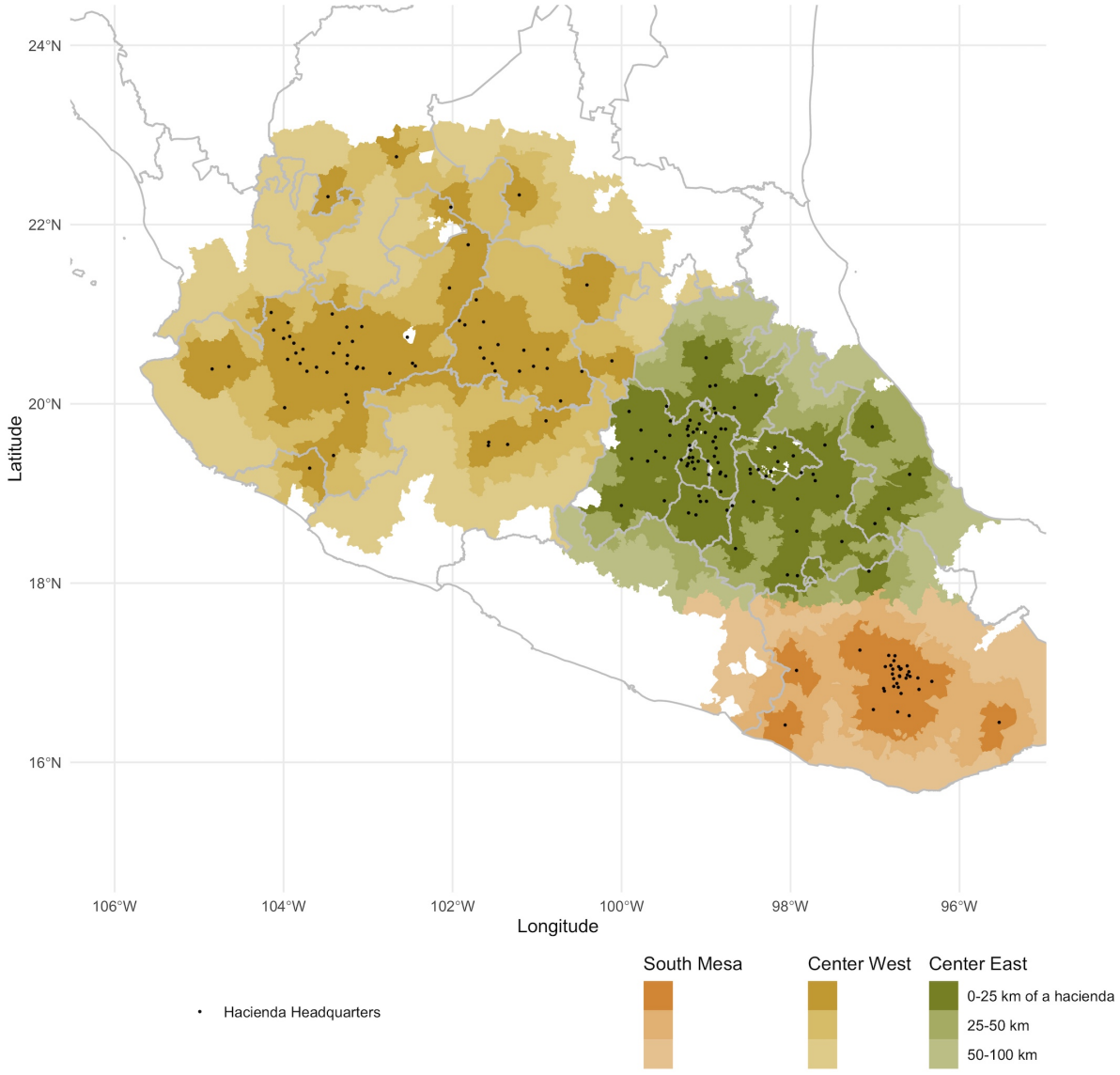
The main explanatory variable is proximity to a large rural estate during the late 18th century. To build the original dataset on colonial haciendas, our primary source is the complete record of Jesuit haciendas expropriated in 1767 from Fonseca and Urrutia (1852, 227-233). The Spanish Crown sent government officials throughout the viceroyalty to create a list of all Jesuit properties in order to sell them. We complement the list of Jesuit haciendas with a list of 70 haciendas, compiled by John Coatsworth, and information from five books that have studied colonial haciendas from historical archives: Brading (1978); Gibson (1964); Rionda Arreguín (2001); Taylor (1972); and Van Young (2006).

The sample of haciendas for the central mesa includes 304 haciendas distributed along 162 municipalities (Figure 2).[8] We recovered from the texts a list of 415 haciendas and were able to identify the exact location of 339 estates (locality and municipality) and only the municipality for the remaining 26. From these, we exclude 11 haciendas located

[7] Mexico is composed of 32 autonomous states, which are internally divided into municipalities. Municipalities have changed throughout the years, but Mexican public records allow us to identify movements and changes in the territorial division.

[8] The number of municipalities is based on the 1970 census. The number of municipalities with haciendas changes depending on the municipalities with information in each census.

Figure 2: Municipalities and colonial haciendas



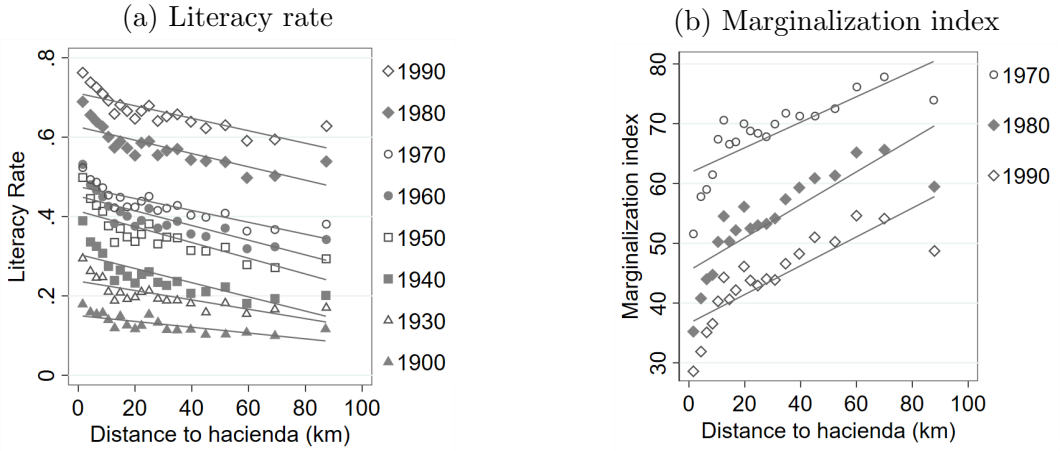
in the north of Mexico, and 50 haciendas in the South Mesa (Oaxaca) located across 34 municipalities. Our location for hacienda refers to the headquarters, or *casco*. The *casco* encompasses the residential houses for owners, administrators and permanent workers, a church or chapel, and other central areas. We may have identified haciendas that were large enough to become a locality in themselves or with characteristics that allowed them to survive the 19th century. Below we discuss how we account for selection bias and ameliorate the possibility of unobserved characteristics that could confound inference.

There is little information on the size or range of haciendas in our sample. A map of hacienda lands would be practically impossible to draw—sometimes not even hacienda owners knew the extent of their own properties. Large estates owned land around their headquarters but also owned other non-adjacent land that allowed access to water and pastureland, not necessarily within the radius of the main hacienda settlement. The hacienda San Xavier in the valley of Mexico, for example, consisted of "scattered lands ... over an extensive area, interrupted and broken by smaller possessions of other persons or Indian towns." (Gibson 1964, 290).

We measure proximity to hacienda with the (Haversine) distance from the centroid of each municipality to the nearest locality with a colonial hacienda. This distance measures the municipal closeness to the hacienda headquarters or casco, regardless of whether there is a colonial hacienda in the municipality. We also define a dichotomous variable that takes the value of 1 if the municipality has at least one hacienda, and 0 otherwise. In the analysis below, we interact proximity to hacienda with this dichotomous variable to disaggregate the results for municipalities without haciendas but close to an hacienda locality.

There is a positive relation between our outcomes and proximity to hacienda in the raw data (Figure 3). Literacy rates decrease as the distance to the nearest hacienda rises while the marginalization index increases for all years. This holds when stratifying by municipalities with and without haciendas (Figures A.3 and A.4).

Figure 3: Mean of outcomes by distance to hacienda



Notes: Bin-scatter with linear fitted estimates. Sample restricted to municipalities with at least one hacienda within a 100km ratio. See the text for a description of the variables and data sources.

2.1 Geographic and socioeconomic controls

Geographic characteristics could have an impact on both the location of colonial haciendas and development outcomes in the 20th century. Regions with relatively higher agricultural productivity may be more likely to have an hacienda and also more likely to have more access to schooling than regions with low agricultural productivity, e.g. due to the resulting higher income of the region. We include latitude, median altitude and land gradient as proxies for productivity.[9] In tropical countries like Mexico, regions with relatively high altitudes have more temperate climates and thus better conditions for agriculture; in regions with higher land gradient it is harder to work the land. In addition, we include a measure of soil suitability between 1961-1999. The composition of the soil is indicative of agricultural potential. The index of soil type takes the values $\{0, 1, 2\}$ according to the suitability of the soil, with higher numbers indicating more suitability.[10] We also include the surface area (km^2) to control for the differences in extension across municipalities.

Table 1 shows descriptive data on geographic characteristics for municipalities with and without an hacienda. Hacienda municipalities and their nonhacienda neighbors have higher altitude, lower land gradient, and lower 20th-century soil suitability measures relative to the full sample, and to those without hacienda. The lower land gradient and higher altitude suggest that hacienda municipalities have terrain more suitable for agriculture compared to all municipalities and to those without haciendas.

Second, mining was a major productive activity in the 18th century. Haciendas may have been more likely to locate close to silver mines in order to provision the mine with food, and municipalities near mines may be more likely to have higher incomes and access to schooling. We use information from von Humboldt (1822) on the location of productive mines circa 1800. We calculate the Haversine distance from the centroid of each municipality to the nearest mine circa 1800. Hacienda municipalities and their nonhacienda neighbors are on average closer to a mine circa 1800 (Table 1).

[9] In contrast to current measures of soil suitability, altitude and land gradient are likely to not have changed much since the colonial period.

[10] We obtained the geographic data from the Global Agro-Ecological Zones (GAEZ) provided by the FAO. http://www.fao.org/nr/gaez. Altitude is measured in kilometers.

Table 1: Statistics by distance to colonial hacienda and hacienda presence

	All		Without Haciendas		Haciendas		Neighbors Without Hac	
	(1) Mean	SD	(2) Mean	SD	(3) Mean	SD	(4) Mean	SD
Dist. nearest hacienda (km)	29.53	22.83	33.37	22.31	6.39	6.23	19.62	11.88
Nearest colonial city (km)	63.45	39.28	66.39	39.60	45.76	32.09	57.36	38.80
Nearest c.1800 mine (km)	126.0	74.42	131.0	76.37	96.3	52.52	118.4	67.56
Median altitude (km)	1.713	0.711	1.667	0.721	1.988	0.580	1.928	0.612
Average land gradient	4.736	3.112	4.948	3.204	3.464	2.083	4.047	2.605
Latitude	19.69	1.093	19.66	1.126	19.86	0.847	19.67	1.042
Soil Suitability	0.204	0.468	0.227	0.483	0.068	0.337	0.144	0.432
Pueblos de indios (prop.)	0.809	0.393	0.798	0.402	0.877	0.330	0.784	0.412
Area of municipality (km^2)	330.3	446.0	321.3	449.9	384.2	419.4	347.4	519.6
Municipalities	1,137		975		162		445	

Notes: Mean and standard deviation using 1970 as reference year for municipalities within 100km of closest hacienda. Differences between columns 2 and 3, and 3 and 4 are statistically significant (except for municipality area, and altitude between columns 3 and 4). The variables are described in the text.

Third, proximity to a colonial city could have an impact on the location of 18th century haciendas and development outcomes in the 20th century. We include the distance from the centroid of each municipality to the nearest urban colonial center (Tanck de Estrada 2002) to control for these differences. Table 1 shows that indeed hacienda municipalities are closer to an urban colonial center, and the difference is statistically significant.

Finally, pueblos de indios shared the rural environs with haciendas, as mentioned.[11] Haciendas may have located near pueblos to have access to labor, while pueblos could have influenced development outcomes directly. While we may expect a negative relation between a pueblo legacy and 20th century literacy and marginalization outcomes (due to, for instance, pueblos living in the fringes of colonial society and with distinct languages), we also know the Crown mandated pueblos to teach Spanish in their schools during the second half of the 18th century (Tanck de Estrada, 1999). The latter policy, where successful, may have led to higher literacy and schooling a century later. We include the list of pueblos de indios circa 1800 compiled by Tanck de Estrada (2005). The variable takes the value of 1 if there was at least one pueblo de indios in the municipality. The median is 2 pueblos per municipality; our results are robust (and stronger) if we instead

[11] Ranchos also shared the rural environs and where typically smaller agricultural units than haciendas. However, there is not a systematic way to differentiate between haciendas and ranchos.

use a threshold of 2 pueblos. The proportion of municipalities with at least one pueblo is larger for hacienda municipalities but the difference is small (Table 1 , $p < 0.05$).

2.2 Estimation Strategy

We undertake both cross-sectional and pooled data analyses to exploit variation between municipalities and across time. To mitigate the possibility of selection bias, we restrict our sample to municipalities within 100 kilometers of hacienda headquarters. This way, we exclude municipalities that are likely to be very different from those with haciendas.[12] For our base model, we use ordinary least squares (OLS). Nonetheless, the results are robust to estimating instead a spatial error model using GLS to account for potential spatial autocorrelation (Anselin 2009). The spatial analysis is in Appendix C.

We estimate our main model using two specifications. The first pools the census data to take into account the time trend in our outcomes and allows us to cluster standard errors at the municipality level. The second studies cross-sectional differences in outcomes across municipalities for every census year with robust standard errors.

We test our identification strategy by estimating the relationship between our hacienda variables and the covariates from Table 1. On average, the controls explain around 63.7 percent of the variation in distance to hacienda, while only 19.2 for the dichotomous hacienda variable (Table B.15). Hence, we focus on distance to hacienda as the main explanatory variable, and estimate the following equations:

$$Y_{ist} = \alpha + \sum_{\ell}^{\mathcal{L}} \beta_\ell \, distHac_i \times \mathbb{1}\{t = \ell\} + \sum_{\ell}^{\mathcal{L}-1} \lambda_\ell \, \mathbb{1}\{t = \ell\} + \mathbb{X}_i'\gamma + \theta_s + \varepsilon_{ist} \tag{1}$$

$$Y_{is} = \alpha + \beta \, distHac_i + \mathbb{X}_i'\gamma + \theta_s + \varepsilon_{is} \,, \quad \forall t \tag{2}$$

where Y_{ist} is the development outcome in municipality i from state s in census year $t \in \{1900, 1930, 1940, 1950, 1960, 1970, 1980, 1990\}$, $distHac_i$ is the distance from the centroid

[12] We choose 100km because (i) it includes all municipalities within one standard deviation of the mean of distance to hacienda, and (ii) after a distance of 100km, the Moran statistic is very close to 0 once we account for spatial autocorrelation in the residuals. See Appendix C.

of municipality i to the nearest hacienda locality (expressed in ten kilometers)[13], $\mathbb{X}_i$ is a vector of geographic and demographic controls and includes the binary pueblos variable, θ_s are state fixed effects, and ε is an error term (usual assumptions on ε). We obtain one estimation per year from equation 2 while equation 1 pools all years in one estimation.

We also analyze whether the relation between proximity to hacienda and our outcomes varies by the presence of an hacienda in the municipality. The equations below interact distance to hacienda with our binary hacienda variable, Hac_i.

$$\begin{aligned} Y_{ist} \;=\; \alpha \;+\; \sum_{\ell}^{\mathcal{L}} \beta_{1\ell}\, distHac_i \times \mathbb{1}\{t=\ell\} \;+\; \sum_{\ell}^{\mathcal{L}} \beta_{2\ell}\, Hac_i \times distHac_i \times \mathbb{1}\{t=\ell\} \\ +\; \sum_{\ell}^{\mathcal{L}} \beta_{3\ell}\, Hac_i \times \mathbb{1}\{t=\ell\} \;+\; \sum_{\ell}^{\mathcal{L}-1} \lambda_\ell\, \mathbb{1}\{t=\ell\} \;+\; \mathbb{X}_i'\gamma \;+\; \theta_s \;+\; \varepsilon_{ist} \end{aligned} \tag{3}$$

$$Y_{is} \;=\; \alpha + \beta_1 distHac_i + \beta_2 Hac_i \times distHac_i + \beta_3 Hac_i + \mathbb{X}_i'\gamma + \theta_s + \varepsilon_{is}\,, \quad \forall t \tag{4}$$

As mentioned before, the initial location of colonial haciendas was not random. Thus, an important concern is the potential endogeneity of our main independent variable, and how this could bias our results. In addition to regressing proximity to hacienda on our controls (Table B.15), we perform a sensitivity test to unobservables using our pooled data specification. Following Oster (2019), we compare the stability of our main coefficients and movements in R-squared by individually including each covariate and testing the year-coefficients against the model without any controls.

Then, to address potential endogeneity issues, we undertake two more analysis to test the validity of our results. First, we create a restricted sample only for municipalities with haciendas ($N = 162$) and their contiguous neighbors ($N = 445$), and we repeat our main analysis. While this comparison is not perfect, it allows us to treat neighboring municipalities as a proxy-control group. Conditional on geographic and socioeconomic controls, the analysis assumes that neighboring municipalities are a valid counterfactual for municipalities with hacienda presence (see map, Figure A.1).

Second, we propose a quasi-experimental design by implementing a nearest neighbor matching (NNM) strategy. For different thresholds of closeness to nearest hacienda, we

[13]For the 26 haciendas that we are unable to identify their locality, we use the centroid of the municipality as the coordinates of the hacienda. The results are robust to not including the 26 haciendas.

stratify our sample between treated (close to hacienda) and control municipalities. Based on our geographic and socioeconomic covariates, the NNM finds the best eligible control municipality to be paired with each hacienda-treated municipality and estimates the Average Treatment Effect on the Treated (ATT) of being δ close to an hacienda. The next section presents these estimates using different parametric and non-parametric techniques, while also varying between our main sample and the restricted neighboring sample.

