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**Colonization, early settlers  
and development: The case  
of Latin America**

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# Colonization, Early Settlers and Development: The Case of Latin America\*

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## Abstract

In this paper, we document the long-run impact of the geographical heterogeneity in skills among the first settlers to Latin America. To this end, we compile administrative data on the early settlers in the Americas between 1492 and 1540 including, among others, name, city of origin, destination, and occupation. From a methodological perspective, a focus on the initial period of colonization in Latin America offers several advantages. First, differences in the geographical distribution of

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occupations among the first settlers are likely to be accidental. Second, a set-up that analyzes an area with a single colonizer (Spain) allows to hold constant formal institutions and legal origin. Our results show a relevant effect of the skills of first colonizers on long-run levels of development of the areas located around the original settlements. We find evidence of persistence in the form of market orientation and entrepreneurial spirit.

# 1 Introduction

Much recent work on comparative development investigates the relevance of large historical events. There has been a particular interest in colonialism and its persistent impact on the long-run development of affected countries.<sup>1</sup> Yet, as argued by [Michalopoulos & Papaioannou \(2020\)](#), the colonial experience looks more like a "bundle treatment" than a single treatment. With regard to Africa, for example, the identity of the colonizers is not common to all the countries. This makes it difficult to disentangle the role of differences in institutional set up or legal origin from the influence of culture, human capital, and skills.

This paper analyzes the Spanish colonization of Latin America and, in particular, the role of heterogeneity in skills among the first settlers. Our choice of colonization area offers several crucial advantages. First, since all the countries were originally settled by the same colonial power, the findings are less subject to the bundle treatment criticism described above. Additionally, since we analyze the first travellers from Spain to the Americas, it is reasonable to assume that the geographical distribution of their occupations was as good as randomly assigned given that the colonizers were settling in previously unexplored, unknown areas. We show that settlers' skills were, in fact, very heterogeneous across locations. Importantly, this initial shock to the distribution of skills persists over time. Our results show a lasting legacy

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<sup>1</sup>For a recent review of the literature on the historical roots of economic development see [Numn \(2020\)](#)

of the initial distribution of occupations: areas where the first settlers had a higher level of skills are currently more developed than those that were settled by low-skilled settlers. To the best of our knowledge, this is the first time that information on the skills of the first colonizers to the Americas has been used for economic research.

Moreover, while previous related research has used statistical analyses (i.e., regression discontinuity, difference-in-differences, and instrumental variables) to disentangle the causal relationships, the characteristics of our data generate a natural experiment.

Specifically, we take advantage of several particular features of the settlement process from Spain to the New World. First, for many years after the discovery of the Americas, there existed just one legal point of departure (Seville), which simplified the task of recording passenger lists. Second, the Spanish Crown imposed strict restrictions on travel for some groups (e.g., Jews, Muslims, and converts). Therefore, those who wanted to travel to the Americas had to show they did not belong to the banned population. Documents for this purpose along with passenger lists are preserved in the General Archive of the Indies (Seville) and, taken together, provide a detailed picture of the approximately 22,000 settlers in the Americas during the first period of colonization (1492-1540). Gathering this information required extensive archival work, the digitalization of long lists of passengers, and many old maps. The data, which includes information on settlers' name, city of origin, destination, and occupation, show that, contrary to common belief, most of

the travellers were not soldiers. That said, the fundamentals of colonization imply that conquest and settlement were part of the same process.

Our empirical strategy is based on the fact that the initial colonizers had no knowledge of the land they intended to conquer. This offers a quasi-random situation: given that the discovered territory had not previously been explored, their settling across it was as good as random. Specifically, we show that the geographical distribution of high- and low-skilled colonizers was very similar as far as concerns the pre-existing characteristics of the settlement areas, supporting the exogeneity assumption relative to the location of the first settlers. In addition, since the entire area was controlled by the same colonial power, we are able to hold constant both formal institutions and legal origin. Importantly, this pseudo-experiment shows that locations originally characterized by a greater proportion of high-skilled settlers today have a higher level of development than locations colonized by a low-skilled majority. In particular, we find evidence of persistence in skill-level in the form of market orientation, infrastructures, and entrepreneurial spirit.<sup>2</sup>

We also discuss some threats to inference. First, we show that the results are robust to geographic, climatic, or pre-colonial characteristics, as well as to controlling for different colonization periods, size of the colonization cohort, colonizers' route order, or penetration line. Second, although the legal origin and institutions of the colonizer, Spain, were the same in all of the

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<sup>2</sup>Dell (2010) similarly shows that the persistent negative effect of Peru's mining "mita" on current incomes is due to less-developed infrastructure and weaker production in the market economy in areas without historical hacienda formation.

areas, we consider whether the original official jurisdictional division, and the time until their formal promulgation, had a relevant impact on the results. Our estimations indicate, however, that these jurisdictional divisions have no effect on the results. We also check that our findings are robust to alternative measures of skills and sizes of the settlement catchment areas.

Our results contribute to several lines of research. First, there is a growing literature on the persistent effect of skills and human capital on economic development<sup>3</sup>. However, very few papers explore this issue in Latin America. [Valencia \(2019\)](#) finds that the higher educational attainment of some Guarani people, due to the presence of Jesuit missions, persisted 250 years later in areas of former Jesuit presence. Higher non-cognitive abilities are consistent with occupational persistence and inter-generational knowledge transmission.<sup>4</sup> [Rocha et al. \(2017\)](#) show that an initial shock in the skill composition of migrants to some municipalities in Brazil in the late 19th and early 20th century persisted over time, leading to higher long-run income per capita. We similarly study the long-run effect of the distribution of skilled settlers to Latin America, but going back to the initial period of colonization. Like [Rocha et al. \(2017\)](#), who examine a single state in Brazil, we hold constant institutions by assessing an area under the same colonizer.<sup>5</sup> In our case, the

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<sup>3</sup>See [Michalopoulos & Papaioannou \(2020\)](#) and [Michalopoulos & Papaioannou \(2017\)](#) for a detailed discussion of this body of work.

<sup>4</sup>In the case of Africa, [Nunn \(2011\)](#) also finds a persistent effect of missionary schools on educational attainment in various countries.

<sup>5</sup>In fact, during the initial period there were no local formal institutions. [Wantchekon et al. \(2015\)](#) find that, even in the absence of prior institutions, human capital has a large impact on economic development in colonial Dahomey (Benin).

issue of de jure institutions is arguably not an important caveat. Nonetheless, we show the robustness of our results to informal institutional arrangements that may have been at work at such early stage of colonization.

Second, our paper builds on studies that distinguish between different types of human capital or abilities. [Squicciarini & Voigtländer \(2015\)](#), for example, find that it is the upper-tail of human capital, and not the average, which is critical in the transition from stagnation to growth. Meanwhile, [Gennaioli et al. \(2013\)](#) emphasize the importance of entrepreneurial human capital in regional development.

Third, our research also relates to work on the effect of long-term population history on economic development. To this regard, there is a growing body of work that studies the impact of changes in the composition of population and migrations on long-run economic performance (e.g. [Spolaore & Wacziarg \(2013\)](#) or [Droller \(2018\)](#)). [Putterman & Weil \(2010\)](#) examine the historical legacy of populations, setting the year 1500 as a reference date to calculate the share of contemporaneous population in each nation descended from people of different countries of origin. They find that the history of the ancestor population matters more than the history of the location. These results indicate that populations who settled in the Americas bore certain traits that made economic development more or less likely. Recently, [Easterly & Levine \(2016\)](#) emphasize the importance of directly measuring colonial European settlements in the early stages of colonization.

Fourth, our results intersect with a relatively new literature on the very

long-run impact of culture, occupations, and skills. Several studies have found that intergenerational mobility actually works much more slowly than predicted by traditional models. [Barone & Mocetti \(2016\)](#) provide evidence of persistence in belonging to elite professions after close to six centuries. [Opper & Andersson \(2019\)](#) find that the entrepreneurial culture of the Ming Dynasty (1368-1644) persists to the private activities of post-reform China (1992-2012).<sup>6</sup> In this paper, we document the very long-run impact of a high proportion of skilled professionals through the persistence of pro-market activities and entrepreneurial preferences.

Finally, as mentioned, much of the related literature focuses on colonial shocks in Africa. Our paper joins a recent body of work that focuses on historical colonial experiences in Latin America, such as [Valencia \(2019\)](#).

