

The Historical Legacy of (Pre?)Colonial Indigenous Settlements in Mexico

Fernando Arteaga *

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Abstract

What is the long term impact of pre-colonial ethnic institutions? How did locals get to defend their autonomy in the face of large centralization attempts? I use Mexico's indigenous groups and their history since pre-colonial times as a study case. Before the conquest, Mesoamerica showed a highly complex geopolitical environment where self-governing polities traded and warred constantly. The Spanish toppled the Aztec empire, but didn't change the rules of the game: The Spanish co-opted local native elites and granted them large levels of sovereignty, in exchange for tribute. Throughout the colonial period, indigenous communities remained largely semi-autonomous. Mexican independence changed the panorama: the need to justify the existence of a Mexican identity made the new national leaders wary of alternative identities (Spaniard and Indian alike); indigenous were asked to forfeit their autonomy and their traditions in order to become Mexicans. Nowadays, Mexico is considered a *mestizo* country. Yet the foundation of its smallest political jurisdiction, the *municipio*, was inherited from its indigenous past. Indigenous communities in prehispanic times transformed into *pueblos* in the colonial period, and *pueblos* are the basis of modern day counties. To test the impact indigenous communities have had I use data on the number of *pueblos* (as they existed in 18th century) per current county, as a proxy of the endurance of complex indigenous communities. I find, after controlling for other factors, that counties that encompass more historical *pueblos*, are more developed, have larger incomes, better educational levels, and more inequality today.

*Economics Department, George Mason University, E-mail: farteaga@gmu.edu.

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1 Introduction

On January first of 1994, the Zapatistas - a local pro-indigenous armed group - seized control of San Cristobal de las Casas, the third largest county in Mexico's state of Chiapas (Its poorest and southernmost state). Soon after, they advanced onto other local counties. The uprising gained worldwide coverage because of the context surrounding it: Mexico had just signed the NAFTA deals and had conceded on the need to privatize the vast amount of communal lands it had. The proposed reforms were an affront to the vast indigenous communities across the country, whose costumes and traditions heavily centered around communal property as the focal point of organization and cooperation among them. The rebellion never went beyond the state of Chiapas, but its message resonated across the country; it obliged to reflect on the status of indigenous people.

Mexico's troubled history with its indigenous communities can be traced back to the times of conquest and before. When the Spaniards arrived, they found a complex geopolitical environment of alliances and enmities, and readily took advantage of them to topple the Aztecs. The conquest of Mesoamerica relied on courting as much as it relied on violence. By the time of independence, the indigenous population still overpassed that of the non-indigenous. Mexico's liberal attempts of national unification set the tone for recent history, where the country was portrayed as being neither indigenous nor European, but both: Mexico was a mestizo country that inherited the best out of the new and old worlds. The new agenda meant that culturally, economically, and politically, the local indigenous groups would be pressured into surrendering their identities in order to become fully Mexicans.

The main questions the text will be attempting to answer are: how indigenous communities responded to these historical events? what has been the long term impact these communities have had? To answer them I will provide a narrative that stresses the persistence of these communities from the conquest to our days. Statistically, I use data that collects the georeferenced position of local indigenous settlements (as they were in the 18th century), and their populations, to quantitatively asses the potential impact pueblos have had in terms of income, schooling and inequality in Mexico today. The story I tell empha-

sizes how local communities, while being in an *a priori* position of disadvantage, reorganize and endogenously create their own pockets of autonomy far from the centers of power.