Finally, to corroborate the robustness of our results, we perform a placebo-type test by replicating the empirical analysis with another major ecological zone in Mexico: the south mesa. This region includes 541 municipalities in Oaxaca and Guerrero, with 50 colonial haciendas along 34 municipalities (Figure 2). The hypothesis behind this falsification test is that south mesa haciendas played a small role, relative to the central mesa, linking the rural world to the large colonial economic activity around mining and trade.

3 Results

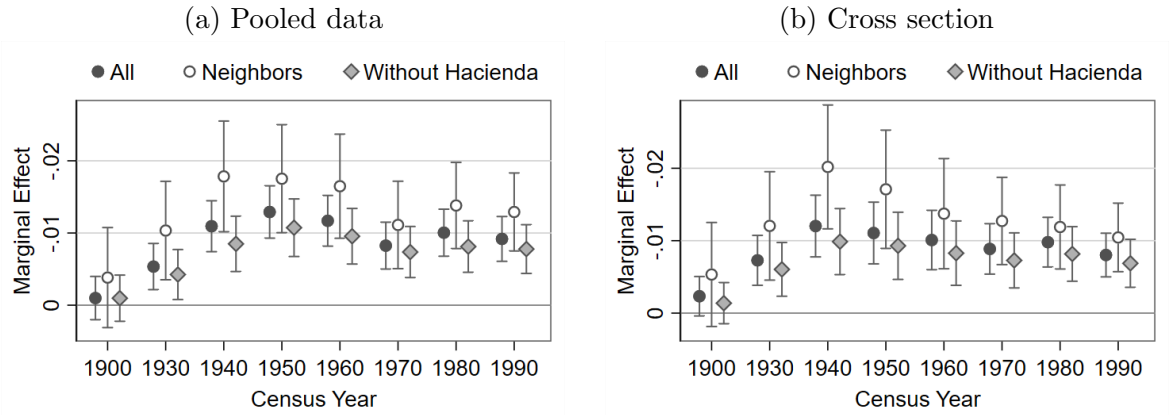
The results for our base specifications show that municipalities closer to a colonial hacienda have higher literacy rates and lower poverty indices than those further away throughout the 20th century. Figure 4a shows the (negative) marginal effect on literacy rates for every 10km increase on distance to hacienda for models (1) and (3), while Figure 4b shows the marginal effect for models (2) and (4). Models (1) and (2) are estimated with the full sample and with the restricted neighbors sample; for the models with interactions (3 and 4), only the coefficients on nonhacienda municipalities are shown. Notice the *y-axis* is reversed to facilitate the comparison of time-trends and coefficient magnitude. The marginal effects for the restricted neighbors sample are larger in magnitude, but with higher variance. This suggests that most of the observed differences in literacy rates come from those municipalities closer to the headquarters of an hacienda. Yet, the differences for nonhacienda municipalities remain statistically significant, although smaller in magnitude. All estimates are positive and statistically significant after 1900 (Fig. 4).[14]

[14]Tables B.1 and B.2 show the results in table form.

On average, municipalities have between 0.5 and 1.3 percentage points higher literacy rates for every 10km decrease in distance to hacienda, for the pooled and cross section analyses. Nonhacienda municipalities have slightly lower increases in literacy rates.[15] When restricting to the neighbors sample, municipalities have between 1.3 and 3.9 percentage points higher literacy for every 10km fall in distance to hacienda.

Although the coefficients seem small, the mean literacy rate in Mexico did not reach 50 percent until 1980. For instance, in 1940, the average increase in the literacy rate for a 30km decrease in distance to hacienda is 3.3 percentage points, a 13% increase with respect to the mean literacy rate of 25.3%. Between 1930 and 1950, the results represent an average increase of 10.5% (with respect to the mean) in literacy rates and around 6% after 1950, for a fall in distance to hacienda of 30km (Tables B.1). For nonhacienda municipalities, the corresponding increases are 8.2% and 5.1%. Notice that the peak increase is in 1940.

Figure 4: Estimates on literacy rates by distance to hacienda, 1900-1990



Notes: Marginal effect of distance to nearest hacienda (10km) with 95% confidence intervals over census year. (a) Pooled OLS regression with standard errors clustered at the municipality level; (b) Cross-section OLS regression with robust standard errors. Municipalities within 100km of closest hacienda headquarters. Includes state fixed effects and all controls.

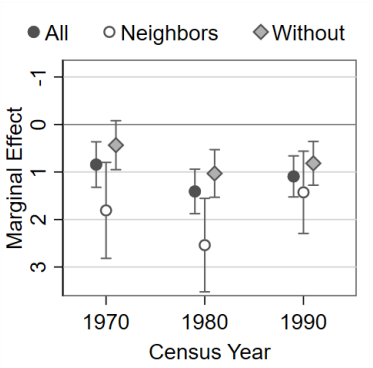
Likewise, the marginalization index falls as the municipality gets closer to an hacienda; closeness to haciendas in the past appears to be linked to lower poverty years later. Figure 5 shows the marginal effects on the index for every 10km of distance to hacienda (*y-axis* reversed for comparison). On average, the full sample estimations represent a decrease of 6.3% with respect to the mean poverty index for municipalities 30km closer to a hacienda. For the neighbors sample, a 10km fall implies a decrease of 3.9% with respect to the

[15]Below we also show the predicted literacy rates for nonhacienda municipalities (Figure 8a).

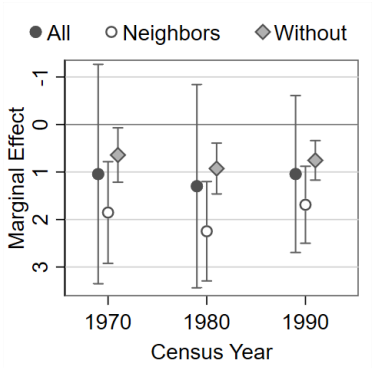
mean index (Tables B.5). Similarly to literacy rates, the size of the marginal effect is smaller for nonhacienda municipalities (between 0.4 and 1 points), yet it is statistically significant in both the cross-section and pooled specifications for most years. On average, the estimation represents a 4.5% decrease on the mean poverty index for nonhacienda municipalities 30km closer to a hacienda.

Figure 5: Estimates on marginalization index by distance to hacienda, 1970-1990

(a) Pooled data



(b) Cross section



Notes: Marginal effect of distance to nearest hacienda (10km) with 95% confidence intervals over census year. (a) Pooled OLS regression with standard errors clustered at the municipality level; (b) Cross-section OLS with robust standard errors. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

Finally, we do not find statistically significant differences from our sensitivity test to unobservables. Tables B.9 and B.10 show these estimations for literacy rate and marginalization index, respectively. When comparing the p-values from the joint test by including each control individually, we do not find statistically significant differences between year-coefficients, except for average land gradient. Nonetheless, the R^2 for the estimation increases proportionally between specifications—suggesting stability across coefficients—and the differences are no longer statistically significant when including any other control.

3.1 Addressing the endogeneity bias

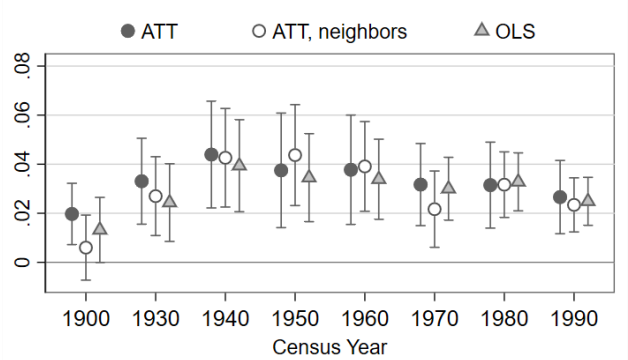
One of the main concerns of our results is the potential endogeneity bias of our measure of hacienda. To the extent that the location of haciendas is correlated with municipality characteristics, our results may be biased. For example, if haciendas located initially in more productive land or better connected to markets, our results might be overestimating the relationship between development and colonial haciendas. To account for this,

we estimate an Average Treatment Effect on the Treated (ATT) using nearest-neighbor matching (NNM). We define our treatment group by closeness to haciendas, grouping municipalities within δ distance to an hacienda based on the mean and median: 29 km for the full sample (median=23), and 16 km for the neighbors sample (median=13).

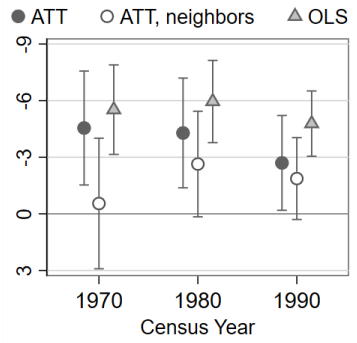
First, we test the validity of the NNM estimates by comparing the balance on covariates between treatment and control groups (Austin, 2009). Figure A.5 shows the standardized differences for different values of δ. As observed in panel A, groups in the main sample are better balanced for a treatment within 29 km of distance to an hacienda (SD<0.25).[16] However, for the neighbors sample, we observe significant differences by state and area of municipality (panel B). To overcome this, we implement a modification in covariates by interacting the area with state dummy variables.[17] This way, we control for the variation in area by state (see map A.1) when constructing the *quasi*-experimental control group for municipalities closer to haciendas. With this modified model, groups are balanced for a treatment within 13 km to an hacienda.[18]

Figure 6: Nearest neighbor matching analysis by hacienda proximity, 1900-1990

(a) Literacy rate



(b) Marginalization index



Notes: ATT (Malahanobis, NNM-1) for municipalities within 29km (ATT), and within 13km distance to nearest hacienda (ATT, neighbors). OLS beta coefficient for presence of hacienda (binary) for municipalities within 100km of an hacienda. All estimations include 95% confidence intervals over census year.

We estimate the ATT using a non-parametric *Malahanobis* matching with one neighbor and bias-adjustment for continuous covariates, as proposed by Abadie and Imbens (2006,

[16] We still observe differences in distance to nearest colonial city and median altitude ($SD \geq 0.25$). Yet, our ATTs do not vary by δ, and they are similar to those using the neighbors sample (Table B.7).

[17] Additionally, we replicate all previous analysis using the same modification. The results do not change significantly. For parsimony, we do not include the results but they are available upon request.

[18] As before, the only exception is distance to nearest colonial city.

2011).[19] Figure 6 shows the ATT year-estimates for the full sample, and neighbors sample. These estimates corroborate the positive relation between closeness to haciendas and economic development in the 20th century and provide further evidence on the validity of our results, for both literacy rate and marginalization index. For comparison, we also include the OLS coefficients from our main model, but replacing distance to hacienda with our dichotomous hacienda variable in model 2).

While the ATT magnitude varies by sample, all estimates are statistically significant, except in 1900 for the neighbors sample. On average, municipalities within 29km to a hacienda have between 1.8 and 3.8 percentage points higher literacy than their counterparts in the full sample; and for the restricted neighbors sample, between 2 and 4.3 percentage points higher literacy for municipalities within 13km to an hacienda (Figure 6a). The OLS estimates show similar magnitudes and precision.

Figure 6b corroborates the negative relation between closeness to haciendas and poverty. Municipalities within 29km to an hacienda have, on average, between 2.2 and 3.3 lower and statistically significant marginalization index than those farther away. In contrast to literacy, the ATT results for the restricted sample are not statistically significant, while the differences between the full sample ATT and OLS estimates are larger.

3.2 Robustness

Hacienda historiography has noted differences in the characteristics of haciendas and pueblos across regions as a result of the initially different rural environments. In this section we undertake a placebo-type test by comparing our results with the South Mesa. To do so, we replicate the main empirical analysis for this region, composed of 541 municipalities in Oaxaca and Guerrero, and with 50 colonial haciendas across 34 municipalities.

The south mesa is a distinct region of *pura sierra* as Mexicans call it. The valleys with steep slopes, little level ground, and narrow ridges impede large-scale agriculture,

[19] While the magnitude of the ATT vary by specification, this obtains the most restrictive estimates. Table B.8 shows three other specifications using the mean and median distance in each sample: non-parametric Malahanobis with 2 and 3 neighbors –respectively, and bias-adjustment, and a propensity score matching (PSM) from a logit model with at least 1 neighbor. For the restricted neighbors sample, we estimate the ATT using the modified model with interactions.

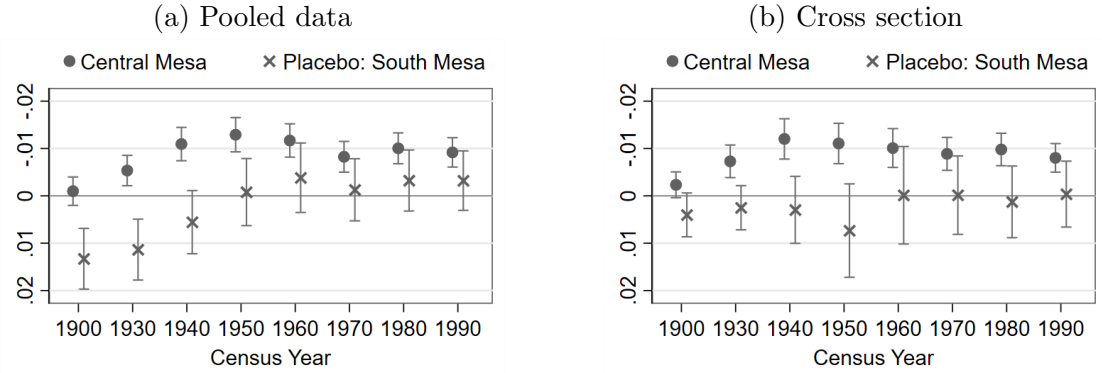
and complicate access to Mexico City. Yet, there are pockets throughout that are suitable for agriculture and have been densely populated since ancient times. The Oaxaca plateau is the most important of such fertile areas in the region, home to the native Zapotec and Mixtec cultures. Early on, haciendas were located alongside native towns yet remained relatively small (Taylor 1972). In the valley of Oaxaca, two-thirds of the agricultural land was owned by Indians; Spaniards and creoles owned small haciendas and ranchos (Taylor 1972, 201). In contrast, more than two thirds of the agricultural land was owned by Spaniards in the central mesa (Gibson 1964, 277-79).

The extraction of mineral resources was not a major colonial economic activity in the South Mesa in the 18th century. Our data for mines from Humboldt has no mines in Oaxaca in 1810. In the South Mesa region, the municipality closest to a mine is in Guerrero: 96km away. Rather, another export commodity, the cochineal—an insect from which a red dye highly valued in Europe at the time was obtained—played a commercial role comparable to gold and silver by the 18th century. However, the main producers of cochineal were native pueblos in Oaxaca because of the labor intensive production process, not haciendas. The dyes produced from cochineal were used in part to pay tribute, but also commercialized through local markets. Indeed, Díaz-Cayeros and Jha (2016) show that localities where cochineal was produced during the colonial period have today a higher female labor force and more political participation compared to those not engaged in cochineal production. Thus, haciendas in this region did not play as important a role in linking rural economic activity to the larger colonial economy as in the central mesa. We test this hypothesis by comparing the estimates for literacy rates between regions.[20]

Figure 7 shows the placebo estimates for our main model and compares them against the central mesa. Using the pooled data, we observe a similar increasing trend during the first half of the 20th century in both regions. Nonetheless, in the south mesa, the relation between proximity to colonial haciendas and literacy rates is negative before 1950. In addition, the placebo estimates across specifications do not share similar trends, and are only statistically significant in 1900 and 1930 for the pooled model. Similarly,

[20]The 1970 Population Census does not have complete information for Oaxaca at the municipality level. Therefore, we are not able to calculate the marginalization index in 1970 for this region. The results for 1980 and 1990 are in Appendix B.

Figure 7: Placebo estimates for literacy rates by distance to hacienda, 1900-1990



Notes: Marginal effect of distance to nearest hacienda (10km) with 95% confidence intervals over census year. (a) Pooled OLS regression with standard errors clustered at the municipality level; (b) Cross-section OLS with robust standard errors. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

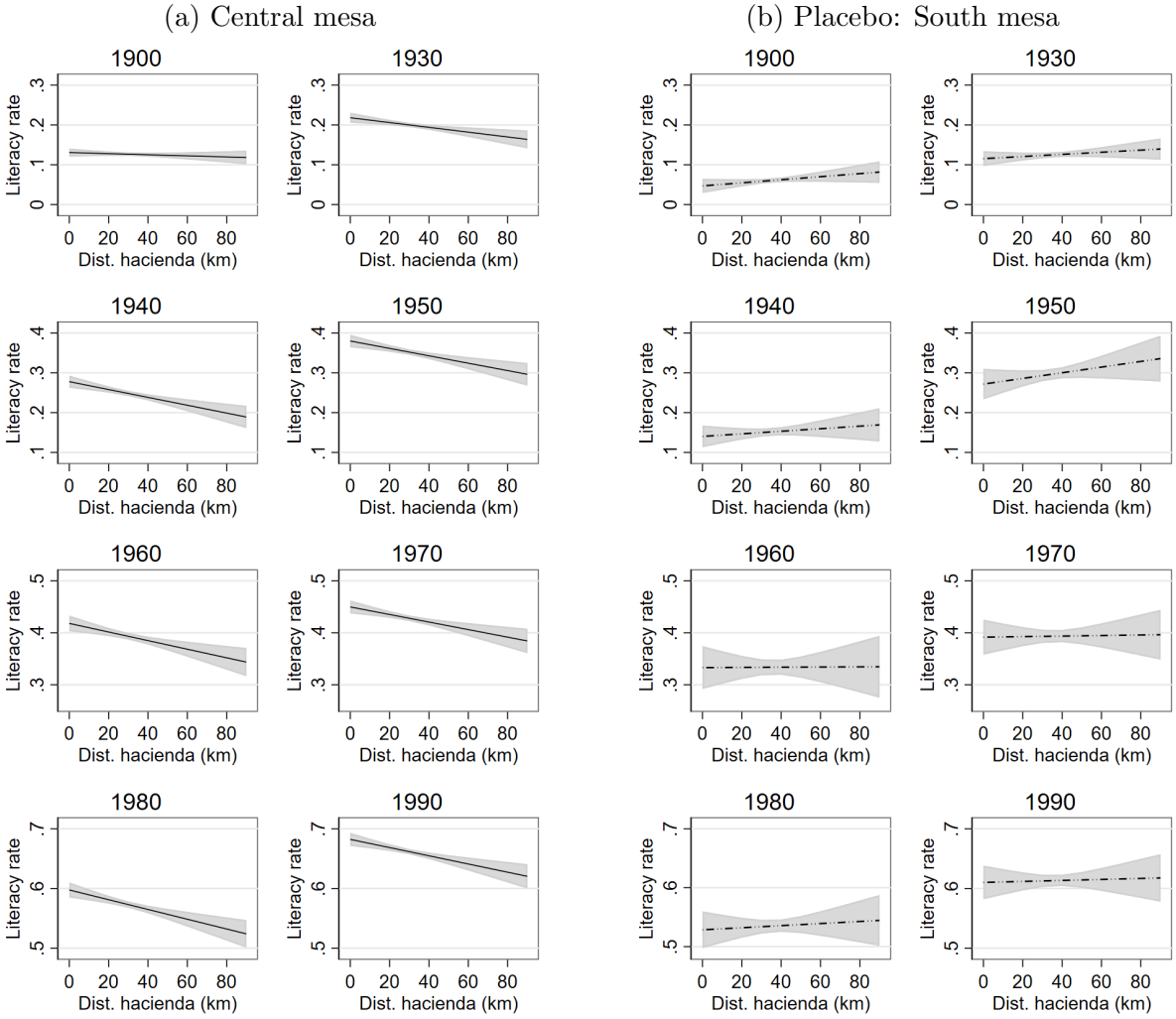
when estimating the models with interactions, we do not observe a statistically significant relation between literacy rates and distance to hacienda in the south mesa (Figure A.6).