## 2 The mechanics of conquest and settlement

The original settlement of Spaniards in the Americas was an organized endeavor, where private enterprise and legal coverage of the Spanish Crown generated a sophisticated set of incentives. The Spanish conquest was carried out by *huestes*, or expeditions, commonly known as *hueste conquistadoras* (conquest expeditions) or *hueste indianas* (indian expeditions). The *huestes* were comprised of a leader (traditionally called a *conquistador* or conqueror)

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<sup>6</sup>For a shorter period, [Alesina et al. \(2020\)](#) document how the Chinese Communist Revolution failed to stop intergenerational transmission. Indeed, the grandchildren of pre-revolution elites differ in cultural values, being more pro-market and individualistic. Cultural traits thus seem to overcome even the strongest attempts to subdue them.

and other individuals who, voluntarily and without payment, joined the group. Under the leader's protection, they undertook missions of discovery, conquest, and settlement. A *hueste* was a private endeavor; from the outset the Crown made clear that it would not finance these groups. The expeditions did, however, have to share the benefits with the Crown, as they operated under a license granted by the latter to the leader. The Alexandrine Bulls, in particular the first bull, Inter Caetera, recognized the Castilian Crown's claim to any discovered lands not already held by a Christian prince. In practical terms, this meant that no one could enter the newly discovered land without authorization from the King of Spain.

The "Manual of Indian Law" provided the legal guide for Castilian expansion in America. From the outset, conquest, discovery, and settlement were all conceived as part of the same process. In fact, the individuals who made up the *huestes* were not soldiers, as has sometimes been assumed, but rather settlers who were originally merchants, doctors, etc. Furthermore, it was in the interests of the Crown that the already discovered and conquered territories not be dismantled by the migration of their inhabitants to other sites. In the words of the time, the land needed to be ennobled, that is, filled with houses, inhabitants, its natural agricultural, mining, and livestock resources exploited. Until that occurred, no authorization was granted to migrate to other lands. Indeed, this explains why the actions of conquest and settlement were considered to be elements of the same endeavor. To this regard, [Lockhart et al. \(1976\)](#) provide an exemplary description:

“Since conquest and settlement were one single ongoing process in Spanish America, we are a little reluctant to emphasize the distinction between them....yet only in this way we can illustrate to what an extent the conquerors were acting like immigrants, businessman and settlers.”

The locations of the settlements had to comply, following the indications of the Spanish administration, with the rules of Saint Thomas Aquinas, who listed the "indispensable" characteristics that a territory should have: access to potable water, proximity to construction material (wood), nearness to forests and cultivable land, etc. These recommendations applied to all the settlements.

Often, the initial resources of these expeditions were recorded in contracts, or licenses, called *capitulaciones*. Evidence shows that the contributions made by the *hueste* participants were then considered when distributing the booty, whereby members were rewarded in function of their inputs.

As evangelization was a fundamental objective of Castilian expansion to the Indies, the *huestes* did not accept non-Catholics. As a result, Muslims, Jews, heretics targeted by the Inquisition and their descendants, were excluded from these expeditions. Similarly prohibited were gypsies, married slaves without his wife and children, single women without a license, or married without their husbands. This aspect is very relevant, as these restrictions were the reason for the Spanish administration's endeavor to record the name, origin, accompanying party, etc. of all the initial travellers to the Americas.

To summarize, Spanish colonization of the Americas was mostly a process

of urban occupation, where settlement and conquest went hand in hand. The location of the original sites was decided based on a common set of simple rules. Finally, settlers were not typically soldiers but people of diverse occupational backgrounds.

### 3 Data

In this section, we describe the data. A gathering of information on the first settlers to the Americas is possible thanks both to the fact that there was just one legal port of departure, and to the existence of restrictions on travel to the New World. In order to verify whether potential travellers met the criteria allowing for embarkation, the authorities required various documents, now preserved in the General Archive of the Indies in Seville.

Until 1668, the sole legal port of departure for ships going to *Las Indias* (the "Indies") was Seville. Beginning in 1492, the *Casa de la Contratación de las Indias* (House of Trade of the Indies; byname House of the Indies) compiled information on all passengers who travelled from Seville to the Indies as part of the commercial regulation of the American colonies. These files are archived in the above-mentioned General Archive of the Indies, where the original information appears in two types of documents. The first comprises the so-called *informaciones y licencias*, or information and licenses, necessary to prove to the officers of the House of the Indies that they were not prohibited from travelling. As described in the previous section, Jews, Muslims, converts,

and those judged by the Inquisition were not permitted; only those of proven Christian origin could embark. Evidence to this regard included baptismal and marriage records, containing demographic information not only on the passenger but their accompanying party (wife and children). The preservation of such documents provides a rich source of information on these travellers. The second type of document consists of passengers' lists, or the *Libro de asientos de pasajeros*. These files include the names of the passengers (double checked upon boarding the ship), the name of the vessel, and its captain. By merging the names of the passengers who appear in both types of documents, it is possible to construct registries that include the travellers' complete name, status as head of the family, marital status, wife and children travelling with him/her, town/city/place of origin in Spain, and destination city<sup>7</sup> in the Americas.<sup>8</sup>

Luis Rubio y Moreno, Deputy Director of the General Archive of the Indies, began the classification of these documents in 1915, and supervised work on the entries between 1492 and 1559. This endeavor was subsequently taken over by Cristobal Bermudez, who compiled all the information into

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<sup>7</sup>This element was not declared at embarkation but is possible to identify by searching the documents of the *Catalogo de los pasajeros a las indias* (Catalogue of passengers to the Indies).

<sup>8</sup>There is a general consensus among scholars of the colonial history of Latin America that these official lists, during the initial decades of colonization, captured most of the passengers. In the 18th century, a liberalization policy began to allow trade between colonies and many other Spanish ports. It is hence possible that an individual might have embarked on a ship to England and from there to the Spanish colonies aboard an illegal vessel transporting merchandise; at the time, non-Spanish ships were still prohibited in Castilian colonies. Captains may also have been occasionally bribed to allow a passenger to board without being legally registered.

three volumes.<sup>9</sup> Then, Peter Boyd-Bowman, after 30 years of laborious archival work, complemented the original compilation with his five volumes. He systematically organized all the data contained in the *Catalogo de los pasajeros a las indias* (Catalogue of passengers to the Indies), as well as added information from many other sources available in the General Archive, in an effort to enrich the personal information on the passengers, in particular relative to destination and occupation. With regard to destination, Boyd-Bowman utilized thousands of documents coming from the Americas (letters, contracts, payrolls, commercial agreements, royalties, *capitulaciones*, etc.) preserved in the General Archive. As he considered only those passengers who matched with documentation from the Americas, the final list comprises settlers who arrived in the New World.<sup>10</sup> Specifically, the first volume, [Boyd-Bowman \(1956\)](#), contains information from 1493 to 1519, while the second, [Boyd-Bowman \(1964\)](#), covers settlers from 1520 to 1540. These first two volumes thus include the first wave of settlers.<sup>11</sup>

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<sup>9</sup>See [Bermudez \(1940-46\)](#). These volumes cover the period of 1509 to 1559. In the early 1980s, specialists of the General Archive published volumes IV to VII, which cover the period of 1560 to 1599.

<sup>10</sup>Thus explaining why the book is called *Primeros pobladores* (First settlers) as opposed to first migrants or passengers.

<sup>11</sup>They also include references by the author to the other three volumes, covering the period of 1541 to 1599. Unfortunately, however, the latter were unpublished manuscripts that went missing after Peter Boyd-Bowman died in 2010. Although we contacted Boyd-Bowman's family (widow, son, and daughter), as well as administrators and colleagues, the manuscripts remain unfound. In addition, we checked the library of his university, as well as inquired about a potential donation of the manuscripts, but have been unable to locate the three missing volumes. Regardless, this does not represent an important shortcoming as, for methodological reasons, we work only with the settlers in the very first colonization wave.

Boyd-Bowman’s work provides a particularly rich source of information in that he was able to match the names on the passenger list with many other documents. Through use of more than 500 sources in addition to the Catalogue, he was able to add valuable data to the original registries. Boyd-Bowman also cleaned the data of double entries and completed information on the origin and destination of each settler. Indubitably, his work provides the best source of information on the origin, destination, occupation, and other background characteristics of the first settlers to the Americas.

Our final dataset thus contains information, classified by year of departure, on the name and surname of all the settlers, village of origin in Spain, initial destination in the Americas, occupation, movements within the Americas (trips, expeditions, conquests, “*cargos*, privileges), and year and place of death. An example of the wealth of information provided for each settler is illustrated by the following example, taken from Boyd-Bowman’s first volume:

3564. Gómez, Hernán, resident in Tui (province of Pontevedra), wife Francisca de Rubiales and sons Lucas and Juanico, destination Indies in 1512 (volume I page 595<sup>12</sup>), occupation court clerk, arrived in Santo Domingo in 1512, resident of Yaquimo (Santo Domingo) in 1514.