The paper's main contribution lies in the attempt to differentiate between two important transmission channels of path dependency: the institutional and the pure increasing returns story. The institutional literature, as told in foundational papers by Sokoloff and Engerman (2000), Acemoglu et al. (2001), Easterly and Levine (2003), and Banerjee and Iyer (2005) cite the importance of political economy stickiness (Boettke et al., 2008) in spreading practices¹ that were adopted long time ago, for very particular reasons, and still exist and exert some kind of effect on economic and political outcomes today. The pure economies of agglomeration story, exemplified through seminal papers by Davis and Weinstein (2002), Bleakley and Lin (2012), Michaels Guy and Rauch Ferdinand (2016), Kocornik-Mina et al. (2016), and Deryugina et al. (2018) show that inertia can have a simpler explanation due to pure lock-in effects (Arthur et al., 1987): dense populated areas will create economies of agglomeration that will self-sustain through time. The empirical strategy I employ uses two distinct measures that can illustrate the importance of these two channels: 1) I use the number of historical indigenous pueblos within a given modern county as a proxy for the level of complexity and endurance, pueblo organizations have had. The rationale is that clusters of pueblos were linked hierarchically since pre-hispanic times (see figure 1). The historical literature emphasizes that through time, a fragmentation process ensued (the indigenous pueblo clusters broke up, and out of one cohesive group, two distinct emerged). The opposite process, the merging of pueblos into its own unified hierarchical community, was much more rare. Current counties were mostly formed out of the pueblos (Garcia Martinez, 2005; Garcia Martinez and Martinez Mendoza, 2012). Therefore, the number of pueblos is a potentially reliable measure of the resilience of institutions. 2) I also present information on the population level of these pueblos in the 18th century, which provides the basic information on the importance of persistence due to agglomeration effects (as studied by Maloney and Caicedo (2015) for the Americas). I exploit some historical circumstances in the regional development in Mexico to assess the importance of the two channels. I show that

¹mainly assessing levels of broad political participation and respect of individual property rights

population density in 1800 still predicts higher income in counties today, (more so in the south and middle Mexico). The relation is robust across a lot of specifications. The number of pueblos also positively affects income across Mexican counties today, but its relevance is highly dependent on them being located on historical Mesoamerica and on high altitudes, places that favor the stickiness of local forms of organization.²

Alternatively, the text also touches on the literature of regional convergence/divergence. Maloney and Caicedo (2015) state that while cross-country analysis may favor the reversal of fortune hypothesis (Acemoglu et al., 2002), subnational persistence carries on over time. I show that within Mexico, a North-South divide process ensued (a kind of subnational reversal of fortune), but within Central and Southern Mexico, persistence is strong.

The paper builds upon, and contributes to, the vast empirical literature that assess the impact of colonial institutions in America. Besides those that have been mentioned already, it is necessary to acknowledge the following: Dell (2010) shows how the extractive colonial Mita system within Peru, where locals were forced to work in mines, predicts worse economic indicators today; Garcia Jimeno (2005) concludes that Colombia's regional development is highly correlated with the presence of colonial institutions like the *encomienda* (which forced indigenous Americans to either work/pay tribute to determined individual Spaniards), colonial state capacity and the levels of slavery; Guardado (2017) shows how the colonial practice of office-selling led to the establishment of an extractive bureaucracy that perpetuated through time and still affects negatively Peru; Waldinger (2017) and Caicedo (2017) show, for Mexico and Paraguay respectively, how the presence of mendicant orders (like the jesuits) in the colonial period, predict better economic outcomes today (by incentivizing the attainment of larger human capital at the time);

Finally, there is a small (but increasing) literature that emphasizes the importance of pre-colonial institutions as determinants of colonial/modern institutions, and of political and economic outcomes today. For a global cross-sectional study: Bentzen et al. (2017) conclude that democracy levels across current countries are a reflection of their indigenous

²Pueblos in traditional middle Mexico had a long historical tradition of complex self organization (colonial pueblos in Northern Mexico were mainly created *ad hoc* by the Spaniards); pueblos in higher altitude areas were more isolated and their ways could endure far easily.