We observe a similar contrast between regions when comparing the predicted literacy rates by distance to hacienda (km) for nonhacienda municipalities (Figure 8). As proximity to hacienda increases, average predicted literacy falls in the central mesa for all years (panel a), but the relation is flat or positive for the south mesa (panel b). These differences remain statistically different from zero for municipalities within 50km from the closest hacienda, for both the pooled and cross-section analyzes.

The analysis for the south mesa highlights the specific characteristics of the hacienda in central Mexico that drive our main results. In particular, the placebo results strongly suggest that in the central mesa the higher literacy, observed years later in municipalities close to colonial haciendas, is related to the haciendas' role as colonial economic hubs linking the rural areas to mining and colonial trade with Spain. In this way, rather than a characteristic inherent to the hacienda as an agricultural estate, it is the economic complementarities between colonies activities that seem to drive the positive relation between colonial haciendas and our outcomes in the 20th century.

In the next section we test whether local scale economies can explain the relation between proximity to colonial hacienda and our social outcomes in the 20th century.

Figure 8: Predicted literacy rate by distance to hacienda for municipalities without haciendas, 1900-1990



Notes: Linear prediction for municipalities without haciendas from cross-section OLS with robust standard errors. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

3.3 Mediators: Economic geography

As mentioned in Section 1, the role of haciendas as hubs of rural, economic activity suggests that haciendas may have played a focal role in coordinating new investments related to industrialization and the growing exports to the north during the 20th century. In this way, proximity to an hacienda in the past would explain path dependence in the location of economic activity. We first discuss why a fixed natural feature—agriculture potential in our case—can not explain this path dependence. Second, we provide empirical evidence in support for the local economies of scale explanation.

Natural features

Haciendas in the central mesa benefited from fertile soil and many invested in irrigation to increase agricultural productivity. The natural features explanation implies that after the demise of the hacienda the sites may have remained important for agricultural production and this may have attracted migrants and economic activity. Table 2 documents, however, that the proportion of workers in agriculture is lower and that of urban localities higher, on average, in municipalities closer to haciendas. In addition, Table 3 documents that higher literacy rates are associated to a lower proportion of workers in agriculture compared to municipalities similar in other respects but farther away from haciendas.

Other geographic features, like mines, were important for the location of haciendas, and may have driven the local development of haciendas as centers of economic activity. Table 1 documents that indeed, circa 1800, municipalities with an hacienda are closer to a mine (and to an urban area) than those farther away from haciendas. Our results above already account for the possible influence of proximity to gold and silver mines circa 1800 by including them as controls.[21]

Table 2: Statistics by distance to colonial hacienda and hacienda presence

	All		Without Haciendas		Haciendas		Neighbors Without Hac	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Dist. to nearest hacienda (km)	29.53	22.8	33.37	22.3	6.39	6.2	19.62	11.9
Urban localities (prop)	0.307	0.31	0.282	0.31	0.448	0.29	0.326	0.31
Workers in agriculture (prop)	0.713	0.22	0.736	0.21	0.573	0.26	0.705	0.22
Workers in manufacture (prop)	0.105	0.12	0.097	0.12	0.150	0.12	0.107	0.12
Workers in trade (prop)	0.050	0.04	0.047	0.04	0.070	0.04	0.050	0.04
Railway station (binary)	0.055	0.23	0.046	0.21	0.111	0.32	0.056	0.23
Granted land (%)	32.93	26.9	31.27	27.0	42.87	23.8	37.91	27.1
Municipalities	1,137		975		162		445	

Notes: Mean and standard deviation using 1970 as reference year for municipalities within 100km of closest hacienda headquarters. Differences between columns 2 and 4, are statistically significant at the 5 per cent level except for railway station; they are not between 3 and 4. See the text for a description of the variables.

[21] New minerals were extracted in the late 19th century yet most new mines were located to the north of our area of study (Velasco Ávila et al. 1988).

Local economies of scale

Local increasing returns to scale in hacienda locations may have attracted investments into the new profitable economic activities, contributing to the geography of industrialization and urbanization in 20th-century central Mexico. In this way, hacienda proximity may be related to an increase in the demand for educated workers and the value of literacy.

We analyze the mediating role of local economies of scale with data from the censuses on the proportion of urban localities per municipality and of labor in agriculture, manufacturing and trade, available starting in 1950. A locality is defined as urban if it has 2,500 inhabitants or more (see Appendix D). We implement a formal mediation model based on Imai, Keele, Tingley and Yamamoto (2011) using our cross-section specification. The approach relies on the assumption that proximity to a colonial hacienda (the treatment) is quasi-randomly assigned conditional on our geographic and other controls, and that the mediator is ignorable conditional on proximity to hacienda and the controls. To conform our estimation to these assumptions we restrict the sample to hacienda municipalities and their neighbors and define the treatment as being within 13km of a colonial hacienda (see the discussion on balance-tests for our NNM analysis above).

The mediation model utilizes the potential outcomes framework to estimate the causal mediation effect by decomposing the total causal effect into direct and indirect effects.[22] Table 3 provides the causal mediation effect estimated for each mediator as a proportion of the total effect of hacienda proximity on the outcome. The estimation shows that the mediation role of urbanization increases with time and goes from mediating 10 per cent of the impact of hacienda proximity on the literacy rate in 1950 to 37 per cent in 1990. The percentages are higher for the index of marginalization mediating from 34 to 71 percent of the total impact of haciendas on the index. Notice that while the legacy of hacienda is mediated by the proportion of urban localities, urban localities are also directly related to our development outcomes, as should be expected.

[22]In the first stage, a mediator model is estimated as a function of the treatment and the covariates. Two predictions for the mediator are obtained, one under the treatment and the other under the control. In our case, these correspond to the predicted proportion of urban localities, say, for municipalities within 30km of hacienda and for those farther away. The second stage fits a regression model of the outcome as a function of the mediator, the treatment, and the covariates. The causal mediation effect corresponds to the average difference in the predicted outcome using the two different predicted values of the mediator.

Table 3: Urban localities and occupational specialization as mediators

	Literacy					Marginalization Index		
	1950	1960	1970	1980	1990	1970	1980	1990
Dist Hac<13km	0.054***	0.047***	0.034***	0.030***	0.021***	-3.16***	-2.34***	-1.18*
	(0.0096)	(0.0086)	(0.0070)	(0.0066)	(0.0055)	(0.98)	(0.79)	(0.60)
Urban localities	0.11***	0.11***	0.087***	0.11***	0.098***	-29.7***	-32.0***	-26.2***
(prop)	(0.016)	(0.014)	(0.011)	(0.010)	(0.0083)	(1.52)	(1.20)	(0.92)
Total Effect								
Mediated (prop)	0.0970	0.1067	0.1385	0.2976	0.3724	0.3542	0.5801	0.7160
Municipalities	597	602	592	609	609	592	609	609
Dist Hac<13km	0.0517***	0.0405***	0.0279***	0.0294***	0.0227***	-1.377**	-2.716***	-1.902***
	(0.00857)	(0.00967)	(0.00635)	(0.00620)	(0.00522)	(0.698)	(0.694)	(0.635)
Workers in	-0.334***	-0.291***	-0.197***	-0.203***	-0.169***	55.48***	50.19***	37.56***
agriculture (prop)	(0.0224)	(0.0210)	(0.0139)	(0.0137)	(0.0120)	(1.530)	(1.526)	(1.460)
Total Effect								
Mediated (prop)	0.1875	0.3512	0.2993	0.3047	0.3211	0.7015	0.5127	0.5271
Municipalities	570	365	607	609	602	592	609	602
Dist Hac<13km	0.0566***	0.0480***	0.0338***	0.0340***	0.0276***	-2.744***	-3.980***	-2.901***
	(0.00961)	(0.0111)	(0.00688)	(0.00674)	(0.00586)	(1.033)	(0.985)	(0.858)
Workers in	0.383***	0.391***	0.252***	0.311***	0.166***	-75.94***	-71.45***	-39.57***
manufacture (prop)	(0.0513)	(0.0503)	(0.0286)	(0.0321)	(0.0274)	(4.526)	(4.693)	(4.020)
Total Effect								
Mediated (prop)	0.1071	0.2251	0.1477	0.1930	0.1673	0.4356	0.3066	0.3007
Municipalities	567	365	607	609	602	592	609	602
Dist Hac<13km	0.0526***	0.0478***	0.0307***	0.0376***	0.0285***	-2.436***	-4.633***	-3.069***
	(0.00874)	(0.00988)	(0.00663)	(0.00674)	(0.00566)	(0.859)	(0.898)	(0.773)
Workers in trade	1.527***	1.400***	1.004***	0.671***	0.478***	-289.6***	-187.6***	-121.4***
(prop)	(0.111)	(0.110)	(0.0872)	(0.0710)	(0.0569)	(11.25)	(9.469)	(7.765)
Total Effect								
Mediated (prop)	0.1719	0.2305	0.2292	0.1018	0.1380	0.4927	0.1964	0.2620
Municipalities	569	365	607	608	602	592	608	602

Notes: Second stage estimations based on Imai et al. (2011). First stage results in Appendix Table B.13. Cross-section OLS with robust standard errors for municipalities within 100km of closest hacienda headquarters. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. Includes all controls and state fixed effects. See the text for a description of the variables and sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

A lower proportion of workers in agriculture mediates between 19 and 36% of the relation between hacienda proximity and literacy, and more than half of the relation between hacienda proximity and marginalization. The proportion of workers in manufactures mediates between 11 and 24% of the hacienda legacy on literacy after 1960, while up to 44% that of poverty; trade workers mediate between 10 and 24% for literacy and between 20 and 48% for poverty. More urbanization and less agriculture as a result of proximity to a colonial hacienda account for more than half of the reduction in poverty by 1990.

Prior colonial rural hacienda locations appear to have become more commercial and urban than their rural nonhacienda counterparts, and in this way increased literacy and reduced poverty years later. While part of of the relation between hacienda and literacy remains to be explained, this evidence suggests that being close to a colonial hacienda set

municipalities in central Mexico on a path away from agricultural production and toward urbanization and integration with the commercial economy by the mid 20th century.

4 Alternative explanations

Two alternative explanations could explain the relation between colonial haciendas and 20th century outcomes: the construction of the railroad that began in the late 19th century and the redistribution of land that followed the Mexican Revolution. The construction of the railroad network allowed for the expansion of trade with the north and through the ports. Closeness to a railroad reduced trade costs for haciendas and could have fostered higher agricultural income and more integration with the market.

The Agrarian reform that began in 1916 allowed for the restitution of land to peasants claiming land dispossession in the 19th century. Later, it also included outright land grants. From the outset, the program had the twofold goal of encouraging commercial agriculture through small property and the endowment of sufficient land to native villages (Brading 1978). To the extent that redistribution made land available to smallholders and reduced land inequality, the reform may have provided economic opportunities for a larger proportion of the population (Engerman and Sokoloff 1997; Acemoglu, Johnson and Robinson 2002). In addition, Garfias (2018) documents that in regions where hacienda land was expropriated, local governments were more likely to invest in state capacity. A stronger local state may have increased the provision of education and other public goods.

We implement below formal mediation models to analyze whether railroads and land reform mediated part of the relation between colonial haciendas and our outcomes.

4.1 Railroads

Our empirical analysis above shows that the differences in literacy begin only in the 1930s and 1940s. In 1900 there does not appear to be a statistically significant higher proportion of literates in municipalities close to a colonial hacienda. Given that railroads had been around for two decades by 1900, the railroads explanation would lead us to expect a positive relation in 1900 yet we do not find a statistically significant one. We digitized the

map of railroad stations in Cosío Villegas (1974) to create a dichotomous variable equal to 1 if the municipality has at least one railway station and 0 otherwise.[23] Table 2 shows that municipalities close to a hacienda have a higher proportion of railway stations than the average for the full sample.

The top panel of Table 4 shows that railway stations have a positive and statistically different from zero relation with literacy, yet railway stations appear to reduce the impact of hacienda on literacy (the causal mediating effect is negative). Even so, the proportion mediated is small: 4% in 1900 and decreasing thereafter. The coefficients on proximity to colonial hacienda remain statistically significant. In a country with many mountain ranges in the center, it is perhaps not surprising the railways' lack of impact and their replacement by roads during the 20th century.

Table 4: Mediators for Literacy and Marginalization Index: Railroads and Land Reform

	Literacy								Marginalization Index		
	1900	1930	1940	1950	1960	1970	1980	1990	1970	1980	1990
Dist Hac<13km	0.020*	0.039***	0.063***	0.061***	0.053***	0.040***	0.042***	0.034***	-5.03**	-5.88***	-4.49***
	(0.0097)	(0.013)	(0.017)	(0.017)	(0.016)	(0.011)	(0.012)	(0.0097)	(2.37)	(1.91)	(1.43)
Railway station	0.058***	0.059**	0.068**	0.056*	0.040	0.034*	0.041**	0.025	-15.3***	-13.5***	-8.95***
(binary)	(0.019)	(0.026)	(0.031)	(0.029)	(0.025)	(0.019)	(0.018)	(0.015)	(3.33)	(2.61)	(2.14)
Total Effect											
Mediated (prop)	-0.0431	-0.0285	-0.0106	-0.0093	-0.0082	-0.0083	-0.0092	-0.0072	-0.0120	-0.0167	-0.0143
Municipalities	470	554	585	597	602	607	609	609	592	609	609
Dist Hac<13km	0.017*	0.035**	0.060***	0.058***	0.051***	0.038***	0.040***	0.032***	-4.62*	-5.45***	-4.19***
	(0.0084)	(0.013)	(0.016)	(0.017)	(0.016)	(0.010)	(0.012)	(0.0093)	(2.20)	(1.72)	(1.30)
Granted land	0.051***	0.052***	0.064***	0.061**	0.048**	0.048*	0.047	0.047*	-7.17***	-7.67**	-6.18*
(binary)	(0.015)	(0.016)	(0.021)	(0.022)	(0.019)	(0.027)	(0.029)	(0.025)	(2.16)	(3.06)	(2.95)
Total Effect											
Mediated (prop)	0.0926	0.0440	0.0221	0.0212	0.0192	0.0246	0.0230	0.0285	0.0204	0.0273	0.0290
Municipalities	468	552	583	595	600	604	606	606	589	606	606

Notes: Second stage estimations based on Imai et al. (2011). First stage results in Appendix Table B.13. Cross-section OLS with robust standard errors for municipalities within 100km of closest hacienda headquarters. Granted land equals 1 if the proportion of land granted is greater than zero, and equals 0 otherwise. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. Includes all controls and state fixed effects. See the text for a description of the variables and sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

4.2 Agrarian Reform

We use data on land grants executed between 1916 and 1948 from the National Agrarian Registry (Registro Agrario Nacional, RAN).[24] The majority of land actions took place

[23]There are only fourteen municipalities with more than one railway station; the maximum is three.

[24]We thank Sánchez-Talanquer (2017, 145) for sharing his data. Results are robust to using land petitions approved by the President between 1916-1976 from Sanderson (2013); not all approved petitions were executed. The RAN data documents grants executed.

between 1930 and 1940 with president Lázaro Cárdenas. As a percentage of the total surface area of municipalities, on average more land was granted in hacienda municipalities and in those close to haciendas (Table 2).

Land redistribution mediates less than 2% of the total effect of hacienda proximity on literacy after 1930, and between 6 and 7% for marginalization (Table 4). The coefficients on hacienda remain statistically different from zero after the inclusion of the proportion of land redistributed. The small role of land redistribution may be related to the lack the incomplete property rights of *ejidos*, which scholars have condemned for the lagging behind of regions with a high concentration of ejidal lands (De Janvry, Gonzalez-Navarro and Sadoulet 2014; Albertus, Díaz-Cayeros, Magaloni and Weingast 2016; Dell 2012); others argue the land reform served rather as a political strategy to demobilize peasants in regions with political conflict (Sanderson 1984; Saffon 2014). The land reform spearheaded the demise of the hacienda yet differences between municipalities close and far from haciendas remain in the 20th century and in some cases have amplified.

The reform does appear to be positively related to literacy, albeit not to poverty (Table 4). While explaining this is outside the scope of this paper, there are studies suggesting possible explanations. For Garfias (2018), expropriation resulted in an increase in local state capacity that may have increased the provision of education and other public goods. Elizalde (2020) finds gains in education in municipalities that were able to restore their rights to ancestral lands—thanks to their pre-colonial legacy of complex indigenous institutions that allowed them to coordinate against the state. In the same vein, Arias (2023) finds that ethnically homogenous municipalities managed to reduce the hindering legacy of remoteness to a colonial hacienda on literacy by leveraging land redistribution. Land grants may have facilitated the integration of far away communities under the umbrella of the state, allowing them to benefit from targeted federal programs.[25]

[25]See Wolf (2017) for an example in the Bajío.