These detailed descriptions allow to not only geographically locate the first settlers of the Americas, but to analyze their occupational profiles, and the potential role of the latter in shaping local economic development. We

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<sup>12</sup>The volume and page refer to the location of the traveller in the compilation of Bermudez (1940-46)

consider only the initial period of settlement (1492-1540) since, during this period, colonization of the Americas covered the extension of the continent from northern Mexico to Argentina. Our database includes a total of 21,912 settlers.

After digitalizing and codifying all of this information, and using additional sources available in the General Archive (in particular, old maps depicting the positions of the original settlements), we geolocated the destination-locations of the settlers. While the names of the cities of origin are easy to match with their contemporary counterparts, matching the names of some destination areas with their current locations represents more of a challenge. That said, in many cases, the corresponding name is relatively straightforward; Morales Padron's (1988) map of settlements in the Americas during the XVI century (Figure 1) confirms the location of most of these places. For other locations, an investigation into town name changes was necessary. Ultimately, the number of settlers for whom we have the precise geolocated destination amounts to 13,692. We denote this sample as PLS (Precise Location Sample).

For other settlers, we have only an area or region. When the destination refers to an area, we look for the settlement that was active in that particular year. Most of these cases can be matched using the work of Lopez de Velasco, cosmographer sent by the Spanish authorities in 1571 to map the Spanish settlement at that time.<sup>13</sup> We consider two approaches to geographically

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<sup>13</sup> Lopez de Velasco (1573), reprinted in [López De Velasco \(1894\)](#). The author was also known for constructing instruments to measure longitude using lunar eclipses.

allocate the colonizers that were assigned to a region. In the first approach, settlers are assigned to the closest settlement with a similar year of first colonization. In the second approach, the colonizers of a region are assigned to the settlement on the same colonization route with the lowest difference in the year of first colonization. That is, regions are first associated to a colonization route. Then, among the colonial settlements associated to a same colonization route, we choose the settlement with the lowest difference between its *first year* and the *first year* of the region. Summarizing, the first procedure implies matching the destination with the oldest settlement in the area. The second relies on assigning travelers to the oldest settlement along the penetration line going through that region.

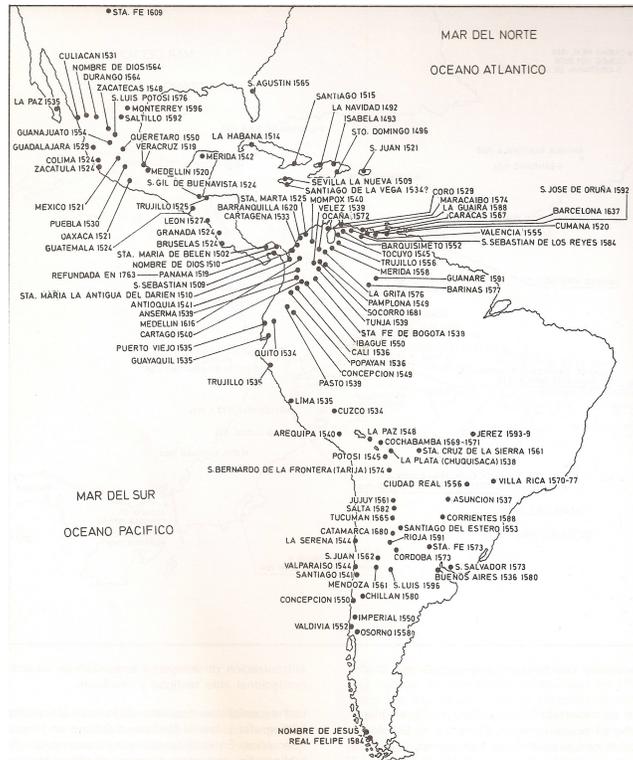


FIGURE 1: Early settlements in the Americas. *Source: Morales Padron (1988)*

These criteria allow us to locate the first settlements of Spanish colonizers to the Americas. Figure 2 depicts the locations of all the settlements identified for the period 1492-1540, where the size of the bubbles reflects the number of settlers in the final year of the period.



FIGURE 2: Early colonial settlements by number of settlers in 1540. *Source: Own elaboration.*

For our study, the occupations of these first settlers is a fundamental variable. Traditionally, historians have argued that most early settlers in the Americas were soldiers but, as argued in Section 2, the data suggests this to be a misconception. To this regard, [Lockhart \(1968\)](#) shows that early settlers came from a variety of occupational backgrounds.<sup>14</sup> Our data confirm his findings: we find 274 different occupations among the first settlers. Some examples include: banker (*banquero*), lawyer (*abogado*), pharmacist

<sup>14</sup>[Leon \(2007\)](#) describes the travellers from Spain as a “small representation of Castilian society at the end of the XV Century.”

(*boticario*), barber (*barbero*), butcher (*carnicero*), dentist (*dentista*), doctor (*doctor médico*), nurse, farmer (*labrador*), merchant or trader (*mercader*), weaver (*tejedor*), servants (*siervos*), etc.

Initially, we sought to associate occupations with a certain level of education, understood as years of instruction or highest degree. This endeavor was, however, hindered by a lack of relevant historical sources needed for an accurate categorization. It is, however, possible to classify the occupations using a set of skills derived from the precise description of jobs at the time. For the purpose of matching skills to occupations, we follow the criteria of [Ladero Quesada \(1980\)](#), who analyzes the structure of Spanish society around 1500. We consider as having a relatively high level of human capital those individuals with occupations requiring skills such being able to read and write, or necessitating entrepreneurial drive. Therefore, the skilled settlers include those with occupations such as doctor, lawyer, pharmacist, etc. Unskilled workers include those with occupations ranging from peasants (*jornaleros*) to servants (*criados*). There exists some evidence of the relative contribution of skilled versus unskilled workers during this period. For instance, [Lockhart \(1968\)](#) argues that "the only Spanish class that contributed really almost nothing, as a functioning group, to Spanish Peruvian society, were the peasants."

Figure 3 depicts each of the destinations according to the proportion of settlers who were skilled, based on the previous definition. The colors of the dots on the map show a clear heterogeneity across locations in terms of the

first settlers' skills levels.



FIGURE 3: Share of settlers with skills. *Source: Own elaboration.*

## 4 Methodology and basic results

In this section, we discuss identification as well as present the basic results. Our aim is to determine whether the proportion of skilled settlers among the early Spanish colonizers can explain differences observed in today's levels of development around the original locations. Our identification strategy rests

on the exogenous nature of the initial Spanish settlements. The territorial expansion from 1492 to 1540 of the urban centers settled by Spanish colonizers extended between the 25th parallel north and the 35th parallel south; reaching from Zacatecas (northern Mexico) to Buenos Aires.

In less than fifty years, colonizers had settled and founded cities across a very large territory, with considerably diverse geography, and climate. Our choice of colonial area and time frame is driven by the pseudo-experimental nature of this period, which allows for a clean identification of the impact and persistent effect of the skills, or human capital brought by the colonizers on current levels of development. Crucially, we consider an area under a single colonial power, allowing to avoid a bundling of institutions and human capital.<sup>15</sup> In addition, we use the period of initial colonization (1492-1540), when differences in the skills of the colonizers across settlements are more likely to be exogenous than at later stages. Their location is also likely to be random and, therefore, exogenous and uncorrelated with the characteristics of potential economic activity in the place of destination. Indeed, the first settlers had no idea of whether certain areas offered a comparative economic advantage, given that the geography of the New World was unknown. As described above, their only guidance consisted of the recommendations of Saint Thomas Aquinas on suitable locations for settlements, together with the King's prohibition on migrating from a new settlement before it was firmly

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<sup>15</sup>In the next section, we present the results of a robustness exercise that considers the potential role of local and informal institutional arrangements.

established.

Additional evidence similarly points to a lack of knowledge about the geography and potential advantages of different areas of the Americas. During the initial phase of colonization, even the *capitulaciones* contained very imprecise geographical allocations, to the point that in many cases, the area granted in fact consisted of a piece of the Pacific Ocean, a non-existent island, or a high mountain. [Garcia-Martinez \(1970\)](#) argues that conquerors could be lucky or unlucky in terms of the land allocated to them in the *capitulacion*, reflecting just how random the process of initial settlement was. It was precisely due to such uncertainty about the geography of the New World that in 1571 the Spanish authorities decided to send Lopez de Velasco, cosmographer and chronicler, to demarcate and describe the geography of the settlements([López De Velasco, 1894](#))<sup>16</sup>.