democratic practices, but only when indigenous communities were strong enough (as to survive exogenous shocks like colonization.). For the African case: Gennaioli and Rainer (2007) and Michalopoulos Stelios and Papaioannou Elias (2013) show that larger and more centralized pre-colonial ethnic communities are correlated with African regions that are more developed today. For the American case in a national and macro-regional perspective: Arias and Girod (2014) suggest that colonial institutions were themselves the result of the interplay between geography and pre-hispanic institutions (They show African slavery was only important in places where two conditions applied: no complex indigenous settlement had existed before and no relevant natural resources were present); Angeles and Elizalde (2017) estimate the level of complexity of pre-columbian indigenous communities and assess that it is correlated with regional development in Latin America today. Juif and Baten (2013) compare the human capital levels of Incas and Spanish at the time of the conquest of Peru, concluding that it was much lower for the former and suggesting as the root cause of underdevelopment in the Andes; Finally, there is only one study I am aware of that focuses on pre-colonial persistence at a granular subnational level: Diaz-Cayeros and Jha (2018) show how indigenous communities, in Mexico's state of Oaxaca, that historically produced Cochineal -a highly sought red dye in colonial period- are currently more developed (but also more unequal.)

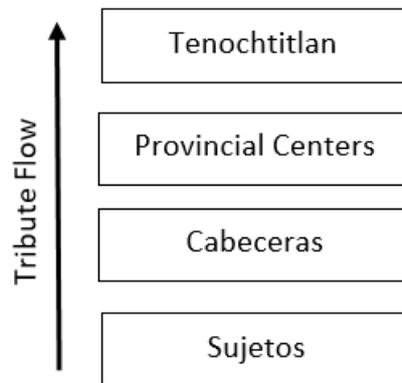
2 Pueblos and its legacy

The way Mexico is divided (States and Counties) reflects the complex historical process it experienced. Today's States are almost in its entirety inherited from the Country's colonial subdivisions (O'Gorman, 1937). Mexico's counties, however, reflect an even deeper division that goes back to precolumbian times (Garcia Martinez and Martinez Mendoza, 2012).

The political map of Mesoamerica at the time of the arrival of the Spaniards is a complicated one: the Aztecs dominated several parts of it, but where but a part of the hundreds of different settlements. These communities were as different between them, as the Spaniards

were compared to them³. Enmities between them were common: war, conquest, tribute, violence were expected. The Aztec empire relied on a loose network of conquered, but self-governed, polities to sustain itself. Figure 1 shows how the system was organized: At the bottom of the pyramid were the *Sujetos*, polities that paid tribute to larger communities called *Cabeceras*, which then paid tribute to Aztec provincial centers, who also paid tribute to Tenochtitlan (The Aztec capital).

Figure 1: Tribute flow between polities in the Aztec Empire



When Cortes arrived to what was to be Mexico, he saw these divisions as opportunities and readily took advantage of them; the process of conquest of Tenochtitlan (Current Mexico City) and of the Aztecs would have been impossible with just a handful of Spanish soldiers⁴. What it is often forgotten, it is that the process of State building is even harder than the process of conquest. Cortes greatest achievement was not the conquest, but the building of strong foundations for a State. He, again, had to rely on making connections with the local elites all across the territories.

After the conquest, the Spanish substituted the Aztecs at the top of the political hierarchy in Mesoamerica, but the main divisions among the local communities (and the enmities

³Today there are 65 native American languages being spoken in Mexico, which makes Mexico the most linguistic diverse country in the Americas, in terms of Native American languages

⁴Phillip Hoffman argues that main reason Cortes could conquer Mexico was because of the Spaniards Military Technological advantage. I'm not arguing against it. That could have been the deep cause that made it possible for the Spaniards to be seen as potential allies of the other communities against the Aztecs. But it nonetheless need help from local communities to consume the project

between them) remained. Mexico City supplanted Tenochtitlan, and other new Spanish cities became the new provincial centers. The rest was maintained (hierarchical relation between cabeceras and sujetos persisted). The Spaniards relied on the threat of violence as much as the Aztecs had to acquire and maintain control (the Spanish expanded throughout the 16th century all across current Mexico to Central America and to the northerner parts of what today are the Mexican states of Sonora and Chihuahua), yet the use of soft power became more prominent: Local indigenous elites were granted noble titles, and relative autonomy over their own territories was given.⁵