5 Concluding Remarks

This study sheds light on the legacies of colonial haciendas in central Mexico through a combination of time-disaggregated quantitative analysis and historical narrative. We find that municipalities close in the past to a hacienda have on average higher rates of literacy and a lower poverty index throughout the 20th century than those similar in other respects yet farther away. These findings are robust to various specifications, a nearest neighbor analysis, a placebo-type test, and tests for sensitivity to unobservables. Differences between municipalities in central Mexico close and far from haciendas remain after the hacienda ceased to play a role in agricultural production in the early 20th century.

While our analysis is unable to account for the differences in colonial haciendas across regions highlighted by historians (e.g, size and quality of landholding, labor relations, use of technology, specialization, ownership), our focus on central Mexico highlights the role of economic complementarities between late-colonial, market-oriented haciendas and mining and trade—the most profitable colonial economic activities. The latter complementarity distinguishes colonial haciendas in the central mesa from their namesakes in the north and south. Our results apply, thus, to agricultural estates with such characteristics and studies their implications for long-run development.

We show that literacy and poverty are not related to closeness to colonial hacienda in the south mesa, where the carmine dye produced from cochineal was an important colonial export yet had no economic complementarities with the hacienda. Native pueblos took charge of the exploitation and commercialization of cochineal, not haciendas. The results for the south mesa suggest that the positive relation between colonial haciendas and our outcomes is not inherent to the hacienda as an agricultural estate. Rather, we draw on models of economic geography to explain the path dependence of economic activity in hacienda locations over time.

In municipalities with a history of hacienda presence, agglomeration effects and local scale economies appear to have facilitated the transition from the old agricultural order to the burgeoning industrial and commercial sectors in the early 1900s. We find that the history of colonial haciendas helps explain the geography of occupational specialization:

areas closer to a hacienda in the past, have more urban localities, a lower proportion of workers in agriculture, and a higher proportion in trade and manufactures in the second-half of the 20th century. After the demise of the hacienda, localities that had been close to a colonial hacienda kept attracting economic migrants while becoming more urban than those further away from haciendas. The change away from agriculture and toward trade and urbanization increased the value of literacy.

Railway stations and land grants appear to play a small role in explaining the legacy of haciendas. While on average hacienda municipalities are closer to railway stations and received more land grants as a proportion of the total area of the municipality, these variables mediate less than 5% of the relation between hacienda and literacy. Still, we find that the proportion of land grants is positively associated with literacy rates in the second half of the 20th century. This finding contrasts with others that have documented a negative relation between ejidos and economic development. While we show that proximity to an hacienda set municipalities in the central mesa on a path of higher literacy, the land reform appears to have also increased literacy albeit independently of distance to an hacienda in the past. More research is needed to better understand whether and through which mechanisms the land redistribution may have also altered the path of development of municipalities in rural Mexico.

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Appendix

A Figures

Figure A.1: Colonial Haciendas and Neighbors

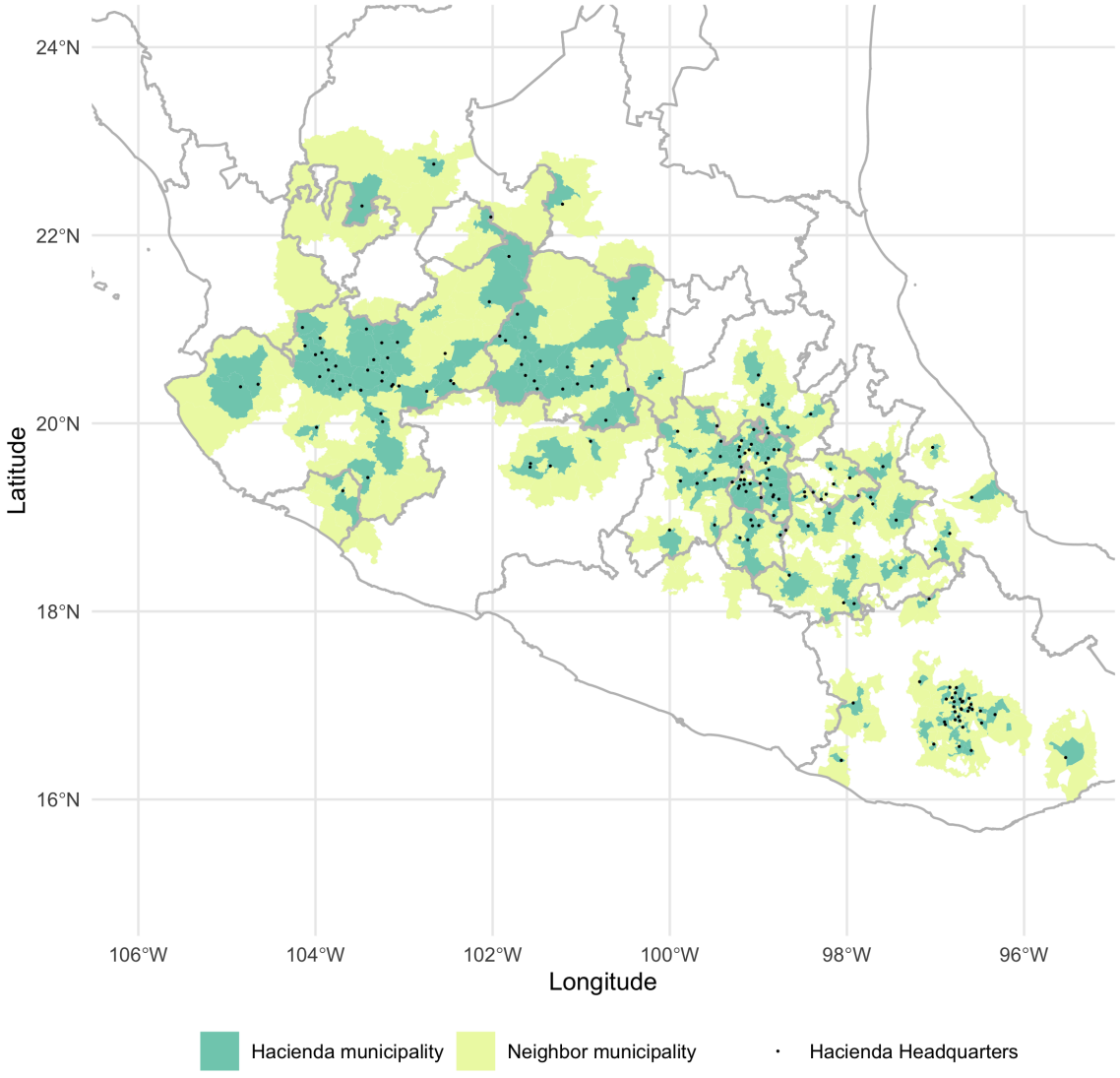
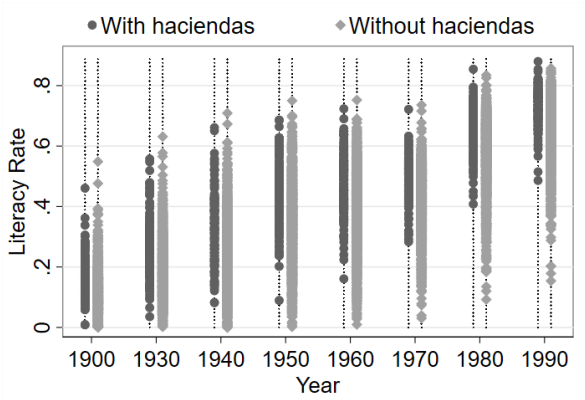
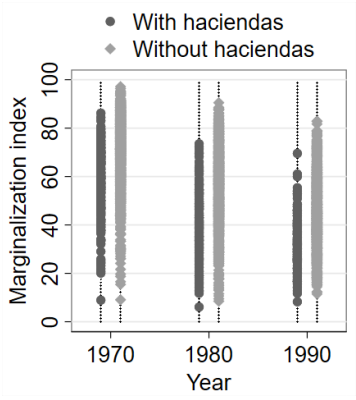


Figure A.2: Mean Development Outcomes by Presence of Hacienda

(a) Literacy



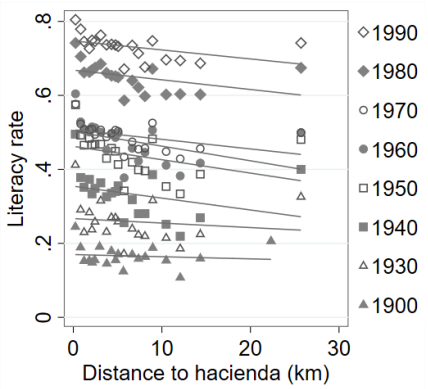
(b) Marginalization index



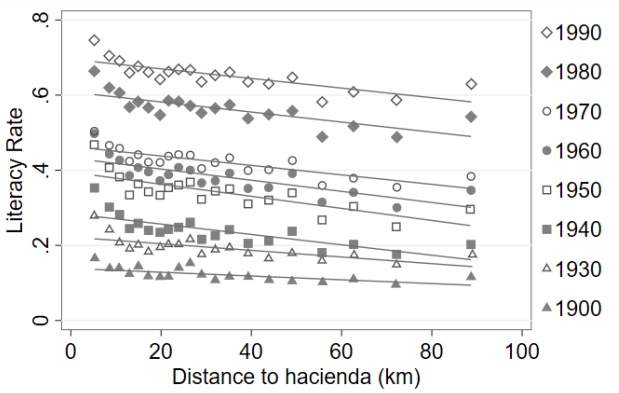
Notes: Dot-graph. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources.

Figure A.3: Mean of Literacy by Presence and Distance to Hacienda

(a) With hacienda



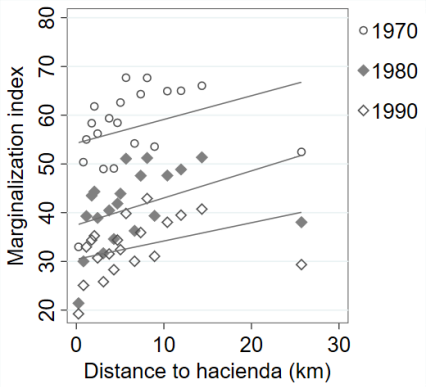
(b) Without hacienda



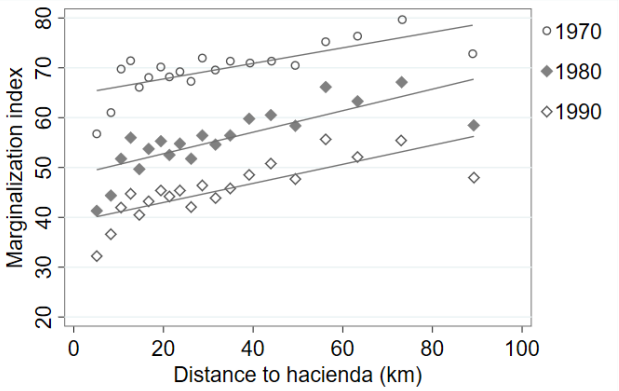
Notes: Bin-scatter with linear fitted estimates. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources.

Figure A.4: Mean of Marginalization Index by Presence and Distance to Hacienda

(a) With hacienda



(b) Without hacienda

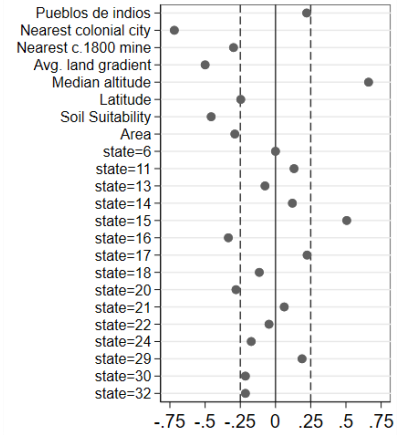


Notes: Bin-scatter with linear fitted estimates. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources.

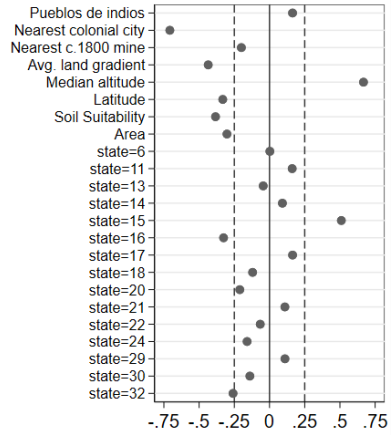
Figure A.5: Balance Test between Treatment and Control groups, Standardized Differences on Covariates

Panel A: Main Sample

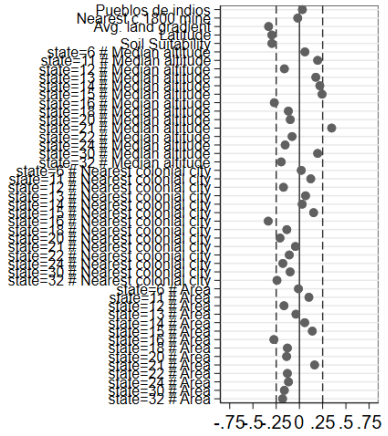
(i) Within 17km



(ii) Within 23km

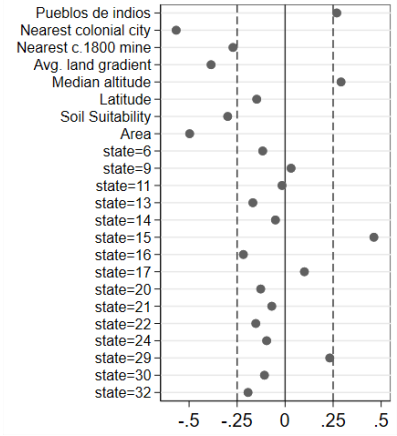


(iii) Within 29km

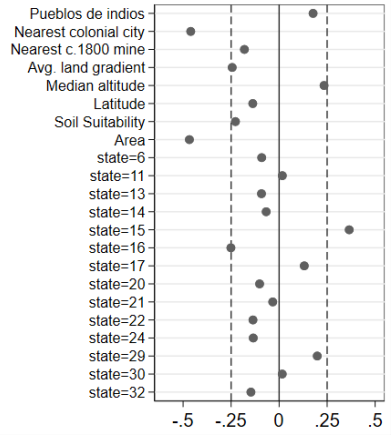


Panel B: Restricted Neighbors Sample

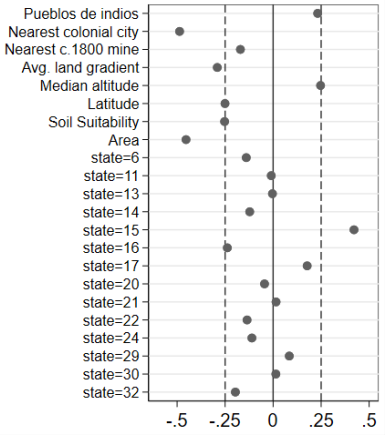
(i) Within 10km



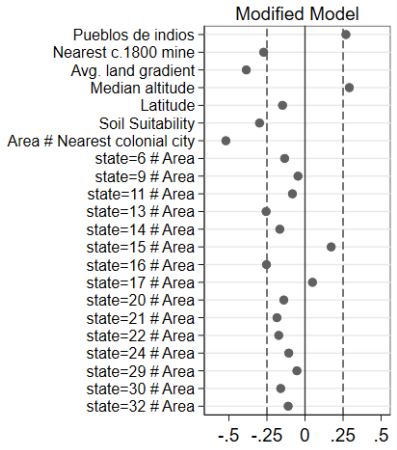
(ii) Within 13km



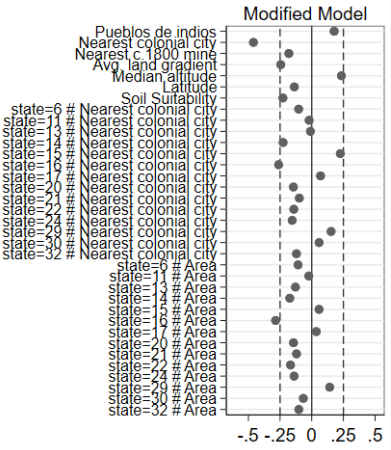
(iii) Within 16km



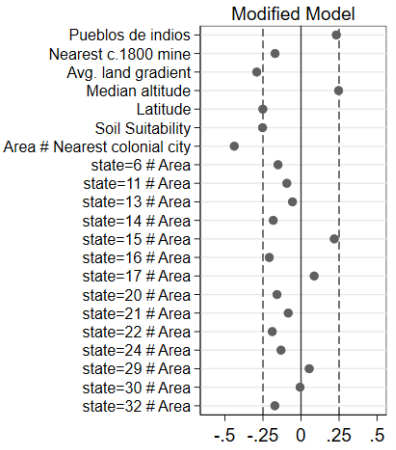
(iv) Within 10km: interacted



(v) Within 13km: interacted

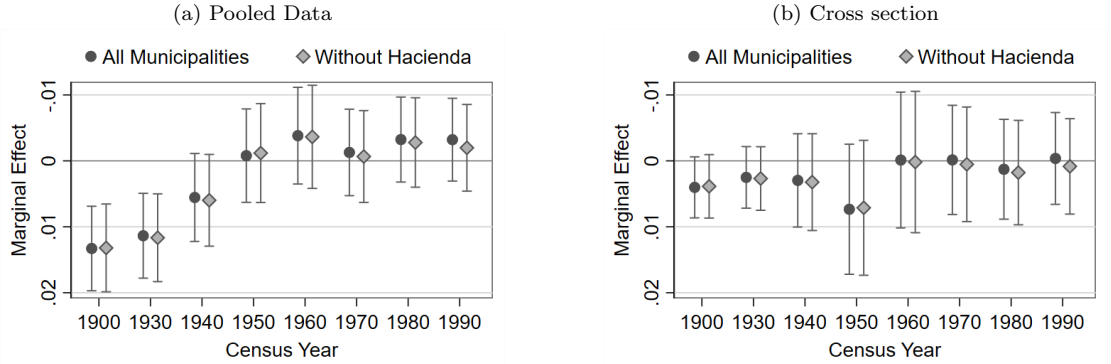


(vi) Within 16km: interacted



Notes: For every δ, a municipality is treated if $\mathbb{1}\{Distance_m \leq \delta\}$. See the text for a description of the variables and data sources.