Accordingly, it is also very likely that the geographical distribution of settlers by skills is exogenous. Our approach takes advantage of this natural experiment of the original Spanish colonization period, thus avoiding the elusive search for instruments for current/recent past levels of human capital.

To analyze the contemporary level of development of each area, we construct buffers of 20km around the original settlements<sup>17</sup> and consider the effect of the skills of the original settlers conditional on many other potential factors that could explain today's levels of economic development. Indeed,

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<sup>16</sup>Reprinted from the original version from 1573.

<sup>17</sup>In the next section, we show the robustness of the results to buffers of different sizes.

the original locations do not generally correspond to current administrative divisions, making it necessary to proxy income per capita in the buffer around the original settlement. While the main outcome variable is per capita income for the buffer area around the original settlement, good-quality data on income per capita is difficult to find at the buffer level. We thus follow [Henderson et al. \(2012\)](#) and use luminosity at night as a proxy for development. Satellite night-light data are available from the National Oceanic and Atmospheric Administration. [Chen & Nordhaus \(2011\)](#) find that luminosity does, in fact, have informational value for countries, regions, and areas with poor quality or missing data. Several papers have also found a very high correlation between luminosity and GDP at the country level. For instance, this type of data has been used by [Michalopoulos & Papaioannou \(2013\)](#) and [Alesina et al. \(2016\)](#), among others. We use Oak Ridge National Laboratory’s (ORNL) Landscan data for population information at each buffer.

The basic specification is:

$$\log gdp_{ji} = \alpha_i + \beta HC_{ji} + \sum \gamma_k z_{kji} + \epsilon_{ji}$$

where  $\log gdp_{ji}$  is the log of per capita night-light in 2010. The variable HC is a proxy that measures the skill levels of the first settlers. The basic variable is the proportion of skilled settlers at the end of the period (1540).

We also consider controls for geography, using distance to the sea, average

roughness,<sup>18</sup> and average elevation, and control for climate using average precipitation and average temperature (CRU). Finally, we include as control variables soil quality (% fertile soil), closest distance to a river, and closest distance to a lake. We calculate averages at each buffer. Finally, we include area-period fixed effects to complete the list of controls. To calculate the standard deviations, we cluster at different levels of aggregation (8 by 8 degrees and 10 by 10 degrees). Table 1 summarizes the descriptive statistics of these variables. The sample includes those settlers who have a precise destination.<sup>19</sup> We identify 123 settlement-locations of the colonizers who arrived up until 1540. This is consistent with the 189 locations mentioned in [López De Velasco \(1894\)](#) for the year 1574.

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<sup>18</sup>[Numm & Puga \(2012\)](#)

<sup>19</sup>The results presented in the tables of the following sections are not affected when using either the full sample or that of the settlers with a precise location. In the robustness section, we show that the results are not altered by using the full sample.

TABLE 1: Descriptive statistics

	mean	sd
<i>Dependent variable</i>		
Ln night-light 2010 per capita	-3.056	0.743
<i>Settlers and skills</i>		
Total settlers	111.317	505.599
% skilled settlers	0.684	0.317
Predominance of skilled settlers (>75 %)	0.504	0.502
Approach 1- % skilled settlers	0.674	0.297
Approach 1 Predominance of skilled settlers (>75 %)	0.455	0.500
Approach 2- % skilled settlers	0.671	0.299
Approach 2 Predominance of skilled settlers (>75 %)	0.480	0.502
<i>Geography and climate variables</i>		
Log temperature	4.394	0.755
Log precipitation	2.915	0.273
Log distance to river	2.770	0.407
Log distance to lake	5.166	1.206
Log distance to coastline	4.191	1.120
Log ruggedness index	20.608	0.323
% Fertile soil	50.994	30.331
<i>Number of settlements</i>	123	123

Table 2 examines the relationship between geography and climate, and the proportion of settlers with high skills by location. In column 1, we use the percentage of settlers with skills in each location.

In column 2, we consider the explanation of a dummy variable that takes a value of 1 if more than 75% of the settlers are skilled. The two specifications show that geography and climate cannot explain the location of skilled versus unskilled settlers. It would therefore seem that the distribution of skilled versus unskilled settlers was random with respect to weather, geography, and

soil fertility.

TABLE 2: Determinants of the distribution of skills of the first colonizers

	Dep. Var: % with Skills (all years) (1)	Dep. Var: Majority with Skills (2)
Log. Temperature	-0.044 [0.039]	-0.041 [0.082]
Log. Precipitation	-0.036 [0.126]	0.083 [0.226]
Log. Distance to Coastline	-0.049 [0.037]	-0.047 [0.064]
Log. Ruggedness Index	0.236* [0.125]	0.338 [0.216]
Log. Distance to River	0.131 [0.081]	0.038 [0.111]
Log. Distance to Lake	0.024 [0.026]	0.073* [0.041]
% Fertile Soil	0.001 [0.001]	0.000 [0.002]
Observations	123	123
R-squared	0.076	0.066

*Notes* - Robust standard errors in brackets.\* Significant at 10%, \*\* at 5%, and \*\*\* at 1%.

Table 3 presents the results on the relationship between the proportion of skilled early settlers and long-term local development. The explanatory variable is the percentage of skilled early settlers in 1540. Column 1 shows that the locations that received a higher percentage of skilled early settlers are more developed today than those that received a low proportion of skilled individuals. The estimation is not only statistically significant but economically very relevant: areas that received only high-skilled settlers have a 60% higher level of GDP per capita than do areas that received only low skilled settlers. This result is basically unaffected if we add controls for geography and climate as in column 2. The results do not change qualitatively if we add controls for land quality, as measured by the percentage of fertile soil,

and proximity to potable water, as measured by distance to the closest river or lake (column 3). These results are consistent with those described above, and with the findings in Table 2, which show that land characteristics, geography, and climate, did not determine the location of skilled versus unskilled settlers. In column 4 we include colonization period fixed effects, which, in fact, also correspond to particular colonization areas. Finally, columns 5 and 6 of Table 3 show the results of clustering at different geographical levels. In particular, column 5 uses clustering for cells of 8 by 8 degrees, while column 6 uses cells of 10 by 10 degrees.<sup>20</sup>

TABLE 3: Development and skills of the first colonizers

<i>Dependent Variable: Log. Night-light 2010 per capita</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
% with Skills (all years)	0.610*** [0.230]	0.588** [0.236]	0.668*** [0.231]	0.633*** [0.227]	0.633*** [0.115]	0.633*** [0.137]
Geographic Variables	No	Yes	Yes	Yes	Yes	Yes
Climate Variables	No	Yes	Yes	Yes	Yes	Yes
Fertile Soil	No	No	Yes	Yes	Yes	Yes
Distance to River	No	No	Yes	Yes	Yes	Yes
Distance to Lake	No	No	Yes	Yes	Yes	Yes
Colonization Period FE	No	No	No	Yes	Yes	Yes
Observations	123	123	123	123	123	123
R-squared	0.068	0.101	0.135	0.172	0.172	0.172

*Notes* - Robust standard errors in columns 1 to 4. In column 5, robust standard errors clustered at grid cells of 8 degrees  $\times$  8 degrees. In column 6, robust standard errors clustered at grid cells of 10 degrees  $\times$  10 degrees. \* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980.

## 5 Robustness analysis

In this section, we assess the robustness of the findings to using alternative definitions for the skilled settlers, early institutions, and other controls.

<sup>20</sup>We thank Hillel Rapoport for suggesting this clustering scheme. The results are also robust to clustering at the colonization period (area), which borders are close to old *governaciones*, and today's countries.

## 5.1 The role of settler density

First, we consider whether the effect of skilled settlers is a reflection of the size of the settlement. Areas with high settler density could have more skilled settlers than did areas with low densities. To check that this is not driving the results, Table 4 includes the log of total colonizers in early years. The estimation is unaffected by the inclusion of the size of the population that arrived in each settlement. Further, we assess whether the settlers of the first location along a penetration route had different characteristics than colonizers who settled further along on the same penetration route. For example, a potential story could be that old or ill colonizers could not continue with the *hueste* and were, therefore, those who settled in the first locations. In order to explore whether this could affect our results, we include the order of the respective settlements along a penetration route in Column 2. The results are not affected by the inclusion of this new variable. Finally, in the last column we control for pre-colonial population density, from [Maloney & Valencia \(2016\)](#), in the baseline specification. The coefficient on the percentage of skilled settlers is positive, statistically significant, and of similar size relative to the basic regressions.