The foundation of the Spanish State in the Americas relied in a grand subdivision between what was known as the *Republic of Spaniards* and the *Republic of Indians*. The former included the main Spanish territories and cities in the Americas, while the latter encompassed the preserved territories of the original native american communities. The difference was extremely important, because the Crown delegated important levels of autonomy to each of the latter (each *Pueblo de Indios*), while it nominally didn't for the former (Mexico City had to answer to the Crown in Spain for its local rulings, the Indian communities didn't). The laws and governance systems that applied to each were different too. For example, if a crime was committed by an Indian, he could not be processed by a Spanish court, but had to be processed by its own community. Even more important for our purposes is the fact that Indians payed a different set taxes than the rest of Spaniards. Individually they actually didn't have to pay anything; as a commune they had to pay a tribute (just liked they used to in prehispanic times if they had been conquered by a different tribe), but nothing else. Each indigenous community relied in different systems of governance. There was no unanimity, no global ruling mechanism for each pueblo. The notion of *Republic of Indians* refers just to the collection of *Pueblos*, each one of them could had been very different between them. Overall, however, they shared a nominal pattern of organization: they relied on a local elite for practical governmental purposes (which could have been a council of elders, or an autocratic royal family) and they were economically

⁵The strongest example of this is the case of the Tlaxcaltecs, an indigenous community that strongly supported the Spanish in the conquest against the Aztecs. Because of it, they gained important levels of autonomy that were preserved for all the colonial times and which we can still see in present time, by looking at the fact that Tlaxcala is its own State today

organized through a system of communal land where each community member was allotted some land (to live and to procure their living).

The *Republics of Indians* were initially constituted around the original territories of the prehispanic communities⁶. There is a debate in the historical literature, about how much of the ancient territories were actually preserved. There is evidence that some *pueblos* were artificially created by the Spaniards to reunite some loose and small communities. The extent of these artificial pueblos is, unfortunately unknown. What we know, however, is that the decrease of in the amount of indigenous population by disease was important⁷, and contributed to the creating of new pueblos that tried consolidate the decimated populations.

After the Independence of Mexico, the new leaders engaged in the process of creating a new State, away from the circles across the Atlantic. In order to do so, they (as all newly created Latin American countries) started a rhetorical campaign that tried to impregnate a sense of cultural unity to the new nation. The name of the country, Mexico, was chosen precisely because it referred to the Mexicas, the Aztecs. The narrative (which is still present today) is that Mexico is a nation that originated out of the contact of two worlds: the European and the Native American. To honor that idea, however, the government had to deal with how it treated the indigenous communities; they could no longer be an annex of the country; they had to be incorporated into the national system. This meant, however, that they would also have to lose the autonomy they had enjoyed in Colonial times. That created problems.

The 19th century in Mexico was a period of chaos in which the new Mexican State tried to consolidate its power over all the territory. The problems of the Zapatista uprising in 1994 (173 years after the de facto independence of the Country) are reverberations of that attempt to create a new State. On a general aggregate level, we can say (by looking into Mexico today), that the State succeeded in the task of creating a nation, but when we look into the particularities of the way Mexico is organized we can see that it succeeded precisely

⁶In the Atlepatl, the original name in nahuatl for these city-states

⁷The extent of the death toll is a hotly debated topic in the literature. The problem is that we don't have credible estimates for the amount of population America had before the arrival of the Europeans. The most accepted figure for Mesoamerica, however, is that it went from 8 million people in the 15th century to less than three million in the 18th

because it had to compromise. Out of the 2460 current municipalities that exist within Mexico today, 1814 have an historical heritage linked with indigenous settlements. That is, 73.7% of current Mexican municipalities had a past where at least one pueblo existed before becoming a county. The goal of the text is to prove how this heritage translates into today's economic outcomes.