Figure A.6: Placebo Estimates on Literacy rates by Distance to Hacienda, 1900-1990

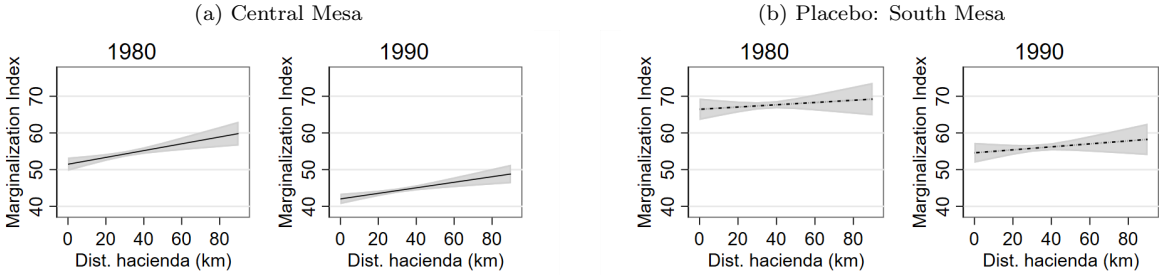


Notes: Marginal effect of distance to nearest hacienda (10km) with 95% CI over census year. (a) Pooled OLS with SE clustered by municipality; (b) Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

Figure A.7: Placebo Estimates on Marginalization Index by Distance to Hacienda, 1980-1990

Notes: Marginal effect of distance to nearest hacienda (10km) with 95% CI over census year. (a) Pooled OLS with SE clustered by municipality; (b) Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

Figure A.8: Predicted Marginalization Index by Distance to Hacienda for Municipalities Without Haciendas, 1980-1990



Notes: Linear prediction for municipalities without haciendas from cross-section OLS with robust SE. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

B Tables

Table B.1: Pooled Data Differences in Literacy by Distance to Hacienda, 1900-1990

	Main Sample						Neighbors Sample			
	Model 1		Model 2		Hac (binary)		Model 1		Model 2	
Year = 1990	0.557***	(0.004)	0.550***	(0.005)	0.526***	(0.003)	0.566***	(0.005)	0.557***	(0.008)
1990×Distance	-0.009***	(0.002)					-0.013***	(0.003)		
1990×Dist×Hac			-0.013**	(0.007)					-0.013**	(0.006)
1990×Dist×Without			-0.008***	(0.002)					-0.009**	(0.003)
1990×Hacienda			0.020***	(0.007)	0.029***	(0.006)			0.016*	(0.009)
Year = 1980	0.472***	(0.005)	0.462***	(0.006)	0.438***	(0.003)	0.481***	(0.006)	0.466***	(0.009)
1980×Distance	-0.010***	(0.002)					-0.014***	(0.003)		
1980×Dist×Hac			-0.015**	(0.007)					-0.015**	(0.007)
1980×Dist×Without			-0.008***	(0.002)					-0.008**	(0.004)
1980×Hacienda			0.029***	(0.008)	0.038***	(0.006)			0.028***	(0.010)
Year = 1970	0.321***	(0.004)	0.317***	(0.005)	0.295***	(0.003)	0.323***	(0.006)	0.312***	(0.009)
1970×Distance	-0.008***	(0.002)					-0.011***	(0.003)		
1970×Dist×Hac			-0.015*	(0.008)					-0.015*	(0.007)
1970×Dist×Without			-0.007***	(0.002)					-0.006	(0.004)
1970×Hacienda			0.013	(0.009)	0.019***	(0.007)			0.021**	(0.010)
Year = 1960	0.298***	(0.005)	0.287***	(0.006)	0.258***	(0.004)	0.305***	(0.007)	0.284***	(0.010)
1960×Distance	-0.012***	(0.002)					-0.016***	(0.004)		
1960×Dist×Hac			-0.028**	(0.011)					-0.028***	(0.011)
1960×Dist×Without			-0.010***	(0.002)					-0.008*	(0.005)
1960×Hacienda			0.038***	(0.011)	0.043***	(0.008)			0.045***	(0.013)
Year = 1950	0.260***	(0.005)	0.249***	(0.007)	0.216***	(0.004)	0.266***	(0.007)	0.244***	(0.010)
1950×Distance	-0.013***	(0.002)					-0.018***	(0.004)		
1950×Dist×Hac			-0.025**	(0.011)					-0.025**	(0.011)
1950×Dist×Without			-0.011***	(0.002)					-0.009*	(0.005)
1950×Hacienda			0.036***	(0.012)	0.047***	(0.009)			0.044***	(0.014)
Year = 1940	0.151***	(0.005)	0.139***	(0.006)	0.114***	(0.003)	0.161***	(0.006)	0.139***	(0.010)
1940×Distance	-0.011***	(0.002)					-0.018***	(0.004)		
1940×Dist×Hac			-0.022*	(0.012)					-0.021*	(0.012)
1940×Dist×Without			-0.008***	(0.002)					-0.009*	(0.005)
1940×Hacienda			0.039***	(0.012)	0.045***	(0.009)			0.042***	(0.014)
Year = 1930	0.085***	(0.004)	0.080***	(0.005)	0.068***	(0.002)	0.089***	(0.005)	0.079***	(0.008)
1930×Distance	-0.005***	(0.002)					-0.010***	(0.003)		
1930×Dist×Hac			-0.001	(0.010)					-0.001	(0.010)
1930×Dist×Without			-0.004**	(0.002)					-0.006	(0.004)
1930×Hacienda			0.011	(0.010)	0.016*	(0.008)			0.014	(0.013)
Year = 1900										
1900×Distance	-0.001	(0.002)					-0.004	(0.004)		
1900×Dist×Hac			0.013	(0.010)					0.013	(0.010)
1900×Dist×Without			-0.001	(0.002)					-0.003	(0.004)
1900×Hacienda			-0.009	(0.010)	-0.007	(0.007)			-0.009	(0.013)
Pueblos de indios	-0.004	(0.007)	-0.005	(0.007)	-0.006	(0.007)	0.009	(0.008)	0.008	(0.008)
Nearest colonial city	-0.063	(0.098)	-0.051	(0.098)	-0.175*	(0.096)	-0.138	(0.124)	-0.136	(0.123)
Nearest c.1800 mine	0.058	(0.067)	0.056	(0.067)	0.044	(0.068)	0.143	(0.097)	0.146	(0.096)
Avg. land gradient	-0.014***	(0.001)	-0.014***	(0.001)	-0.014***	(0.001)	-0.013***	(0.002)	-0.014***	(0.002)
Median altitude	0.001	(0.005)	0.003	(0.005)	0.012**	(0.005)	-0.026***	(0.008)	-0.024***	(0.008)
Latitude	-0.002	(0.005)	-0.004	(0.005)	-0.010**	(0.005)	0.009	(0.008)	0.007	(0.008)
Soil Suitability	0.001	(0.006)	0.000	(0.006)	-0.002	(0.006)	-0.015**	(0.007)	-0.017**	(0.008)
Area (100 km^2)	-0.001*	(0.001)	-0.001**	(0.001)	-0.002***	(0.001)	-0.001	(0.001)	-0.001	(0.001)
Constant	0.248**	(0.101)	0.273***	(0.101)	0.387***	(0.101)	0.067	(0.151)	0.093	(0.151)
R-squared	0.818		0.819		0.815		0.845		0.847	
Municipalities	8,694		8,694		8,694		4,633		4,633	

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.2: Differences in Literacy by Distance to Hacienda for each year, 1900-1990

	Model 1							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0023*	-0.0073***	-0.0120***	-0.0111***	-0.0101***	-0.0089***	-0.0098***	-0.0080***
	(0.0014)	(0.0018)	(0.0022)	(0.0022)	(0.0021)	(0.0018)	(0.0017)	(0.0015)
Pueblos de indios	-0.002	0.002	0.005	-0.001	-0.002	-0.009	-0.010	-0.009
	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)
Nearest colonial city (km)	-0.071	-0.084	-0.166	-0.113	-0.101	0.023	0.047	-0.036
	(0.102)	(0.113)	(0.130)	(0.132)	(0.123)	(0.098)	(0.104)	(0.087)
Nearest c.1800 mine (km)	0.042	0.060	0.197**	0.031	0.091	0.047	-0.035	0.021
	(0.053)	(0.067)	(0.084)	(0.093)	(0.090)	(0.077)	(0.076)	(0.069)
Average land gradient	-0.006***	-0.010***	-0.013***	-0.016***	-0.015***	-0.013***	-0.017***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Median altitude (km)	-0.001	-0.006	-0.008	0.004	0.005	0.010*	-0.001	0.004
	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Latitude	-0.001	0.001	0.011	-0.004	-0.002	-0.005	-0.013**	-0.007
	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Soil Suitability	0.002	-0.003	-0.005	0.001	0.002	0.000	0.003	0.005
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)
Area (100 km^2)	-0.0004	-0.0015**	-0.0011*	-0.0008	-0.0012*	-0.0010*	-0.0006	-0.0008
	(0.0004)	(0.0006)	(0.0007)	(0.0008)	(0.0007)	(0.0006)	(0.0006)	(0.0005)
Constant	0.184**	0.256**	0.138	0.546***	0.526***	0.614***	0.951***	0.899***
	(0.084)	(0.100)	(0.134)	(0.144)	(0.137)	(0.115)	(0.113)	(0.102)
R-squared	0.373	0.424	0.438	0.435	0.446	0.424	0.515	0.551
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143
Mean dep. var.	0.128	0.203	0.253	0.356	0.397	0.431	0.576	0.664
	Model 2							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0005	-0.0046	-0.0251**	-0.0217*	-0.0224**	-0.0176**	-0.0104	-0.0093
× Hacienda	(0.0099)	(0.0097)	(0.0120)	(0.0113)	(0.0108)	(0.0078)	(0.0077)	(0.0068)
Dist. hacienda (10km)	-0.0014	-0.0060***	-0.0099***	-0.0093***	-0.0083***	-0.0073***	-0.0082***	-0.0069***
× Without	(0.0014)	(0.0019)	(0.0023)	(0.0024)	(0.0023)	(0.0019)	(0.0019)	(0.0017)
Hacienda	0.0105	0.0142	0.0347***	0.0287**	0.0308***	0.0259***	0.0220***	0.0162**
	(0.0101)	(0.0106)	(0.0124)	(0.0121)	(0.0110)	(0.0087)	(0.0079)	(0.0068)
Pueblos de indios	-0.002	0.001	0.003	-0.002	-0.003	-0.011	-0.011	-0.010
	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)
Nearest colonial city (km)	-0.062	-0.076	-0.151	-0.099	-0.086	0.035	0.060	-0.026
	(0.101)	(0.112)	(0.130)	(0.133)	(0.124)	(0.098)	(0.104)	(0.087)
Nearest c.1800 mine (km)	0.042	0.061	0.193**	0.028	0.088	0.046	-0.035	0.021
	(0.053)	(0.067)	(0.084)	(0.093)	(0.091)	(0.077)	(0.076)	(0.070)
Average land gradient	-0.006***	-0.010***	-0.013***	-0.016***	-0.015***	-0.013***	-0.017***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Median altitude (km)	0.001	-0.004	-0.005	0.006	0.007	0.013**	0.001	0.005
	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Latitude	-0.002	0.000	0.009	-0.006	-0.003	-0.007	-0.014**	-0.008
	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Soil Suitability	0.001	-0.004	-0.005	0.001	0.002	0.000	0.003	0.005
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)
Area (100 km^2)	-0.0005	-0.0017***	-0.0013**	-0.0009	-0.0014*	-0.0012**	-0.0008	-0.0009*
	(0.0004)	(0.0006)	(0.0006)	(0.0008)	(0.0007)	(0.0006)	(0.0007)	(0.0006)
Constant	0.193**	0.268***	0.163	0.565***	0.546***	0.632***	0.969***	0.911***
	(0.084)	(0.101)	(0.134)	(0.145)	(0.138)	(0.116)	(0.113)	(0.103)
R-squared	0.375	0.426	0.442	0.437	0.449	0.427	0.518	0.552
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143
Mean dep. var.	0.128	0.203	0.253	0.356	0.397	0.431	0.576	0.664

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.3: Differences in Literacy by Distance to Hacienda for each year (Neighbors Sample), 1900-1990

	Model 1: Neighbors Sample							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0053	-0.0120***	-0.0202***	-0.0171***	-0.0137***	-0.0127***	-0.0119***	-0.0104***
	(0.0037)	(0.0038)	(0.0044)	(0.0042)	(0.0039)	(0.0031)	(0.0030)	(0.0024)
Pueblos de indios	0.003	0.017*	0.020*	0.014	0.014	0.002	0.003	0.001
	(0.010)	(0.009)	(0.012)	(0.011)	(0.010)	(0.009)	(0.008)	(0.007)
Nearest colonial city (km)	-0.241	-0.180	-0.215	-0.131	-0.218	-0.051	-0.023	-0.083
	(0.154)	(0.156)	(0.172)	(0.169)	(0.159)	(0.121)	(0.124)	(0.097)
Nearest c.1800 mine (km)	0.113	0.122	0.329**	0.139	0.228*	0.103	0.052	0.045
	(0.100)	(0.112)	(0.132)	(0.134)	(0.129)	(0.104)	(0.107)	(0.086)
Average land gradient	-0.006***	-0.011***	-0.014***	-0.017***	-0.014***	-0.012***	-0.016***	-0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Median altitude (km)	-0.020**	-0.027***	-0.039***	-0.030***	-0.030***	-0.018*	-0.027***	-0.020**
	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.010)	(0.009)
Latitude	0.008	0.009	0.025**	0.009	0.011	0.004	0.001	0.004
	(0.007)	(0.008)	(0.010)	(0.011)	(0.010)	(0.009)	(0.009)	(0.008)
Soil Suitability	-0.008	-0.017**	-0.023***	-0.013	-0.017	-0.019**	-0.012	-0.009
	(0.008)	(0.008)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	(0.007)
Area (100 km^2)	0.0000	-0.0006	-0.0006	-0.0002	-0.0007	-0.0006	-0.0008	-0.0008
	(0.0006)	(0.0008)	(0.0009)	(0.0010)	(0.0009)	(0.0007)	(0.0009)	(0.0007)
Constant	0.059	0.143	-0.079	0.348	0.327	0.483***	0.727***	0.735***
	(0.142)	(0.158)	(0.202)	(0.216)	(0.211)	(0.175)	(0.174)	(0.152)
R-squared	0.312	0.432	0.447	0.444	0.439	0.393	0.505	0.549
Municipalities	470	554	585	597	602	607	609	609
Mean dep. var.	0.145	0.224	0.283	0.389	0.429	0.456	0.610	0.697
	Model 2: Neighbors Sample							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0004	-0.0057	-0.0268**	-0.0219**	-0.0217**	-0.0179**	-0.0082	-0.0080
× Hacienda	(0.0098)	(0.0095)	(0.0111)	(0.0104)	(0.0101)	(0.0075)	(0.0074)	(0.0068)
Dist. hacienda (10km)	-0.0033	-0.0082*	-0.0128**	-0.0100*	-0.0056	-0.0059	-0.0054	-0.0063**
× Without	(0.0046)	(0.0049)	(0.0055)	(0.0053)	(0.0050)	(0.0040)	(0.0037)	(0.0031)
Hacienda	0.0064	0.0146	0.0353**	0.0333**	0.0393***	0.0324***	0.0276***	0.0178**
	(0.0125)	(0.0132)	(0.0150)	(0.0147)	(0.0132)	(0.0107)	(0.0093)	(0.0078)
Pueblos de indios	0.003	0.016*	0.019	0.013	0.013	0.001	0.002	0.000
	(0.010)	(0.009)	(0.012)	(0.011)	(0.010)	(0.009)	(0.008)	(0.007)
Nearest colonial city (km)	-0.236	-0.175	-0.213	-0.129	-0.217	-0.050	-0.019	-0.080
	(0.154)	(0.157)	(0.171)	(0.168)	(0.157)	(0.121)	(0.123)	(0.097)
Nearest c.1800 mine (km)	0.115	0.131	0.332**	0.141	0.230*	0.106	0.058	0.049
	(0.101)	(0.112)	(0.130)	(0.133)	(0.128)	(0.103)	(0.106)	(0.086)
Average land gradient	-0.006***	-0.011***	-0.014***	-0.017***	-0.014***	-0.012***	-0.016***	-0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Median altitude (km)	-0.018**	-0.025***	-0.036***	-0.027**	-0.026***	-0.015	-0.024**	-0.018**
	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.010)	(0.009)
Latitude	0.007	0.008	0.023**	0.007	0.009	0.002	-0.001	0.003
	(0.007)	(0.008)	(0.010)	(0.011)	(0.011)	(0.009)	(0.009)	(0.008)
Soil Suitability	-0.008	-0.018**	-0.025***	-0.015	-0.019*	-0.020**	-0.014	-0.010
	(0.008)	(0.008)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.007)
Area (100 km^2)	-0.0002	-0.0010	-0.0011	-0.0008	-0.0013	-0.0011	-0.0014	-0.0012*
	(0.0006)	(0.0008)	(0.0009)	(0.0010)	(0.0009)	(0.0008)	(0.0009)	(0.0007)
Constant	0.061	0.151	-0.067	0.360*	0.341	0.495***	0.741***	0.744***
	(0.141)	(0.159)	(0.202)	(0.216)	(0.212)	(0.175)	(0.174)	(0.152)
R-squared	0.314	0.436	0.453	0.450	0.448	0.402	0.513	0.554
Municipalities	470	554	585	597	602	607	609	609
Mean dep. var.	0.145	0.224	0.283	0.389	0.429	0.456	0.610	0.697

Notes: Cross-section OLS with robust SE. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.4: Differences in Marginalization Index by Distance to Hacienda for each year, 1970-1990