TABLE 4: Development and skills of the first colonizers.  
Robustness I

*Dependent variable: Log. 2010 night-light per capita*

	(1)	(2)	(3)
% with Skills (all years)	0.620*** [0.225]	0.542** [0.256]	0.485** [0.210]
Log Total Colonizers Early Years	-0.107 [0.094]		
Geographic Variables	Yes	Yes	Yes
Climate Variables	Yes	Yes	Yes
Fertile Soil	Yes	Yes	Yes
Distance to River	Yes	Yes	Yes
Distance to Lake	Yes	Yes	Yes
Colonization Period FE	Yes	Yes	Yes
Colonizer Route Order	No	Yes	No
Pre-colonial pop density	No	No	Yes
Observations	123	123	98
R-squared	0.183	0.261	0.309

*Notes* - Robust standard errors in brackets.\* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: Average temperature from 1961-1980 and average precipitation from 1961-1980.

## 5.2 Early institutions

Yet another important issue to consider is whether the effect of early skilled settlers is confounded by the impact of initial institutions. In our analysis, the entire area falls under the Spanish Kingdom, where Spanish colonizers brought with them the same institutions. That said, historical evidence seems to indicate that there were, in fact, very few formal institutions at this very early stage of colonization. The only formal institution consisted of the *audiencia*, or tribunal of administration and justice. The *audiencias* were responsible for ensuring the implementation of law and order and, in particular, intervening in cases where issues arose involving conquerors. Yet, *audiencias* were often far from early settlements; in other cases, an *audiencia* had not yet been established at the moment of founding a given settlement.

In addition to the audiencias, a second source of rules and regulations existed in the figure of the conqueror. In signing a *capitulacion*, the conqueror was recognized as an informal source of law and order, and as such held most of the power at the colonization stage. Thus, although there existed some audiencias, conquerors in areas far away from the Audiencias may have had few constraints on their control. In order to capture this early institutional framework, we use as proxies several measures of audiencias and the penetration paths of the conquerors.

Figure 4 depicts the two audiencias established before 1540: Santo Domingo (established in 1511) and Mexico (established in 1527). The number of audiencias then increased rapidly after 1540, as shown in Figure 5. This means that before 1540, the political centers of many settlements were located quite far away, implying that the conquerors were likely the foremost source of law and order.



FIGURE 4: Audiencias established before 1540

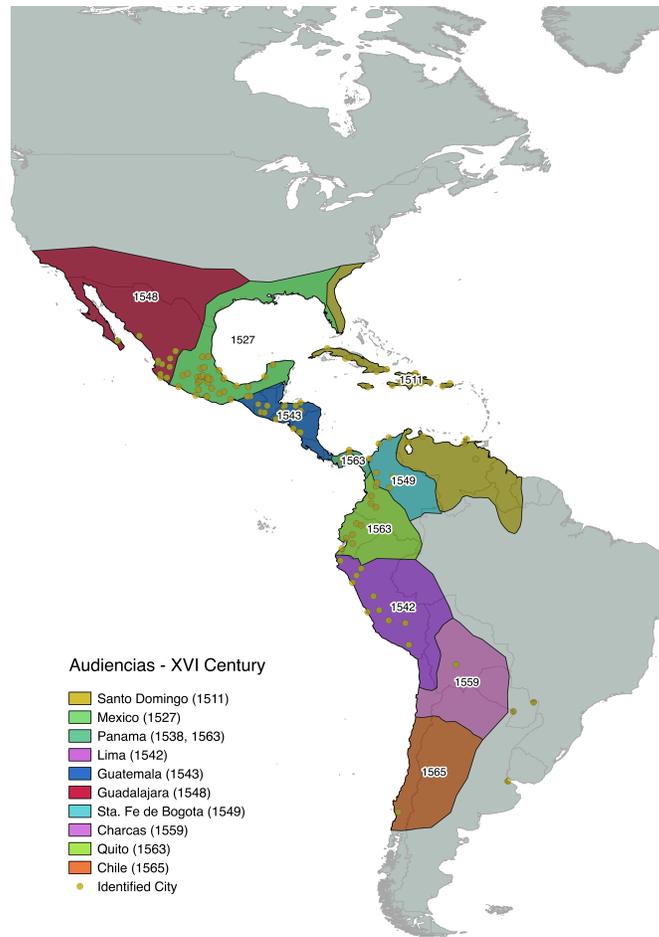


FIGURE 5: Audiencias at the end of the XVI Century

The expedition paths followed by the conquerors are known as "penetration lines."<sup>21</sup> We geo-digitalized fifty-one expedition paths for the period before 1540, which correspond to 31 conquerors. They are composed of either entire expedition paths or segments. For each line, we have information about the starting year, end year, and name of the conqueror. Figure 6 depicts

<sup>21</sup>Information on the penetration lines comes from the *Atlas del Descubrimiento de América y Oceanía*, which uses Montana (1943) as a basic source.

these penetration lines, showing that, as expected, early settlements are very close to these paths. Figure 7 provides a closer view of the penetration lines in Central America before 1540. We associated the location of the various settlements with their corresponding penetration line, and the conqueror leading each expedition.



FIGURE 6: Penetration lines before 1540

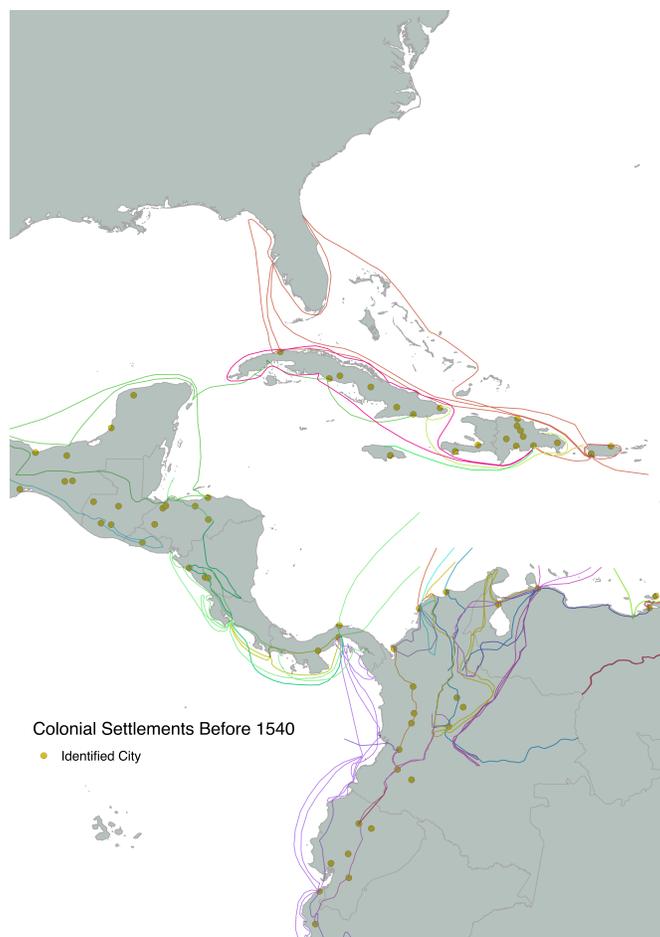


FIGURE 7: Detail of penetration lines in Central America

In Table 5 we analyze the robustness of the basic results to the inclusion of different proxies that capture the early institutional framework. In column 1 we include the log of the distance from each settlement to the closest audiencia, as a control for the latter's ability to exercise power over each location. In column 2 we include a dummy that takes a value of 1 if at the year of first settlement there was no official audiencia (basically those

settlements before 1512). In column 3 we include the years without an official Audiencia as an alternative measure of a lack of formal institutions. Finally, in column 4 we include the penetration line of the conqueror as a proxy for the conqueror-penetration line effect. The results presented in Table 5 show that taking into account early institutions does not alter the basic finding: the initial settlements with a high proportion of skilled settlers perform better in the long run than do those with many unskilled settlers.

TABLE 5: Development and skills of the first colonizers.  
Audiencias and colonizer effect

*Dependent variable: Log. 2010 night-light per capita*

	(1)	(2)	(3)	(4)
% skilled settlers (all years)	0.623*** [0.231]	0.621*** [0.212]	0.643*** [0.220]	0.857*** [0.304]
Log Dist. Audiencia before 1540	0.047 [0.047]			
Colonial settlements without an official Audiencia at foundation		-0.713*** [0.241]		
Number of years without an official Audiencia			-0.046** [0.020]	
Geographic Variables	Yes	Yes	Yes	Yes
Climate Variables	Yes	Yes	Yes	Yes
Fertile Soil	Yes	Yes	Yes	Yes
Distance to River	Yes	Yes	Yes	Yes
Distance to Lake	Yes	Yes	Yes	Yes
Colonization Period FE	Yes	Yes	Yes	Yes
Colonizer Route FE	No	No	No	Yes
Observations	123	123	123	123
R-squared	0.182	0.221	0.197	0.563

*Notes* - Robust standard errors in brackets. \* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980.