3 Data

The pueblo data comes from Tanck de Estrada (2005), who compiled and georeferenced the location of pueblos in the 18th century across all territory that would become Mexico⁸. In total 4,469 colonial indigenous Pueblos are identified. 3,190 of them (71%) have additional information regarding the amount of population living in them. The source of city data in the 18th century comes from two sources that capture different settings: First, Abad and Zanden (2016) identify the Spanish localities that had more than 5,000 inhabitants at the time; Second, Rojas (2016) distinguishes the towns that, indistinctly of the amount of population they had, were officially recognized by the Spanish Crown as cities. The distinction is relevant because the former captures real urbanized locations, and the latter identifies a more politically oriented vision of the places that were relevant for the spatial organization of the territory. There is a small overlap between the cities and pueblo dataset: some pueblos were considered cities (either because they had large populations and/or they enjoyed privileges that made them politically distinct from other pueblos). Given that I am interested in contrasting Spanish cities and Indigenous pueblos, I only consider the cities that were not pueblos. After the editing, the city dataset comprised 20 and 22 locations respectively. The city population was gathered from Buringh (2013). The geographical boundaries of Mexican counties today are taken from INEGI (*Instituto Nacional de Estadística y Geografía*) and reflect the country as it was divided in 2010. The variables of interest for our purpose are constructed using these data: I estimated the number of pueblos/cities per current county (as it is a proxy for hierarchical complexity of the settlements and/or

⁸She also collected data on the pueblos in the current Mexican State of Chiapas, which in colonial times was a region that belonged to the General Captaincy of Guatemala.

level of cooperation) and the population density of pueblo and city inhabitants in terms of municipal borders today.

Figure 2: Location of 18th Century Pueblos

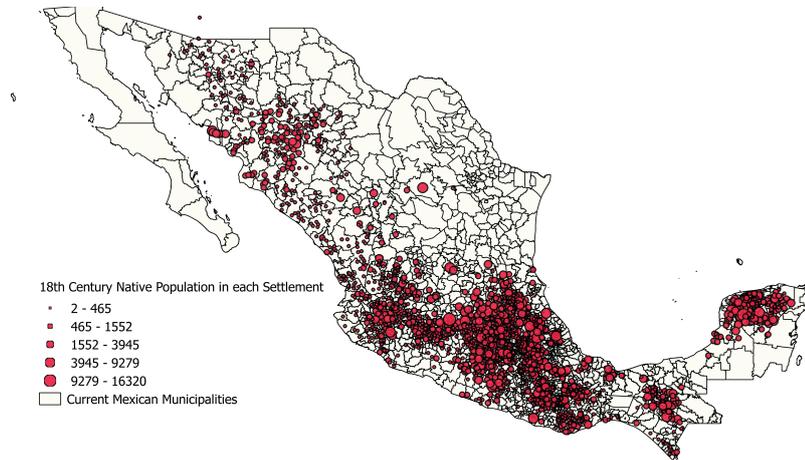
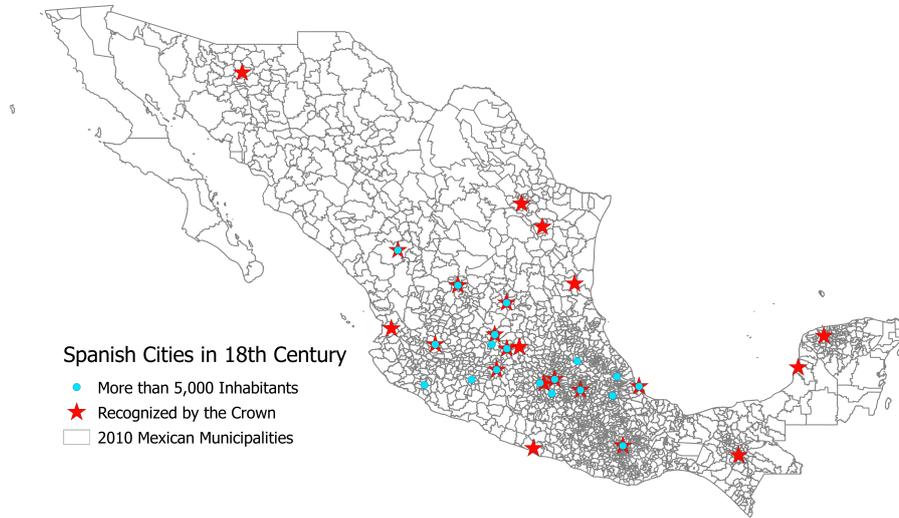