	Main Sample						Neighbors Sample					
	Model 1			Model 2			Model 1			Model 2		
	1970	1980	1990	1970	1980	1990	1970	1980	1990	1970	1980	1990
Dist. hacienda (10km)	1.04***	1.30***	1.04***				1.85***	2.25***	1.69***			
	(0.27)	(0.26)	(0.20)				(0.55)	(0.53)	(0.41)			
Dist×Hacienda				2.35	2.58	1.38				2.22	2.50	1.15
				(1.57)	(1.65)	(1.34)				(1.57)	(1.74)	(1.44)
Dist×Without				0.64**	0.93***	0.75***				0.86	1.30**	0.93*
				(0.29)	(0.27)	(0.21)				(0.66)	(0.63)	(0.49)
Hacienda				-5.69***	-5.65***	-4.06***				-4.49**	-4.33**	-3.18**
				(1.66)	(1.53)	(1.24)				(1.88)	(1.72)	(1.40)
Pueblos de indios	1.08	0.93	1.09	1.32	1.19	1.28	-0.99	-1.09	-1.03	-0.83	-0.93	-0.90
	(1.18)	(1.09)	(0.84)	(1.17)	(1.09)	(0.84)	(1.48)	(1.40)	(1.07)	(1.48)	(1.39)	(1.06)
Nearest colonial city	24.9	28.2*	15.1	21.9	25.1	12.7	65.1***	47.8**	23.4	64.5***	47.5**	22.9
	(17.0)	(16.0)	(12.7)	(16.9)	(15.9)	(12.8)	(23.2)	(21.0)	(16.5)	(23.1)	(20.9)	(16.4)
Nearest c.1800 mine	-22.8**	-21.9**	-17.7**	-22.5**	-21.6**	-17.6**	-12.9	-7.7	-9.5	-12.7	-8.2	-10.2
	(11.3)	(10.6)	(8.5)	(11.2)	(10.6)	(8.4)	(16.8)	(16.6)	(13.2)	(16.6)	(16.4)	(13.0)
Avg land gradient	1.50***	1.94***	1.92***	1.51***	1.94***	1.92***	2.04***	2.46***	2.26***	2.08***	2.49***	2.29***
	(0.16)	(0.14)	(0.12)	(0.16)	(0.14)	(0.12)	(0.22)	(0.21)	(0.18)	(0.22)	(0.21)	(0.18)
Median altitude	-0.73	-0.79	-1.85***	-1.30	-1.30*	-2.24***	0.86	0.29	0.32	0.41	-0.12	-0.03
	(0.78)	(0.75)	(0.63)	(0.80)	(0.76)	(0.64)	(1.34)	(1.31)	(1.14)	(1.34)	(1.30)	(1.13)
Latitude	-1.31	0.05	0.94	-0.94	0.38	1.19*	-0.24	1.25	0.45	0.07	1.49	0.66
	(0.84)	(0.84)	(0.66)	(0.84)	(0.84)	(0.66)	(1.38)	(1.39)	(1.12)	(1.39)	(1.38)	(1.11)
Soil Suitability	0.94	1.27	0.82	0.97	1.32	0.86	0.54	1.19	1.04	0.81	1.41	1.21
	(0.98)	(0.93)	(0.76)	(0.97)	(0.92)	(0.76)	(1.46)	(1.34)	(1.12)	(1.47)	(1.35)	(1.13)
Area (100 km^2)	0.049	0.146	0.115	0.089	0.184*	0.150*	-0.124	-0.020	0.057	-0.042	0.061	0.131
	(0.09)	(0.10)	(0.08)	(0.08)	(0.10)	(0.08)	(0.12)	(0.13)	(0.10)	(0.12)	(0.13)	(0.11)
Constant	85.3***	40.5**	16.1	80.6***	36.4**	13.1	55.7**	9.2	18.0	52.5*	7.3	16.3
	(17.3)	(17.2)	(13.5)	(17.1)	(17.1)	(13.4)	(27.3)	(27.3)	(21.9)	(27.2)	(27.1)	(21.7)
R-squared	0.393	0.492	0.571	0.401	0.499	0.576	0.430	0.476	0.520	0.437	0.483	0.527
Municipalities	1,061	1,141	1,143	1,061	1,141	1,143	592	609	609	592	609	609
Mean dep. var.	67.9	53.6	43.7	67.9	53.6	43.7	64.4	48.5	38.8	64.4	48.5	38.8

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table B.5: Pooled Data Differences in Marginalization Index by Distance to Hacienda, 1970-1990

	Main Sample						Neighbors Sample			
	Model 1		Model 2		Hac (binary)		Model 1		Model 2	
Year = 1990	-25.92***	(0.41)	-26.56***	(0.49)	-25.29***	(0.26)	-25.22***	(0.56)	-26.27***	(0.78)
1990×Distance	1.09***	(0.22)					1.43***	(0.44)		
1990×Dist×Hacienda			1.13	(1.33)					0.98	(1.39)
1990×Dist×Without			0.82***	(0.23)					0.72	(0.53)
1990×Hacienda			-3.50***	(1.27)	-4.56***	(0.91)			-2.76*	(1.44)
Year = 1980	-17.05***	(0.33)	-17.20***	(0.42)	-15.22***	(0.23)	-17.35***	(0.42)	-17.86***	(0.64)
1980×Distance	1.41***	(0.24)					2.54***	(0.50)		
1980×Dist×Hacienda			2.93*	(1.64)					2.79*	(1.68)
1980×Dist×Without			1.03***	(0.26)					1.63***	(0.59)
1980×Hacienda			-5.82***	(1.50)	-6.45***	(1.08)			-4.14**	(1.68)
Year = 1970										
1970×Distance	0.84***	(0.24)					1.81***	(0.52)		
1970×Dist×Hacienda			2.23	(1.58)					2.10	(1.61)
1970×Dist×Without			0.44*	(0.26)					0.73	(0.61)
1970×Hacienda			-6.12***	(1.67)	-5.21***	(1.19)			-5.14***	(1.86)
Pueblos de indios	1.03	(0.98)	1.26	(0.98)	1.33	(0.97)	-1.03	(1.23)	-0.88	(1.23)
Nearest colonial city	22.52	(14.56)	19.73	(14.52)	32.57**	(14.20)	45.13**	(19.12)	44.68**	(18.99)
Nearest c.1800 mine	-19.91**	(9.48)	-19.74**	(9.40)	-18.26*	(9.49)	-9.60	(14.63)	-9.94	(14.41)
Average land gradient	1.80***	(0.13)	1.81***	(0.13)	1.87***	(0.13)	2.26***	(0.19)	2.29***	(0.19)
Median altitude	-1.16*	(0.67)	-1.64**	(0.68)	-2.58***	(0.64)	0.48	(1.19)	0.07	(1.18)
Latitude	-0.06	(0.74)	0.26	(0.73)	0.88	(0.73)	0.52	(1.22)	0.77	(1.21)
Soil Suitability	0.99	(0.84)	1.03	(0.84)	1.27	(0.83)	0.94	(1.23)	1.16	(1.24)
Area (100 km^2)	0.10	(0.09)	0.14*	(0.08)	0.19**	(0.08)	-0.03	(0.11)	0.05	(0.11)
Constant	60.5***	(15.1)	56.9***	(15.0)	45.9***	(15.0)	41.2*	(23.9)	39.5*	(23.6)
R-squared	0.627		0.632		0.628		0.642		0.646	
Municipalities	3,345		3,345		3,345		1,810		1,810	

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table B.6: Differences in Outcomes by Presence of Hacienda (binary) for each year, 1900-1990

	Literacy								Marginalization index		
	1900	1930	1940	1950	1960	1970	1980	1990	1970	1980	1990
Hacienda	0.013*	0.024***	0.039***	0.034***	0.034***	0.030***	0.033***	0.025***	-5.52***	-5.95***	-4.78***
	(0.007)	(0.008)	(0.010)	(0.009)	(0.008)	(0.007)	(0.006)	(0.005)	(1.21)	(1.11)	(0.88)
Pueblos de indios	-0.002	0.000	0.002	-0.004	-0.004	-0.011	-0.012	-0.011*	1.34	1.30	1.36
	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)	(1.17)	(1.08)	(0.83)
Nearest colonial city	-0.084	-0.173	-0.313**	-0.254*	-0.227*	-0.089	-0.078	-0.143*	32.01*	41.10***	25.70**
	(0.096)	(0.108)	(0.127)	(0.131)	(0.122)	(0.097)	(0.104)	(0.087)	(16.54)	(15.65)	(12.46)
Nearest c.1800 mine	0.039	0.051	0.180**	0.014	0.076	0.034	-0.050	0.007	-21.26*	-20.24*	-16.19*
	(0.053)	(0.068)	(0.085)	(0.094)	(0.092)	(0.078)	(0.077)	(0.070)	(11.28)	(10.67)	(8.47)
Avg land gradient	-0.007***	-0.011***	-0.014***	-0.017***	-0.016***	-0.014***	-0.018***	-0.016***	1.58***	2.02***	1.98***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.16)	(0.14)	(0.12)
Median altitude	0.002	0.003	0.006	0.017**	0.017***	0.021***	0.011*	0.013***	-2.13***	-2.41***	-3.15***
	(0.004)	(0.005)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.74)	(0.71)	(0.60)
Latitude	-0.003	-0.004	0.001	-0.013*	-0.010	-0.013**	-0.021***	-0.013***	-0.39	1.12	1.79***
	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)	(0.006)	(0.005)	(0.005)	(0.82)	(0.83)	(0.66)
Soil Suitability	0.001	-0.006	-0.009	-0.002	-0.001	-0.002	0.000	0.002	1.12	1.63*	1.11
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)	(0.97)	(0.91)	(0.76)
Area (100 km^2)	-0.001	-0.002***	-0.002***	-0.002*	-0.002**	-0.002***	-0.001*	-0.001**	0.13	0.24**	0.19**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.08)	(0.10)	(0.08)
Constant	0.21***	0.34***	0.29**	0.68***	0.65***	0.72***	1.07***	1.00***	71.7***	24.7	3.6
	(0.08)	(0.10)	(0.13)	(0.14)	(0.14)	(0.12)	(0.11)	(0.10)	(16.9)	(17.1)	(13.5)
R-squared	0.375	0.420	0.431	0.429	0.441	0.419	0.510	0.545	0.398	0.493	0.571
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143	1,061	1,141	1,143
Mean dep. var.	0.13	0.20	0.25	0.36	0.40	0.43	0.58	0.66	67.9	53.6	43.7

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table B.7: Nearest Neighbor Matching by Closeness to Hacienda for each year, 1900-1990

	Within 23km				Within 29km			
	NNM-1	NNM-2	NNM-3	PSM	NNM-1	NNM-2	NNM-3	PSM
Literacy								
Year = 1900	0.0156**	0.0159***	0.0140**	-0.0151	0.0183**	0.0197***	0.0191***	0.0068
(N=666)	[.0024,.029]	[.004,.028]	[.0029,.025]	[-.04,.0095]	[.0043,.032]	[.0072,.032]	[.0073,.031]	[-.015,.029]
Year = 1930	0.0396***	0.0387***	0.0335***	0.0256**	0.0334***	0.0331***	0.0281***	0.0229*
(N=774)	[.022,.057]	[.022,.055]	[.018,.049]	[.0051,.046]	[.014,.053]	[.016,.051]	[.012,.045]	[-.0033,.049]
Year = 1940	0.0592***	0.0565***	0.0528***	0.0356***	0.0379***	0.0439***	0.0375***	0.0294*
(N=805)	[.038,.081]	[.037,.076]	[.035,.071]	[.013,.058]	[.013,.063]	[.022,.066]	[.017,.058]	[-.0013,.06]
Year = 1950	0.0551***	0.0474***	0.0426***	0.0399**	0.0297**	0.0375***	0.0311***	0.0399***
(N=813)	[.027,.083]	[.023,.072]	[.021,.064]	[.0033,.076]	[.0026,.057]	[.014,.061]	[.0094,.053]	[.011,.069]
Year = 1960	0.0530***	0.0445***	0.0409***	0.0249*	0.0319**	0.0377***	0.0315***	0.0330**
(N=813)	[.027,.079]	[.021,.068]	[.019,.062]	[-.0042,.054]	[.006,.058]	[.015,.06]	[.01,.052]	[.0034,.062]
Year = 1970	0.0399***	0.0352***	0.0317***	0.0234*	0.0293***	0.0317***	0.0265***	0.0280**
(N=817)	[.019,.061]	[.017,.054]	[.014,.049]	[-.0043,.051]	[.01,.048]	[.015,.048]	[.011,.042]	[.0033,.053]
Year = 1980	0.0444***	0.0368***	0.0336***	0.0222	0.0294***	0.0315***	0.0267***	0.0325**
(N=815)	[.023,.066]	[.018,.056]	[.016,.051]	[-.0094,.054]	[.0092,.05]	[.014,.049]	[.011,.043]	[.00047,.065]
Year = 1990	0.0345***	0.0278***	0.0255***	0.0190*	0.0212**	0.0266***	0.0238***	0.0209*
(N=816)	[.016,.053]	[.012,.044]	[.011,.04]	[-.0019,.04]	[.0038,.039]	[.012,.042]	[.01,.037]	[-.0026,.044]
Marginalization Index								
Year = 1970	-4.764***	-5.134***	-5.353***	-2.756**	-4.549***	-4.972***	-4.386***	-4.567***
(N=741)	[-7.7,-1.8]	[-7.7,-2.5]	[-7.8,-2.9]	[-5,-.47]	[-7.6,-1.5]	[-7.7,-2.2]	[-7,-1.8]	[-7.3,-1.8]
Year = 1980	-5.194***	-5.017***	-4.660***	-3.096**	-4.286***	-4.900***	-4.496***	-5.907***
(N=815)	[-8.3,-2.1]	[-7.8,-2.2]	[-7.2,-2.1]	[-5.8,-.39]	[-7.2,-1.4]	[-7.5,-2.3]	[-7,-2]	[-9.6,-2.3]
Year = 1990	-4.437***	-4.243***	-4.032***	-2.197**	-2.700**	-3.566***	-3.545***	-3.245**
(N=816)	[-6.8,-2.1]	[-6.4,-2.1]	[-6,-2]	[-4.1,-.27]	[-5.2,-.19]	[-5.8,-1.3]	[-5.7,-1.4]	[-5.9,-.59]

Notes: Average Treatment Effect on the Treated (ATT) with 95% CI over census year. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.8: Nearest Neighbor Matching by Closeness to Hacienda (Neighbors) for each year, 1900-1990

	Within 13km				Within 16km			
	NNM-1	NNM-2	NNM-3	PSM	NNM-1	NNM-2	NNM-3	PSM
Literacy								
Year = 1900	0.0057	0.0060	0.0071	0.0097	0.0176**	0.0155**	0.0127*	0.0117
(N=414)	[-.0086,.02]	[-.0073,.019]	[-.006,.02]	[-.011,.031]	[.0039,.031]	[.0026,.028]	[-.00021,.026]	[-.019,.042]
Year = 1930	0.0287***	0.0270***	0.0299***	0.0307**	0.0369***	0.0325***	0.0299***	0.0216**
(N=503)	[.011,.047]	[.011,.043]	[.014,.046]	[.004,.057]	[.02,.053]	[.018,.047]	[.015,.044]	[.0044,.039]
Year = 1940	0.0434***	0.0426***	0.0444***	0.0746***	0.0595***	0.0560***	0.0502***	0.0567***
(N=530)	[.02,.067]	[.023,.063]	[.025,.064]	[.048,.1]	[.038,.081]	[.036,.076]	[.031,.069]	[.034,.079]
Year = 1950	0.0396***	0.0437***	0.0460***	0.0568***	0.0519***	0.0513***	0.0476***	0.0320***
(N=541)	[.016,.063]	[.023,.064]	[.026,.066]	[.028,.086]	[.029,.075]	[.03,.073]	[.027,.068]	[.0088,.055]
Year = 1960	0.0402***	0.0391***	0.0387***	0.0526***	0.0458***	0.0425***	0.0397***	0.0203*
(N=545)	[.02,.061]	[.021,.057]	[.021,.057]	[.029,.076]	[.026,.066]	[.024,.061]	[.022,.058]	[-.0013,.042]
Year = 1970	0.0180**	0.0217***	0.0210***	0.0183*	0.0300***	0.0298***	0.0270***	0.0219**
(N=550)	[.00093,.035]	[.0061,.037]	[.0061,.036]	[-.0017,.038]	[.013,.047]	[.014,.046]	[.012,.042]	[.0037,.04]
Year = 1980	0.0296***	0.0317***	0.0313***	0.0323***	0.0383***	0.0356***	0.0316***	0.0133
(N=552)	[.015,.045]	[.018,.045]	[.019,.044]	[.013,.051]	[.021,.056]	[.02,.051]	[.017,.046]	[-.003,.029]
Year = 1990	0.0220***	0.0234***	0.0234***	0.0248***	0.0307***	0.0279***	0.0247***	0.0090
(N=552)	[.0098,.034]	[.012,.034]	[.013,.034]	[.0093,.04]	[.016,.045]	[.015,.04]	[.013,.036]	[-.005,.023]
Marginalization Index								
Year = 1970	-0.548	-1.098	-1.431	-1.925	-3.551***	-3.671***	-3.479***	-4.391***
(N=538)	[-4,2.9]	[-4.2,2]	[-4.3,1.5]	[-4.8,.94]	[-6.1,-1]	[-5.9,-1.4]	[-5.7,-1.2]	[-7.3,-1.5]
Year = 1980	-2.639*	-3.254***	-3.433***	-2.659*	-4.660***	-4.637***	-4.202***	-2.265*
(N=552)	[-5.4,.16]	[-5.7,-.84]	[-5.7,-1.2]	[-5.4,.1]	[-7.1,-2.2]	[-6.8,-2.5]	[-6.3,-2.1]	[-4.9,.34]
Year = 1990	-1.869*	-2.213**	-2.276**	-2.075*	-3.528***	-3.285***	-2.792***	-1.399
(N=552)	[-4,.3]	[-4.1,-.33]	[-4.1,-.5]	[-4.4,.25]	[-5.6,-1.5]	[-5.1,-1.5]	[-4.5,-1.1]	[-3.6,.84]

Notes: ATT with 95% CI over census year. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.9: Sensitivity Test to Covariates, Pooled Data Differences in Literacy by Distance to Hacienda, 1900-1990