### 5.3 Alternative measures of skills

In Table 6 we analyze the sensitivity of the results to an alternative measure of skills. We construct a dummy variable to capture locations with a very high proportion of skilled settlers. Specifically, in column 1 we include a dummy that takes a value of 1 if the percentage of skilled settlers is larger than 75%.

In the previous sections, we considered those settlers for whom we know their exact destination. However, for other settlers, rather than their exact destination we have only a reference to the region. In the data section, we discussed potential approaches that might be adopted to incorporate this information. The first implies matching the destination with the oldest settlement in the area. The second relies on assigning travelers to the oldest settlement along the penetration line going through that region. Table 6 presents the results using all the settlers, showing that the estimation is consistent with the basic findings.

TABLE 6: Development and skills of the first colonizers  
All settlers

*Dependent variable: Log. 2010 night-light per capita*

		Approach 1	Approach 1	Approach 2	Approach 2
	(1)	(2)	(3)	(4)	(5)
% with Skills (all years)		0.600** [0.262]		0.576** [0.253]	
Majority with Skills (>75) (all years)	0.308** [0.130]		0.288** [0.129]		0.235* [0.131]
Geographic Variables	Yes	Yes	Yes	Yes	Yes
Climate Variables	Yes	Yes	Yes	Yes	Yes
Fertile Soil	Yes	Yes	Yes	Yes	Yes
Distance to River	Yes	Yes	Yes	Yes	Yes
Distance to Lake	Yes	Yes	Yes	Yes	Yes
Colonization Period FE	Yes	Yes	Yes	Yes	Yes
Observations	123	123	123	123	123
R-squared	0.144	0.158	0.139	0.156	0.128

*Notes* - Robust standard errors in brackets.\* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980.

## 5.4 Size of the relevant area

In this section, we consider the effect of changing the size of the buffers that define the area of interest. Specifically, we consider 10 km, 20 km, and 30 km buffers. Since the areas become much larger, situations of overlap can arise across different buffers. In such cases, we drop the area that was founded later.

The results in Table 7 confirm the basic results: the proportion of skilled settlers has a positive effect on long-run development. The estimated coefficient for the percentage of skilled settlers is very similar to that obtained in previous tables.

TABLE 7: Development and skills of the first colonizers  
Alternative sizes for the buffers (non-overlapping)

*Dependent variable: Log. 2010 night-light per capita*

	10km buffer no overlapping (1)	20km buffer no overlapping (2)	30km buffer no overlapping (3)
% with Skills (all years)	0.623** [0.240]	0.698*** [0.244]	0.641** [0.300]
Geographic Variables	Yes	Yes	Yes
Climate Variables	Yes	Yes	Yes
Fertile Soil	Yes	Yes	Yes
Distance to River	Yes	Yes	Yes
Distance to Lake	Yes	Yes	Yes
Colonization Period FE	Yes	Yes	Yes
Observations	117	112	108
R-squared	0.152	0.183	0.145

*Notes* - Robust standard errors in brackets. \* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980.

## 6 Analyzing the persistence mechanism

The results of the previous sections demonstrate that the areas in Latin America that received the highest proportions of skilled settlers today have greater income per capita than places that received large numbers of unskilled settlers. In this section, we assess several possible drivers behind the persistence mechanism. While the economic literature has documented a notable persistence of important historical events on comparative development, there is long-standing debate over the mechanism that explains this persistence. Much work centers around early institutions, cultural traits, and human capital. In our case, the early institutions of the Americas are relatively uniform, being linked to a single colonial power. We also control for the possibility of informal early institutions, namely powerful conquerors far from the audiencias.

Crucially, the source of the initial shock is the different distribution of skills of the first settlers. As discussed in Section 2, the latter is not necessarily the same as the distribution of education, given that matching occupations of the time and education represents a significant challenge.<sup>22</sup> Here, the occupations considered as high skilled share a common characteristic: they imply a certain degree of entrepreneurship. [Murphy et al. \(1991\)](#) and [Baumol \(1990\)](#) likewise consider the central role of entrepreneurship in the process of economic growth. In line with [Baumol \(1990\)](#), we define entrepreneurs broadly, as "persons who are ingenious and creative in finding ways that add to their own wealth, power, and prestige."<sup>23</sup> Artisans, doctors, etc. must necessarily invest and accept some risk to develop their activities. By contrast, the low-skilled group includes laborers, such peasants and servants, who work for others. Our analysis therefore relies on differences in the supply of local entrepreneurial skills and assesses their persistence over time. Prior research shows evidence of the long-term stability of certain attitudes. For instance, [Necker & Voskort \(2014\)](#) and [Dohmen et al. \(2012\)](#) provide empirical support for the persistence of attitudes such as the willingness to take risks. There is also evidence of persistence in occupations over generations.<sup>24</sup> [Opper &](#)

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<sup>22</sup>Occupations have frequently been employed in studies that analyze very long-run processes. For instance, the intergenerational mobility literature often uses occupational change as a metric of mobility when conducting comparisons with earlier periods. See [Long & Ferrie \(2013\)](#) or [Barone & Mocetti \(2016\)](#)

<sup>23</sup>This definition is similarly adopted in [Opper & Andersson \(2019\)](#)

<sup>24</sup>See, for example, [Long & Ferrie \(2013\)](#). The focus here is less on intergenerational occupational persistence than on the transmission of the entrepreneurial content of the occupations. To this regard, recent research by [Barone & Mocetti \(2016\)](#) shows evidence of persistence of elite professions across many generations.

Andersson (2019) analyze the long-term stability of entrepreneurial culture and talent pools using occupational choice in preindustrial China. They find strong persistence in the regional distribution of entrepreneurial skills, which correlates with the performance of regions in post-reform China.

In light of such studies, which find persistence driven by the intergenerational transmission of cultural values and attitudes, it seems reasonable to analyze this factor as the first mechanism. A high level of entrepreneurship can arguably accelerate the structural transformation of the economy when the conditions for such change are met.<sup>25</sup> One important mechanism is the structural transformation of agricultural activities towards a market-oriented sector.

In order to examine the density of agricultural activities, we first compute the proportion of land within a 20 km buffer of the colonial settlement that is used as cropland (i.e., territory employed for the cultivation of food) in the year 2000. This data is based on satellite information compiled by Ramankutty et al. (2008), available from Columbia University's Center for International Earth Science Information Network (CIESIN).<sup>26</sup>

Second, we also compute the proportion of land within a 20 km buffer

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<sup>25</sup>In the same spirit, Opper & Andersson (2019) finds that the regional distribution of a measure of entrepreneurship during the Ming and Qing Dynasties explains the differential economic growth of regions in China in the post-reform period (1992-2012).

<sup>26</sup>Ramankutty, N., A.T. Evan, C. Monfreda, and J.A. Foley. 2010. Global Agricultural Lands: Croplands, 2000. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). <http://dx.doi.org/10.7927/H4C8276G>. Ramankutty, N., A.T. Evan, C. Monfreda, and J.A. Foley. 2008. Farming the Planet: 1. Geographic Distribution of Global Agricultural Lands in the Year 2000. *Global Biogeochemical Cycles* 22 (1): GB1003. <http://dx.doi.org/10.1029/2007GB002952>

from the colonial settlement that is suitable for agriculture. We use the index of land suitability for cultivation by Ramankutty et al. (2002), which is based on temperature and soil conditions and distributed by the Center for Sustainability and the Global Environment (SAGE), at the University of Wisconsin-Madison.<sup>27</sup>

Using this information, we compute the proportion of land used as cropland over the land that is suitable for cultivation (*proportion of cropland/proportion of land suitable for cultivation*). Note that the data is only available for 118 out of 123 buffers.

The results in column 1 of Table 8 suggest a positive relationship between the above ratio and the level of entrepreneurship of the first colonizers.

TABLE 8: Mechanisms - Eff. cropped land and infrastructure

	Eff Cropped Land	Roads Per Capita
% skilled settlers (all years)	0.125** [0.060]	0.007** [0.003]
Geographic Variables	Yes	Yes
Climate Variables	Yes	Yes
Fertile Soil	Yes	Yes
Distance to River	Yes	Yes
Distance to Lake	Yes	Yes
Colonization Period FE	Yes	Yes
Observations	118	123
R-squared	0.201	0.110

Notes - Robust standard errors in brackets.\* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980. The dependent variables are: cropped land over land suitable for cultivation within a 20 km buffer from the colonial settlement; and road length (in km) per capita within a 20 km buffer from the colonial settlement.

We assess market orientation by examining the existing infrastructures, in

<sup>27</sup>Ramankutty, N., J.A. Foley, J. Norman, and K. McSweeney. 2002. The global distribution of cultivable lands: current patterns and sensitivity to possible climate change. *Global Ecology and Biogeography* 11 (5), 377-392. <https://doi.org/10.1046/j.1466-822x.2002.00294.x>

particular roads, which facilitate the transportation and selling of products in other places. Infrastructures often take time to build and follow historical patterns. We examine whether places where the original settlers had a comparatively high skill level also have more routes, allowing to connect with other areas.

Data on contemporary infrastructures are obtained from the Seamless Digital Chart of the World (SDCW) v10.<sup>28</sup> The SDCW is based on the Digital Chart of the World (DCW), the most comprehensive global geodatabase currently available. The main variable of interest is the total length (in km) of any type of road within a 20 km buffer of the colonial settlement. Any type of roads refers to all operational roads, including primary roads (with and without a median) and secondary roads (without a median by definition). We define the following variable:

$$Roads\ per\ capita = \log \left( 0.1 + \frac{Road\ Length\ (km)}{Total\ Population} \right)$$

where *Total Population* within a 20 km buffer of the colonial settlement is computed using the LandScan raster data for 2010. In column 2 of Table 8 we find a positive and significant relationship between *Roads per capita* and the high-skilled proportion of first colonizers, measured as the percentage of colonizers with skills. The results indicate that locations characterized by a high proportion of skilled settlers use more land for crops and have a

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<sup>28</sup>See <http://www.worldgeodatasets.com/basemaps/>

greater density of transportation infrastructures than do locations with a low proportion of skilled settlers.

Additionally, to the extent that risk attitudes and, in particular, entrepreneurship, persist over time, areas with a high level of entrepreneurs among the original settlers should display higher economic growth still today. To provide evidence on this second mechanism, we employ the Latinobarometer, using responses to the following question as a proxy for attitudes towards entrepreneurship: "What is the most important thing in order for a country to successfully develop?" We consider as a positive attitude towards entrepreneurship the answer: "Having an active entrepreneurial class." Each individual in the Latinobarometer is associated with a specific location, indicating their city of residence. We use this information to match the individuals with our original locations. To this end, we georeferenced all the locations found in the Latinobarometer.<sup>29</sup> Once we extracted the latitude and longitude of each location, we matched these cities with the original settlements using two methods. First, we matched the two cities if their coordinates exactly coincide and we can identify them by name as being the same. Second, we consider as a positive match those places where the Latinobarometer location falls within the 20 km buffer of the original settlement city. Upon completion of the automatic match, we also conducted a manual check. Specifically, we checked that the coordinates of all matched cities are correct, in order to

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<sup>29</sup>We employed Google maps API, using the name of the city, region, and country as search parameters.

discard false positives. In a second step, we assessed whether those cities that were not matched with any location in the Latinobarometer can be matched manually. This may occur where the name in the Latinobarometer is very different from that in Google maps. In total, we were able to match 75.6 % of the locations using the buffer method, and 67.5% using the exact method. Upon concluding the matching, we calculated the percentage of individuals who replied "Having an active entrepreneurial class" to the question of "What is the most important thing in order for a country to develop successfully?" The results in Table 9 show that areas that had a higher proportion of skilled first settlers have more positive attitudes towards the role of entrepreneurship in development, than do areas that had lower levels of skilled early colonizers, supporting the hypothesis of the transmission of entrepreneurial attitudes over generations. The results are robust to excluding (column 1) or including (column 2) individual characteristics.

TABLE 9: Having an active entrepreneurial class (Latinobarometer)

	<i>Dependent variable: Having an active entrepreneurial class</i>	
	(1)	(2)
% with Skills (all years)	0.104** [0.043]	0.112** [0.043]
Geographic Variables	Yes	Yes
Climate Variables	Yes	Yes
Fertile Soil	Yes	Yes
Distance to River	Yes	Yes
Distance to Lake	Yes	Yes
Colonization Period FE	Yes	Yes
Individual Variables	No	Yes
Observations	54	54
R-squared	0.422	0.477

*Notes* - Robust standard errors clustered at grid cells of  $8 \times 8$  degrees.\* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980. The vector of individual variables includes the following respondent characteristics: average age, proportion of females, and proportion of individuals by social class categorical variables. The dependent variable is the share of respondents that respond "Having an active entrepreneurial class" as their answer to the question: "What is the most important thing in order for a country to successfully develop?"

Are there alternative mechanisms that could explain the persistence of skills over time in Latin America? While the literature on the persistence of large historical events often analyzes the education channel, our data are difficult to match with level of instruction, leading us to use occupations and their associated skill levels. We do, however, check whether the variance in skills across the original locations could have led to persistent differences in education. Indeed, the latter may indicate that the unobservable differences in education, proxied by occupations, are the main factor explaining the persistence.

As a preliminary exercise, we explore the relationship between Jesuit missions and early settler skills. The recent literature suggests, in fact, a connection between the location of Jesuit establishments and current levels of education.<sup>30</sup> We assess whether the places with a greater proportion of skilled settlers are more closely correlated with Jesuit missions than those with fewer skilled settlers.<sup>31</sup> The main source of information on Jesuit presence in our area of analysis is [Hamy \(1892\)](#), which includes, among others, a catalogue of all Jesuit establishments located around the world between 1540 and 1773. While the original edition is preserved in the Roman Jesuit Archives, Boston College has an accessible digitalized version. For each address, the catalogue provides the name (in Latin and French) and kind of the establishment, and

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<sup>30</sup>See [Valencia \(2019\)](#) for the case of Latin America and [Numm \(2014\)](#) for nineteenth-century Christian missions in Africa.

<sup>31</sup>Several seminar participants wondered if Jesuit missions might have been located close to high-skilled populations.

the Jesuit province to which it belongs. The establishments are classified into five categories: *Collège* (School), *Résidence* or *Maison de probation* (Housing), *Séminaire* (Higher education) and *Mission*.

For the most part, the name is sufficient for identifying the location of the Jesuit establishment, as it commonly coincides with that of the colonial settlement. For those that match with our original settlements, we use the coordinates already collected. Otherwise, we employ the coordinates of contemporary city locations provided by Google Maps.

We define two different variables: a dummy which takes a value of 1 if there is a Jesuit presence within a 20 km buffer of the colonial settlement, and the Log of the distance, in km, to the closest Jesuit location.

Columns 1 and 2 of Table 10 analyze the relationship between skills and Jesuit missions. We find no relationship between the proportion of high-skilled settlers and Jesuit presence. The same is true if we consider the distance to the missions in the buffer area.

TABLE 10: Mechanisms - Jesuit missions and education

	Jesuit Missions (Dummy)	Jesuit Missions (Log dist)	Years of schooling	Secondary education
% with Skills (all years)	-0.012 [0.125]	2.874 [2.403]	-0.578 [0.548]	-0.042 [0.067]
Geographic Variables	Yes	Yes	Yes	Yes
Climate Variables	Yes	Yes	Yes	Yes
Fertile Soil	Yes	Yes	Yes	Yes
Distance to River	Yes	Yes	Yes	Yes
Distance to Lake	Yes	Yes	Yes	Yes
Colonization Period FE	Yes	Yes	Yes	Yes
Observations	123	123	103	101
R-squared	0.210	0.224	0.186	0.250

*Notes* - Robust standard errors in brackets. \* Significant at 10%, \*\* at 5%, and \*\*\* at 1%. Geographic variables include: distance to coastline and ruggedness index. Climate controls: average temperature from 1961-1980 and average precipitation from 1961-1980. The dependent variables are: Jesuit mission dummy, which takes a value of 1 if there is Jesuit presence within a 20 km buffer of the colonial settlement, and 0 otherwise; log of the distance in km to the closest Jesuit mission; mean years of schooling, restricted to males between 18 to 55 years of age (from IPUMS); and percentage of the population that is at least 15 years old and has not finished a basic education (elementary, primary, and secondary school) according to the official population censuses.

It is also possible to directly study the relationship between the proportion of skills among the original settlers and contemporary education. To this end, we employ two variables from IPUMS, linking each colonial settlement to a unique second-level subnational unit and using the name and coordinates of contemporary municipalities.

The variable *years of schooling* indicates the average number of years of schooling to reach the highest grade/level of education completed among males aged 18 to 55.<sup>32</sup> The variable *secondary education* records the fraction of the population that has completed, as their highest level of schooling, a secondary education among males age 18-55.

Columns 3 (Years of schooling) and 4 (Proportion of the population with a secondary education) in Table 10 show that the proportion of skilled settlers among the original colonizers is not a statistically significant determinant of

<sup>32</sup>We top coded this variable at 18 years of schooling.

current levels of education in these locations.