	Literacy									
	(1) None	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) All
Year = 1990	0.558***	0.558***	0.558***	0.558***	0.558***	0.558***	0.558***	0.558***	0.557***	0.557***
	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0041)	(0.0041)
1990 × Distance	-0.014***	-0.014***	-0.014***	-0.014***	-0.013***	-0.016***	-0.014***	-0.013***	-0.010***	-0.009***
	(0.0014)	(0.0014)	(0.0014)	(0.0015)	(0.0016)	(0.0016)	(0.0014)	(0.0015)	(0.0013)	(0.0016)
Year = 1980	0.474***	0.474***	0.474***	0.473***	0.474***	0.474***	0.473***	0.474***	0.472***	0.472***
	(0.0045)	(0.0045)	(0.0046)	(0.0045)	(0.0045)	(0.0045)	(0.0046)	(0.0045)	(0.0045)	(0.0045)
1980 × Distance	-0.015***	-0.015***	-0.015***	-0.015***	-0.014***	-0.017***	-0.015***	-0.015***	-0.011***	-0.010***
	(0.0016)	(0.0016)	(0.0015)	(0.0016)	(0.0017)	(0.0017)	(0.0015)	(0.0016)	(0.0014)	(0.0017)
Year = 1970	0.323***	0.323***	0.323***	0.323***	0.323***	0.323***	0.322***	0.323***	0.322***	0.321***
	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0042)	(0.0042)	(0.0042)
1970 × Distance	-0.013***	-0.013***	-0.013***	-0.013***	-0.012***	-0.015***	-0.013***	-0.013***	-0.009***	-0.008***
	(0.0015)	(0.0015)	(0.0014)	(0.0015)	(0.0016)	(0.0016)	(0.0014)	(0.0015)	(0.0014)	(0.0017)
Year = 1960	0.299***	0.299***	0.299***	0.299***	0.299***	0.299***	0.299***	0.299***	0.298***	0.298***
	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)
1960 × Distance	-0.017***	-0.017***	-0.017***	-0.017***	-0.016***	-0.019***	-0.017***	-0.016***	-0.013***	-0.012***
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0016)	(0.0017)	(0.0016)	(0.0018)
Year = 1950	0.262***	0.262***	0.262***	0.262***	0.262***	0.262***	0.261***	0.262***	0.260***	0.260***
	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0051)	(0.0051)	(0.0052)	(0.0051)	(0.0051)	(0.0051)
1950 × Distance	-0.018***	-0.018***	-0.018***	-0.018***	-0.017***	-0.020***	-0.018***	-0.017***	-0.014***	-0.013***
	(0.0017)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0019)	(0.0017)	(0.0017)	(0.0016)	(0.0018)
Year = 1940	0.152***	0.152***	0.152***	0.152***	0.152***	0.152***	0.152***	0.152***	0.151***	0.151***
	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)
1940 × Distance	-0.016***	-0.016***	-0.016***	-0.016***	-0.015***	-0.018***	-0.016***	-0.015***	-0.012***	-0.011***
	(0.0016)	(0.0016)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0016)	(0.0017)	(0.0015)	(0.0018)
Year = 1930	0.086***	0.086***	0.086***	0.085***	0.086***	0.086***	0.085***	0.086***	0.086***	0.085***
	(0.0037)	(0.0037)	(0.0037)	(0.0038)	(0.0037)	(0.0038)	(0.0038)	(0.0037)	(0.0037)	(0.0037)
1930 × Distance	-0.010***	-0.010***	-0.010***	-0.010***	-0.009***	-0.012***	-0.010***	-0.010***	-0.007***	-0.005***
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0016)	(0.0016)	(0.0014)	(0.0014)	(0.0013)	(0.0016)
Year = 1900										
1900 × Distance	-0.006***	-0.006***	-0.006***	-0.006***	-0.005***	-0.008***	-0.006***	-0.005***	-0.002*	-0.001
	(0.0012)	(0.0012)	(0.0013)	(0.0013)	(0.0014)	(0.0014)	(0.0012)	(0.0013)	(0.0012)	(0.0015)
Nearest c.1800		-0.009								0.058
mine (km)		(0.0684)								(0.0671)
Latitude			-0.002							-0.002
			(0.0049)							(0.0050)
Area (100 km^2)				-0.001						-0.001*
				(0.0006)						(0.0006)
Nearest colonial					-0.136					-0.063
city (km)					(0.1007)					(0.0979)
Median altitude						-0.011*				0.001
(km)						(0.0057)				(0.0052)
Pueblos de indios							-0.021***			-0.004
							(0.0072)			(0.0068)
Soil Suitability								-0.018***		0.001
								(0.0063)		(0.0060)
Average land									-0.013***	-0.014***
gradient									(0.0009)	(0.0010)
Constant	0.147***	0.148***	0.192**	0.149***	0.153***	0.171***	0.165***	0.149***	0.201***	0.248**
	(0.0045)	(0.0096)	(0.0963)	(0.0046)	(0.0064)	(0.0126)	(0.0072)	(0.0044)	(0.0053)	(0.1013)
R-squared	0.7837	0.7837	0.7837	0.7838	0.7840	0.7844	0.7849	0.7850	0.8169	0.8176
Municipalities	8,694	8,694	8,694	8,694	8,694	8,694	8,694	8,694	8,694	8,694
p-value, $H_0 : \beta = \beta_{none}$		1.0000	1.0000	0.9831	0.9848	0.8824	0.9129	0.5750	0.0000	0.0088

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.10: Sensitivity Test to Covariates, Pooled Data Differences in Marginalization Index by Distance to Hacienda, 1970-1990

	Marginalization Index									
	(1) None	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) All
Year = 1990	-25.81***	-25.81***	-25.81***	-25.82***	-25.81***	-25.82***	-25.81***	-25.76***	-25.89***	-25.92***
	(0.411)	(0.411)	(0.411)	(0.412)	(0.411)	(0.410)	(0.411)	(0.412)	(0.405)	(0.407)
1990 × Distance	2.05***	2.03***	2.12***	2.06***	2.01***	1.77***	2.06***	1.92***	1.53***	1.09***
	(0.200)	(0.203)	(0.224)	(0.199)	(0.208)	(0.222)	(0.194)	(0.203)	(0.183)	(0.220)
Year = 1980	-16.98***	-16.98***	-16.98***	-16.99***	-16.98***	-16.99***	-16.97***	-16.94***	-17.03***	-17.05***
	(0.330)	(0.330)	(0.330)	(0.330)	(0.330)	(0.329)	(0.331)	(0.332)	(0.326)	(0.327)
1980 × Distance	2.39***	2.37***	2.46***	2.39***	2.35***	2.10***	2.39***	2.25***	1.85***	1.41***
	(0.223)	(0.226)	(0.247)	(0.222)	(0.230)	(0.240)	(0.218)	(0.225)	(0.202)	(0.239)
Year = 1970										
1970 × Distance	1.85***	1.83***	1.92***	1.85***	1.81***	1.56***	1.86***	1.73***	1.30***	0.84***
	(0.219)	(0.224)	(0.243)	(0.219)	(0.227)	(0.237)	(0.214)	(0.221)	(0.207)	(0.244)
Latitude		0.25								-0.06
		(0.708)								(0.735)
Median altitude			0.44							-1.16*
(km)			(0.725)							(0.675)
Nearest c.1800				-8.06						-19.91**
mine (km)				(9.402)						(9.482)
Area (100 km^2)					0.09					0.10
					(0.091)					(0.087)
Nearest colonial						32.97**				22.52
city (km)						(14.773)				(14.563)
Pueblos de indios							3.33***			1.03
							(1.026)			(0.980)
Soil Suitability								3.30***		0.99
								(0.833)		(0.843)
Average land									1.82***	1.80***
gradient									(0.121)	(0.130)
Constant	63.19***	58.36***	62.23***	64.17***	63.00***	61.95***	60.47***	62.88***	56.35***	60.52***
	(0.764)	(13.867)	(1.735)	(1.365)	(0.767)	(1.022)	(1.031)	(0.754)	(0.780)	(15.088)
R-squared	0.5488	0.5488	0.5489	0.5491	0.5491	0.5510	0.5530	0.5547	0.6221	0.6269
Municipalities	3,345	3,345	3,345	3,345	3,345	3,345	3,345	3,345	3,345	3,345
p-value, $H_0 : \beta = \beta_{none}$		0.9888	0.9470	0.8779	0.7809	0.1702	0.5747	0.0064	0.0000	0.0000

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table B.11: Placebo Differences by Distance to Hacienda for each year, 1900-1990

	Model 1									
	Literacy								Marginalization	
	1900	1930	1940	1950	1960	1970	1980	1990	1980	1990
Dist. hacienda	0.004*	0.003	0.003	0.007	-0.000	-0.000	0.001	-0.000	0.602	0.697*
(10km)	(0.002)	(0.002)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.397)	(0.375)
Pueblos de indios	-0.010	-0.002	-0.032	-0.031	-0.035*	-0.030*	-0.029**	-0.020	3.171**	1.619
	(0.012)	(0.011)	(0.020)	(0.021)	(0.021)	(0.017)	(0.015)	(0.015)	(1.591)	(1.402)
Nearest colonial	-0.120	-0.126	-0.428**	-1.193***	-0.902***	-0.882***	-1.129***	-0.904***	42.304*	3.169
city	(0.138)	(0.136)	(0.203)	(0.295)	(0.291)	(0.246)	(0.224)	(0.204)	(22.850)	(21.486)
Nearest c.1800	0.091**	0.166***	0.431***	0.830***	0.977***	0.821***	0.728***	0.693***	-74.140***	-66.742***
mine	(0.044)	(0.052)	(0.074)	(0.105)	(0.110)	(0.090)	(0.089)	(0.087)	(8.611)	(8.163)
Average land	-0.005***	-0.004***	-0.009***	-0.010***	-0.009***	-0.006***	-0.010***	-0.011***	0.986***	1.104***
gradient	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.160)	(0.156)
Median altitude	0.020***	0.009	0.012	0.020*	0.030**	0.010	-0.000	0.002	4.127***	1.312
	(0.005)	(0.006)	(0.009)	(0.012)	(0.013)	(0.010)	(0.010)	(0.009)	(0.903)	(0.891)
Latitude	0.021***	0.037***	0.076***	0.157***	0.177***	0.159***	0.129***	0.106***	-14.770***	-11.595***
	(0.006)	(0.009)	(0.012)	(0.017)	(0.018)	(0.015)	(0.014)	(0.012)	(1.269)	(1.191)
Soil Suitability	0.002	-0.010*	-0.015*	-0.013	-0.014	-0.010	0.001	-0.003	-0.538	0.782
	(0.004)	(0.006)	(0.008)	(0.011)	(0.012)	(0.010)	(0.010)	(0.009)	(0.943)	(0.816)
Area (100 km^2)	0.0010	0.0010	0.0017	0.0007	0.0015	0.0012	0.0013	-0.0002	0.1804	0.1536
	(0.0012)	(0.0016)	(0.0020)	(0.0031)	(0.0033)	(0.0026)	(0.0023)	(0.0021)	(0.2635)	(0.2254)
Constant	-0.33***	-0.54***	-1.19***	-2.52***	-2.89***	-2.47***	-1.74***	-1.27***	321.83***	260.66***
	(0.11)	(0.15)	(0.21)	(0.30)	(0.32)	(0.26)	(0.25)	(0.22)	(22.94)	(21.26)
R-squared	0.130	0.117	0.205	0.310	0.306	0.329	0.343	0.349	0.339	0.315
Municipalities	496	494	491	500	502	502	502	502	502	502
Mean dep. var.	0.06	0.13	0.15	0.30	0.33	0.39	0.53	0.61	67.11	55.59

	Model 2									
	Marginalization index									
	1970	1980	1990	Xhac_1950	Xhac_1960	Xhac_1970	Xhac_1980	Xhac_1990	Xhac2_1980	Xhac2_1990
Hacienda=0 × Dist. hacienda (10km)	0.0039	0.0027	0.0032	0.0071	0.0002	0.0005	0.0018	0.0008	0.3076	0.4063
	(0.0025)	(0.0025)	(0.0037)	(0.0052)	(0.0055)	(0.0044)	(0.0040)	(0.0037)	(0.4037)	(0.3828)
Hacienda=1 × Dist. hacienda (10km)	-0.0147	-0.0184	0.0085	0.0644	0.0639	0.0430	0.0622*	0.0513*	-7.2894	-6.9938
	(0.0346)	(0.0453)	(0.0471)	(0.0527)	(0.0515)	(0.0354)	(0.0372)	(0.0265)	(4.8450)	(4.9195)
Hacienda	0.006	0.016	0.004	-0.037	-0.027	-0.006	-0.020	0.003	-3.215	-3.228
	(0.021)	(0.026)	(0.030)	(0.030)	(0.029)	(0.024)	(0.024)	(0.017)	(2.940)	(3.117)
	-0.010	-0.002	-0.032	-0.030	-0.035*	-0.031*	-0.029**	-0.021	3.546**	1.990
	(0.012)	(0.011)	(0.020)	(0.021)	(0.021)	(0.017)	(0.015)	(0.015)	(1.570)	(1.384)
	-0.110	-0.108	-0.428**	-1.237***	-0.943***	-0.902***	-1.164***	-0.922***	43.287*	4.070
	(0.140)	(0.135)	(0.205)	(0.300)	(0.298)	(0.250)	(0.229)	(0.209)	(22.791)	(21.755)
	0.088*	0.160***	0.429***	0.845***	0.987***	0.823***	0.735***	0.691***	-72.755***	-65.354***
	(0.045)	(0.052)	(0.075)	(0.106)	(0.112)	(0.091)	(0.090)	(0.089)	(8.704)	(8.259)
	-0.005***	-0.004***	-0.009***	-0.010***	-0.009***	-0.006***	-0.011***	-0.011***	0.977***	1.094***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.159)	(0.157)
	0.020***	0.009	0.012	0.019	0.029**	0.010	-0.001	0.002	4.050***	1.235
	(0.005)	(0.006)	(0.009)	(0.012)	(0.013)	(0.010)	(0.010)	(0.009)	(0.896)	(0.879)
	0.021***	0.037***	0.076***	0.157***	0.178***	0.159***	0.130***	0.106***	-14.537***	-11.364***
	(0.006)	(0.009)	(0.012)	(0.017)	(0.018)	(0.015)	(0.014)	(0.012)	(1.263)	(1.188)
	0.002	-0.010*	-0.015*	-0.013	-0.015	-0.010	0.001	-0.003	-0.536	0.783
	(0.004)	(0.006)	(0.008)	(0.011)	(0.012)	(0.010)	(0.010)	(0.009)	(0.950)	(0.816)
	0.0010	0.0010	0.0016	0.0005	0.0012	0.0009	0.0011	-0.0006	0.2495	0.2215
	(0.0012)	(0.0016)	(0.0021)	(0.0032)	(0.0034)	(0.0027)	(0.0023)	(0.0021)	(0.2623)	(0.2276)
	-0.326***	-0.535***	-1.183***	-2.528***	-2.894***	-2.462***	-1.739***	-1.260***	318.501***	257.365***
	(0.108)	(0.151)	(0.211)	(0.298)	(0.320)	(0.262)	(0.248)	(0.220)	(22.845)	(21.221)
	0.130	0.118	0.205	0.311	0.306	0.329	0.344	0.352	0.354	0.331
	496	494	491	500	502	502	502	502	502	502
	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	67.1	55.6

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.12: Placebo Pooled Data Differences by Distance to Hacienda, 1900-1990

	Literacy				Marginalization Index			
	Model 1		Model 2		Model 1		Model 2	
Year = 1990	0.611***	(0.008)	0.605***	(0.009)	-11.877***	(0.485)	-11.992***	(0.558)
1990×Distance	-0.003	(0.003)			0.703*	(0.377)		
1990×Dist×Hacienda			0.032	(0.025)			-7.894	(4.900)
1990×Dist×Without			-0.002	(0.003)			0.422	(0.386)
1990×Hacienda			0.013	(0.016)			-2.678	(3.037)
Year = 1980	0.532***	(0.009)	0.529***	(0.010)				
1980×Distance	-0.003	(0.003)			0.597	(0.363)		
1980×Dist×Hacienda			0.034	(0.036)			-6.389	(4.778)
1980×Dist×Without			-0.003	(0.003)			0.292	(0.370)
1980×Hacienda			-0.007	(0.023)			-3.764	(2.974)
Year = 1970	0.384***	(0.010)	0.381***	(0.012)				
1970×Distance	-0.001	(0.003)						
1970×Dist×Hacienda			0.033	(0.035)				
1970×Dist×Without			-0.001	(0.004)				
1970×Hacienda			-0.002	(0.025)				
Year = 1960	0.333***	(0.012)	0.331***	(0.014)				
1960×Distance	-0.004	(0.004)						
1960×Dist×Hacienda			0.040	(0.049)				
1960×Dist×Without			-0.004	(0.004)				
1960×Hacienda			-0.016	(0.030)				
Year = 1950	0.284***	(0.011)	0.285***	(0.013)				
1950×Distance	-0.001	(0.004)						
1950×Dist×Hacienda			0.024	(0.050)				
1950×Dist×Without			-0.001	(0.004)				
1950×Hacienda			-0.024	(0.031)				
Year = 1940	0.118***	(0.007)	0.115***	(0.009)				
1940×Distance	0.006	(0.003)						
1940×Dist×Hacienda			0.023	(0.046)				
1940×Dist×Without			0.006*	(0.004)				
1940×Hacienda			-0.002	(0.029)				
Year = 1930	0.072***	(0.006)	0.071***	(0.006)				
1930×Distance	0.011***	(0.003)						
1930×Dist×Hacienda			0.035	(0.043)				
1930×Dist×Without			0.012***	(0.003)				
1930×Hacienda			-0.007	(0.026)				
Year = 1900								
1900×Distance	0.013***	(0.003)						
1900×Dist×Hacienda			0.040	(0.036)				
1900×Dist×Without			0.013***	(0.003)				
1900×Hacienda			-0.017	(0.021)				
Pueblos de indios	-0.024*	(0.013)	-0.024*	(0.014)	2.395*	(1.414)	2.768**	(1.393)
Nearest colonial city	-0.712***	(0.183)	-0.728***	(0.187)	22.736	(20.870)	23.679	(20.924)
Nearest c.1800 mine	0.596***	(0.068)	0.599***	(0.069)	-70.441***	(8.028)	-69.054***	(8.115)
Average land gradient	-0.008***	(0.001)	-0.008***	(0.001)	1.045***	(0.149)	1.036***	(0.149)
Median altitude	0.013*	(0.007)	0.013*	(0.007)	2.719***	(0.830)	2.642***	(0.819)
Latitude	0.108***	(0.011)	0.108***	(0.011)	-13.182***	(1.151)	-12.951***	(1.145)
Soil Suitability	-0.008	(0.007)	-0.008	(0.007)	0.122	(0.829)	0.123	(0.833)
Area (100 km^2)	0.001	(0.002)	0.001	(0.002)	0.167	(0.237)	0.235	(0.237)
Constant	-1.918***	(0.190)	-1.914***	(0.191)	297.187***	(20.728)	293.929***	(20.651)
R-squared	0.752		0.752		0.448		0.460	
Municipalities	3,989		3,989		1,004		1,004	

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.13: First stage estimations of mediation model by mediator