Another potential mechanism of persistence is an agglomeration effect<sup>33</sup> induced by high-skilled settlements attracting more people, and thus becoming more densely populated compared to locations with low-skilled colonizers. Employment density is positively related to productivity at the regional level; the same effect could be at work at the local level. Using data on population density from three different sources (Population Density Grid from the Gridded Population of the World (GPW, v.3), Census and LANDSCAN) we find no evidence of this mechanism.<sup>34</sup>

## 7 Concluding remarks

In this paper, we use administrative data on the first colonizers to the Americas to analyze the long-run effect of skill differences among them. To this end, we construct a dataset containing the first 22,000 settlers to the Americas, which includes their complete name, place of origin, destination, and occupation. To the best of our knowledge, this is the first time that information on the skills of the first settlers to the Americas has been used for economic research.

The early years of Latin American colonization (1492-1540) provide a unique natural experiment for evaluating the effect of skills on long-run development. First, differences in the geographical distribution of skills are

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<sup>33</sup>See [Rocha et al. \(2017\)](#)

<sup>34</sup>Results are available upon request.

likely to be accidental. Second, the area was colonized by a single colonial power, allowing to hold constant formal institutions and legal origin. Previous analyses of the legacy of colonial powers have dealt with the bundle effect of institutions and human capital using different instruments (which are sometimes difficult to justify), or current/recent past levels of human capital. Our approach provides a novel and credible alternative to such methodologies.

The results indicate that locations where a greater number of early settlers had skilled occupations currently have a higher level of development than those where early settlers were less skilled. Our findings are robust to many alternative specifications. Specifically, we find evidence of persistence in the form of market orientation and entrepreneurial spirit.

## References

- Alesina, A., Michalopoulos, S., & Papaioannou, E. (2016). Ethnic inequality. *Journal of Political Economy*, *124*(2), 428-488.
- Alesina, A., Seror, M., Yang, D., You, Y., & Zeng, W. (2020). Persistence through revolutions. *NBER WP 1060*.
- Barone, G., & Mocetti, S. (2016). Intergenerational mobility in the very long run: Florence 1427-2011. *Banca de Italia WP 1060*.
- Baumol, W. (1990). Entrepreneurship: productive, unproductive and destructive. *Journal of Political Economy*, *98*(5), 893-921.
- Bermudez, C. (1940-46). *Catlogo de pasajeros a indias durante los siglos xvi, xvii y xviii*. (Vols. vol. I, 1509-1534; vol. II, 1535-1538, y vol. III, 1539-1559). CSIC.
- Boyd-Bowman, P. (1956). *Indice geo-biografico de 56 pobladores de america* (Vol. I).
- Boyd-Bowman, P. (1964). *Indice geo-biografico de 56 pobladores de america* (Vol. II).
- Chen, X., & Nordhaus, W. D. (2011). Using luminosity data as a proxy for economic statistics. *Proceedings of the National Academy of Sciences*, *108*(21), 8589–8594.

- Dell, M. (2010). The persistent effect of Peru's mining mita. *Econometrica*, 78(6), 1863-1903.
- Dohmen, T., Falk, A., & Sunde, U. (2012). The intergenerational transmission of risk and trust attitudes. *Review of Economic Studies*, 79(2), 645-677.
- Droller, F. (2018). Migration, population composition and long run economic development: Evidence from settlements in the pampas. *The Economic Journal*, 128(614), 2321-2352.
- Easterly, W., & Levine, R. (2016). The European origins of economic development. *Journal of Economic Growth*, 21(3), 225-257.
- Garcia-Martinez, B. (1970). Ojeada a las capitulaciones para la conquista de America. *Revista de Historia de America*, 69, 1-40.
- Gennaioli, N., La Porta, R., Lopez-de Silanes, F., & Shleifer, A. (2013). Human capital and regional development. *The Quarterly Journal of Economics*, 128(1), 105-164.
- Hamy, A. (1892). *Documents pour servir a l'histoire des domiciles de la compagnie de Jesus dans le monde entier de 1540 a 1773*.
- Henderson, J. V., Storeygard, A., & Weil, D. N. (2012). Measuring economic growth from outer space. *American Economic Review*, 102(2), 994-1028.
- Ladero Quesada, M. A. (1980). *Historia de America Latina. hechos, documentos, polemicas. España en 1492* (Vol. I). Editorial Hernando.

- Leon, M. (2007). Pasajeros del segundo viajes de cristobal colon. *Revista de Estudios Colombinos*(3), 20-60.
- Lockhart, J. (1968). *Spanish peru, 1532-1560: A colonial society*. University of Wisconsin Press Madison.
- Lockhart, J., Otte, E., Lockhart, J. M., & Knight, A. (1976). *Letters and people of the spanish indies: sixteenth century* (Vol. 22). Cambridge University Press.
- Long, J., & Ferrie, J. (2013). Intergenerational occupational mobility in great britain and the united states since 1850. *American Economic Review*, 103(4), 1109-1137.
- López De Velasco, J. (1894). *Geografía y descripción universal de las indias* (Vol. reprinted from the original version from 1573). Establ. tip. de Fortanet.
- Maloney, W., & Valencia, F. (2016). The persistence of (subnational) fortune. *Economic Journal*, 126(598), 2363-2401.
- Michalopoulo, S., & Papaioannou, E. (2013). Pre-colonial institutions and contemporary african development. *Econometrica*, 81(1), 113-152.
- Michalopoulos, S., & Papaioannou, E. (2017). *The long economic and political shadow of history* (Vol. I). Washington DC: Center for Economic Policy Research.

- Michalopoulos, S., & Papaioannou, E. (2020). Historical development and african development. *Journal of Economic Literature*, 58(1), 53-128.
- Montana, A. (1943). *Descubrimiento, exploraciones y conquistas de españoles y portugueses en américa y oceanía*. Ed. Miguel Salvatella, Barcelona.
- Morales Padron, F. (1988). *Atlas historico cultural de america, vol i* (Vol. I). Comision Canarias para la Conmemoracion del V Centenarios del Descubrimiento de America, Las Palmas de Gran Canaria.
- Murphy, K., Shleifer, A., & Vishny, R. (1991). The allocation of talent: implications for growth. *Quarterly Journal of Economics*, 106(2), 503-530.
- Necker, S., & Voskort, A. (2014). Intergenerational transmission of risk attitudes - a revealed preference approach. *European Economic Review*, 65, 66-89.
- Nunn, N. (2014). Gender and missionary influence in colonial africa. In E. Akyeampong, R. Bates, N. Nunn, & J. Robinson (Eds.), *African development in historical perspective* (p. 489-512). Cambridge: Cambridge University Press.
- Nunn, N. (2020). The historical roots of economic development. *Science*, 367(6485).
- Nunn, N., & Puga, D. (2012). Ruggedness: The blessing of bad geography in africa. *Review of Economics and Statistics*, 94(1), 20-36.

- Opper, S., & Andersson, F. (2019). Are entrepreneurial cultures stable over time? historical evidence from china. *Asian Pacific Journal of Management*, *36*, 1165-1192.
- Putterman, L., & Weil, D. N. (2010). Post-1500 population flows and the long-run determinants of economic growth and inequality. *The Quarterly journal of economics*, *125*(4), 1627–1682.
- Ramankutty, N., Evan, A. T., Monfreda, C., & Foley, J. A. (2008). Farming the planet: 1. geographic distribution of global agricultural lands in the year 2000. *Global biogeochemical cycles*, *22*(1).
- Ramankutty, N., Foley, J. A., Norman, J., & McSweeney, K. (2002). The global distribution of cultivable lands: current patterns and sensitivity to possible climate change. *Global Ecology and biogeography*, *11*(5), 377–392.
- Rocha, R., Ferraz, C., & Soares, R. R. (2017). Human capital persistence and development. *American Economic Journal: Applied Economics*, *9*(4), 105–36.
- Spolaore, E., & Wacziarg, R. (2013). How deep are the roots of economic development? *Journal of economic literature*, *51*(2), 325–69.
- Squicciarini, M. P., & Voigtländer, N. (2015). Human capital and industrialization: Evidence from the age of enlightenment. *The Quarterly Journal of Economics*, *130*(4), 1825–1883.

Valencia, F. (2019). The mission: Human capital transmission, economic persistence, and culture in south america. *The Quarterly Journal of Economics*, 134(1), 507–556.

Wantchekon, L., Klašnja, M., & Novta, N. (2015). Education and human capital externalities: evidence from colonial benin. *The Quarterly Journal of Economics*, 130(2), 703–757.