β: Dist. Hacienda < 13km	By Census Year				
	1950	1960[b]	1970	1980	1990
Urban localities (prop)	0.0506*	0.0494*	0.0598**	0.1063***	0.1231***
	(0.0282)	(0.0249)	(0.0216)	(0.0305)	(0.0307)
Workers in agriculture (prop)	-0.0349	-0.0710	-0.0577	-0.0605	-0.0603**
	(0.0211)	(0.0420)	(0.0335)	(0.0354)	(0.0277)
Workers in manufacture (prop)	0.0169	0.0338**	0.0220	0.0248	0.0320***
	(0.0100)	(0.0158)	(0.0172)	(0.0143)	(0.0097)
Workers in trade (prop)	0.0067	0.0096	0.0086**	0.0060	0.0090*
	(0.0040)	(0.0076)	(0.0040)	(0.0057)	(0.0049)
Railway station (binary)		-0.0108			
		(0.0274)			
Granted land (%)		0.0193			
		(0.0222)			

Notes: [b]Baseline year for Railway station (binary) and Granted land (%). Treatment defined as municipalities within 13km distance to closest hacienda. Cross-section OLS regression with robust SE. Includes all controls and state fixed effects. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.14: OLS Mediation Analysis by Mediator

	Literacy					Marginalization Index		
	1950	1960	1970	1980	1990	1970	1980	1990
i. Urban localities	0.070***	0.066***	0.060***	0.084***	0.075***	-25.888***	-28.685***	-23.762***
	(0.018)	(0.015)	(0.012)	(0.010)	(0.008)	(1.844)	(1.398)	(1.017)
Dist. hacienda (10km)	-0.016***	-0.013***	-0.011***	-0.009***	-0.007***	1.086***	1.172***	0.623**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.392)	(0.349)	(0.267)
ii. Workers in agriculture	-0.287***	-0.238***	-0.163***	-0.170***	-0.129***	51.296***	46.988***	34.669***
	(0.022)	(0.023)	(0.014)	(0.012)	(0.012)	(1.803)	(1.653)	(1.600)
Dist. hacienda (10km)	-0.014***	-0.011**	-0.010***	-0.008***	-0.008***	0.852***	1.273***	0.891***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.321)	(0.319)	(0.292)
iii. Workers in manufacture	0.297***	0.290***	0.188***	0.247***	0.133***	-63.304***	-64.442***	-35.214***
	(0.059)	(0.049)	(0.027)	(0.031)	(0.024)	(5.957)	(6.203)	(4.268)
Dist. hacienda (10km)	-0.016***	-0.012**	-0.012***	-0.010***	-0.009***	1.315***	1.664***	1.198***
	(0.004)	(0.005)	(0.003)	(0.003)	(0.002)	(0.472)	(0.463)	(0.390)
iv. Workers in trade	1.320***	1.121***	0.808***	0.575***	0.337***	-249.114***	-178.245***	-104.911***
	(0.101)	(0.100)	(0.085)	(0.077)	(0.072)	(17.816)	(14.034)	(14.068)
Dist. hacienda (10km)	-0.014***	-0.012***	-0.010***	-0.011***	-0.009***	1.092***	1.912***	1.289***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.360)	(0.357)	(0.322)
v. Railway station	0.081***	0.062***	0.053***	0.060***	0.040***	-17.614***	-14.961***	-10.261***
	(0.017)	(0.015)	(0.011)	(0.011)	(0.009)	(2.326)	(2.014)	(1.549)
Dist. hacienda (10km)	-0.018***	-0.014***	-0.013***	-0.012***	-0.011***	1.936***	2.346***	1.757***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.497)	(0.496)	(0.392)
vi. Granted land (binary)	0.057***	0.044**	0.050***	0.044**	0.040**	-4.303**	-4.672**	-3.706**
	(0.020)	(0.020)	(0.016)	(0.018)	(0.015)	(1.777)	(1.831)	(1.544)
Dist. hacienda (10km)	-0.016***	-0.013***	-0.012***	-0.011***	-0.009***	1.754***	2.143***	1.602***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.551)	(0.538)	(0.418)

Notes: Treatment defined as municipalities within 15km distance to nearest hacienda. Cross-section OLS regression with robust SE. Includes all controls and state fixed effects. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table B.15: Mean Dependent Variable Regression by Measure of Colonial Hacienda

	Main Sample			Neighbors Sample		
	Hacienda (binary)	Dist. hacienda (10km)	Hacienda within 29km	Hacienda (binary)	Dist. hacienda (10km)	Hacienda within 13km
Pueblos de indios (prop.)	0.045**	0.055	-0.004	0.080*	-0.166	0.066
	(0.023)	(0.132)	(0.032)	(0.045)	(0.117)	(0.055)
Nearest colonial city (km)	-2.203***	20.093***	-3.628***	-2.851***	11.036***	-2.583***
	(0.357)	(1.717)	(0.390)	(0.637)	(1.672)	(0.745)
Nearest c.1800 mine (km)	-0.218	2.196	0.234	-0.555	1.128	-0.198
	(0.241)	(1.411)	(0.319)	(0.519)	(1.497)	(0.610)
Average land gradient	-0.006**	0.087***	-0.022***	-0.002	0.050**	-0.013
	(0.003)	(0.016)	(0.004)	(0.008)	(0.020)	(0.009)
Median altitude (km)	-0.011	-1.191***	0.189***	-0.054	-0.250**	0.006
	(0.017)	(0.091)	(0.020)	(0.042)	(0.103)	(0.050)
Latitude	0.004	0.812***	-0.178***	-0.017	0.345***	0.026
	(0.018)	(0.101)	(0.024)	(0.044)	(0.123)	(0.055)
Soil Suitability	-0.020	0.362***	-0.149***	-0.022	0.307**	-0.071
	(0.020)	(0.116)	(0.029)	(0.046)	(0.130)	(0.053)
Area (100 km^2)	0.007***	0.040***	-0.006**	0.009**	0.064***	-0.014***
	(0.003)	(0.013)	(0.003)	(0.004)	(0.011)	(0.005)
Constant	0.231	-13.222***	4.134***	0.833	-5.768**	0.183
	(0.390)	(2.057)	(0.507)	(0.871)	(2.412)	(1.088)
R-squared	0.192	0.636	0.506	0.140	0.462	0.207
Municipalities	1,137	1,137	1,137	607	607	607
Mean dep. var.	0.14	2.95	0.59	0.27	1.61	0.49

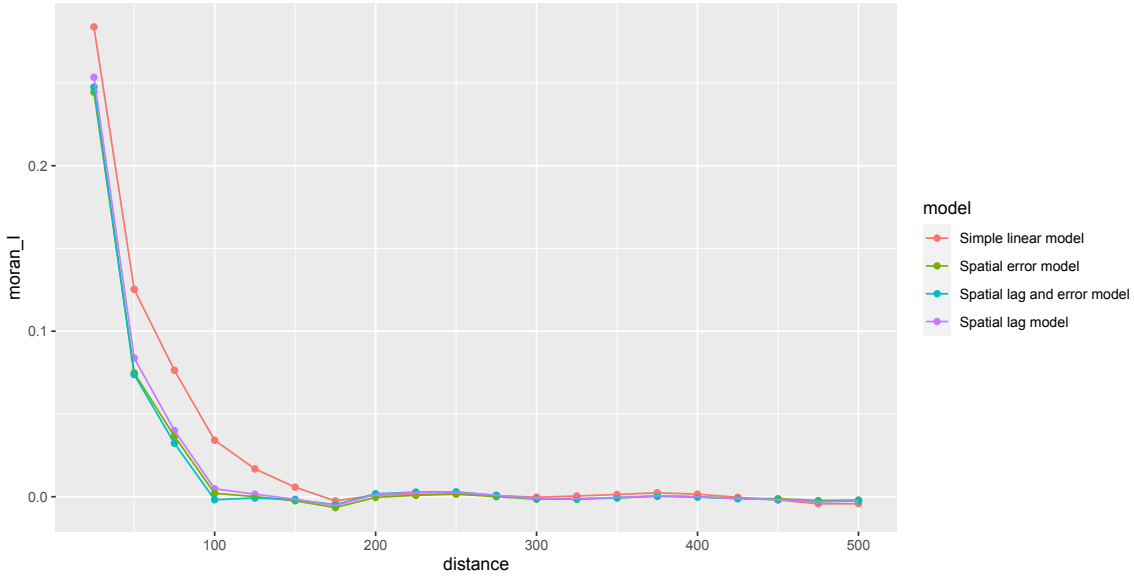
Notes: Cross-section OLS with robust SE, base year is 1960. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

C Spatial Model

We performed the Moran's I test for spatial autocorrelation for all years and for various specifications of the spatial weights matrix. In general, we found a positive and statistically significant Moran's I, which indicates that there is clustering of like values in our data: locations with higher literacy rates are have typically locations with higher literacy rates nearby; and the same for low literacy rates.

We estimated a neighborhood contiguity matrix by distance (using dnearneigh in R) and estimated the Moran's I statistic for various values of distance. Figure C.1 shows the results for the year 1950. Spatial autocorrelation starts high and decreases, reaching values close to zero at around 100 km distance. We omit the rest of the years for space considerations; the results are very similar across years.

Figure C.1: Moran's I sensitivity to distance in spatial weights



The Moran's I statistic does not provide information about the type of spatial dependence, which is necessary in order to choose among different spatial regression models that account for the spatial autocorrelation. Figure C.1 also compares the Moran's I statistic among different spatial models, and includes a linear model for comparison. We can see that the spatial error model is the one that gives a Moran's I closest to 0 at a distance of 100km. Tables C.1 and C.2 show the results for spatial error models using a neighborhood contiguity matrix by distance using 100km.

Table C.1: Differences in Literacy by hacienda for each year with Spatial Autoregressive Errors, 1900-1990

	Model 1							
	1900	1930	1940	1950	1960	1970	1980	1990
Hacienda	0.00788	0.01113	0.02147**	0.01964**	0.02011**	0.01941***	0.02311***	0.01686***
	(0.00582)	(0.00709)	(0.00867)	(0.00937)	(0.00879)	(0.00741)	(0.00737)	(0.00636)
Pueblos de indios	-0.0009	-0.0027	-0.0028	-0.009	-0.0117	-0.0148**	-0.0166**	-0.015***
	(0.0061)	(0.0069)	(0.0084)	(0.0089)	(0.0081)	(0.0067)	(0.0067)	(0.0058)
Nearest colonial city (km)	-0.1891**	-0.5259***	-0.7704***	-0.8849***	-0.8144***	-0.6049***	-0.5373***	-0.5068***
	(0.0874)	(0.1174)	(0.144)	(0.1546)	(0.1445)	(0.1211)	(0.1206)	(0.1034)
Nearest c.1800 mine (km)	-0.0052	-0.2191	-0.18	-0.2901	-0.228	-0.1192	-0.1832	-0.0985
	(0.0704)	(0.1114)	(0.1383)	(0.1494)	(0.1395)	(0.1164)	(0.1157)	(0.0989)
Average land gradient	-0.006***	-0.0096***	-0.0128***	-0.0149***	-0.0145***	-0.0128***	-0.0164***	-0.0154***
	(0.0008)	(0.001)	(0.0012)	(0.0013)	(0.0012)	(0.001)	(0.001)	(0.0008)
Median altitude (km)	-0.001	-0.0082	-0.0078	-0.0008	0.001	0.009	0.0006	0.0046
	(0.0042)	(0.0053)	(0.0064)	(0.0069)	(0.0065)	(0.0054)	(0.0054)	(0.0047)
Latitude	-0.0003	-0.0055	0.0049	-0.0059	-0.0043	-0.0049	-0.0076	-0.0041
	(0.0061)	(0.0121)	(0.0156)	(0.0169)	(0.0158)	(0.0129)	(0.0127)	(0.0107)
Soil Suitability	0.0036	0.0029	0.0028	0.0136*	0.0124*	0.0071*	0.0086	0.01*
	(0.0047)	(0.0058)	(0.007)	(0.0076)	(0.0071)	(0.006)	(0.006)	(0.0051)
Constant	0.1554	0.4516*	0.3465	0.7022*	0.6881**	0.6894**	0.9167***	0.9007***
	(0.1354)	(0.2543)	(0.3305)	(0.3594)	(0.3345)	(0.2703)	(0.2673)	(0.2242)
Log Likelihood	1,304.80	1,235.30	1,054.02	985.36	1,068.40	1,271.26	1,278.90	1,450.93
Mean dep. var.	0.128	0.203	0.253	0.356	0.397	0.431	0.576	0.664
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143

Notes: Spatial error model with robust standard errors for municipalities within 100km of closest hacienda headquarters. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table C.2: Differences in Marginalization Index by hacienda for each year with Spatial Autoregressive Errors, 1970-1990

	Model 1		
	1970	1980	1990
Hacienda	-4.17789***	-4.5796***	-3.61007***
	(1.09568)	(1.05557)	(0.85162)
Pueblos de indios	1.0004	0.9049	1.3781*
	(1.0376)	(0.9614)	(0.7735)
Nearest colonial city (km)	84.0102***	89.0656***	67.837***
	(17.6219)	(17.0000)	(13.8170)
Nearest c.1800 mine (km)	1.9882	6.7853	1.937
	(16.9334)	(15.9669)	(13.1746)
Average land gradient	1.4293***	1.8288***	1.7668
	(0.1553)	(0.1409)	(0.1136)
Median altitude (km)	-0.5848	-0.7017	-1.4681**
	(0.8218)	(0.7695)	(0.6229)
Latitude	-0.4436	0.8512	1.1389
	(1.6613)	(1.6607)	(1.4137)
Soil Suitability	0.4831	0.9919	0.4183
	(0.9428)	(0.8513)	(0.6873)
Constant	58.0505*	9.6299	4.1182
	(34.9203)	(34.7299)	(29.5540)
Log Likelihood	-4,109.01	-4,383.43	-4,146.69
Mean dep. var.	67.94	53.56	43.74
Municipalities	1,061	1,141	1,143

Notes: Spatial error model with robust standard errors for municipalities within 100km of closest hacienda headquarters. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

D Mexican Population Census Data

D.1 Cleaning Census Data

For cleaning the census data we mainly use the "Historical Archive of Geostatistical Localities" (AHL for its acronym in Spanish), combined with maps and GIS data. The AHL tracks the evolution of all localities within municipalities in Mexico with their geographic coordinates. If available, it also provides data on total population that allows us to compare with the Census data. (`https://www.inegi.org.mx/app/geo2/ahl`).

Example for 1900

1. The raw 1900 census has 2,975 observations (municipalities) from 29 states. Baja California and Baja California Sur are omitted because these territories only have state-level data available in 1900. The state of Sinaloa is unaccounted for.[26]
2. Of the 2,975 municipalities, across 15 states there are 290 municipalities with the same name, but they are located in different districts. Therefore, for merging with the municipal code we match each municipality using name, state and district. A preliminary merge before cleaning any municipal name is able to match 1,050 with 2010 municipal and state names; 1,925 municipalities from 1900 are unmatched, and 1,408 municipalities from 2010 are unmatched (the 2010 data has 2,458 municipalities).
3. For our analysis, we restrict the sample to only 21 states: Aguascalientes, Coahuila, Colima, Chihuahua, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Estado de México, Michoacán, Morelos, Nayarit, Oaxaca, Puebla, Querétaro, San Luis Potosí, Sonora, Tlaxcala, Veracruz, Zacatecas and Mexico City; which account for 2,321 municipalities. After cleaning the names of these municipalities to match the name they have in 2010 (some are simple spelling changes or typos, while other municipalities changed names completely), 2,297 of the 2,321 municipalities from 1900 are matched with counterparts in 2010.
    - This leaves 24 municipalities, all in Oaxaca, which got lost from 1900 to 2010. These "lost" municipalities could be the consequence of municipalities that disappeared all together from 1900 to 2010, or that we simply could not track.
    - This leaves 352 municipalities in 2010 that do not have a counterpart in 1900. These municipalities may be the result of splits from 1900 municipal definitions, municipalities that did not exist at all in 1900, or municipalities that did exist in 1900 but that were left out of the census. For those municipalities that split into 2-4 municipalities by 2010, we were not able to disaggregate the data by 2010 political division. Instead, we merge the 1900 municipality with the 2010 municipality that maintains the same name as in 1900, or in the case that none of the split municipalities share the name, we take the municipality that is larger in 2010.
4. Of the 2,321 municipalities that are matched from 1900, 672 consolidated into groupings of two or more municipalities by 2010. We collapse these municipalities into one and match them with their 2010 division counterpart. This leaves us with 1,649 unique municipal codes.

D.2 Census Data Comparison by Year

We sought to maintain the different variables comparable across censuses. However, this was not always possible because measurements sometimes change between censuses. The following definitions are con-

[26] In 1900 Baja California and Baja California Sur were considered territories and did not have municipalities. Sinaloa was a state but we do not have data for it.

Table D.1: Comparison of variables by Population Census in Mexico 1900-1990

Variable	1900	1930	1940	1950	1960	1970	1980	1990
Literates	Pop. able to read and write (age not specified)	Pop. able to read and write (age not specified)	Pop. 10 years or older able to read and write	Pop. 6 years or older able to read and write	Pop. 6 years or older able to read and write	Pop. 10 years or older able to read and write	Pop. 6 years or older able to read and write	Pop. 6 years or older able to read and write
Urban localities	NA	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more
Workforce	ND	ND	ND	ND	Economically active population over 12 years old by main economic activity	Economically active population over 12 years old by main economic activity	Economically active population over 12 years old by main economic activity	Economically active population over 12 years old by main economic activity
Income reported	NA	NA	NA	NA	NA	8 income groups ($MX)	17 income groups ($MX)	9 categories by perceived minimum wages
Housing conditions	NA	NA	NA	NA	NA	Houses or occupants: number of rooms, bathroom, type of floor, electricity, piped water, drainage	Houses or occupants: number of rooms, bathroom, type of floor, electricity, piped water, drainage	Houses or occupants: number of rooms, bathroom, type of floor, electricity, piped water, drainage

NA: Information not available for this year. ND: Information not digitized.

strained by the available information in each census: see Table D.1. All outcomes reported are proportions of target population.

D.3 Marginalization index

The marginalization index is the mean average of 7 indicators expressed as rates with respect to the total population: iliteracy, incomplete primary schooling, low income (workers earning less than 2 minimum wages), population with no firm floor, population without electricity, population without drainage, population living in overcrowded houses (more than 2.5 persons per room).