Figure 2 shows the distribution of pueblos across Mexico. There are several regional clusters. Most of the pueblos are located in central Mexico, in historical Mesoamerica. There are also pockets in the south, in the Yucatan peninsula (Mayan territory), in the west (around current Guadalajara city, where the Chichimeca tribes were located), and in the northwestern part (Current state of Sonora, where the Yaquis lived). Figure 3 shows the city locations from the two sources above described. Although both data sets mostly overlap, the difference between them is evident: true urbanized cities are centered around middle Mexico, while officially recognized cities spread all across the territory - it signals the political attempts in trying to incentivize settlement around border and frontier zones.

Income, inequality and schooling data at the county level for the year 2010 are gathered from SNIM (*Sistema Nacional de Información Municipal*). And the HDI (*Human Development Index*) is taken from Oficina de Investigación en Desarrollo Humano del PNUD (2014). Income is estimated in 2005 PPP Dollars, inequality is measured through county level Gini Index, and schooling is the average years of education for persons that are 15 or older. The IDH is a composite index of income, schooling and health indicators. Figures in the appendix show the map distribution of the data. Geographic (altitude and latitude), de-

Figure 3: Location of 18th Century Spanish Cities



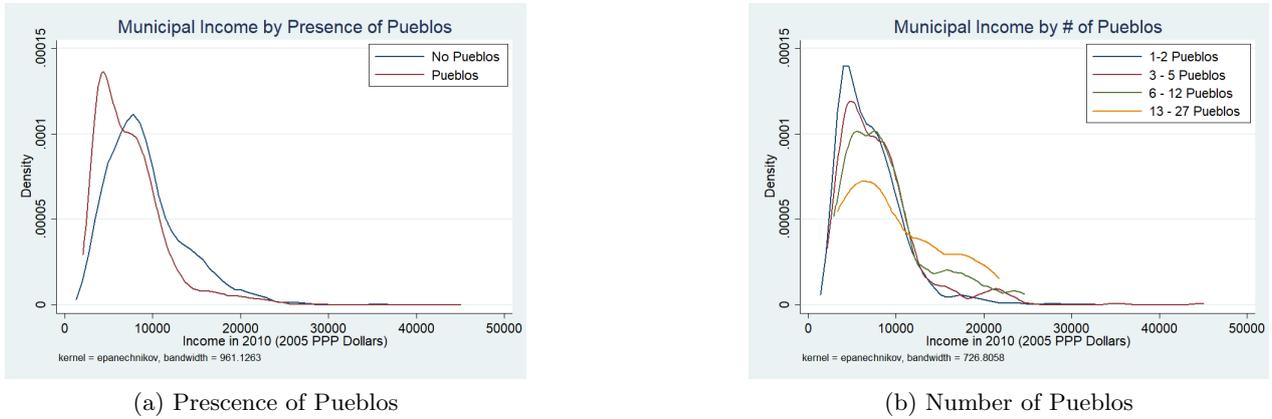
mographic (total and indigenous population) and urban controls (rural dummy for counties where more than 50% of population live in localities that have less than 2,500 inhabitants) are taken from SNIM and INEGI as well. A statistical summary of all the variables used is presented in the appendix.

4 Empirical Strategy

The goal is to identify the long term impact 18th century indigenous pueblos have had in Mexico's economic wellbeing. Several problems limit the inference one can make out of simple comparisons, as a quick glance of figures 4a and 4b can attest: The former plots the distribution of income in Mexican counties today according to the presence of a pueblo, the latter plots it according to the number of pueblos encompassed in a county. Municipalities with a pueblo past appear to be poorer than those that didn't have such legacy⁹. But when the relation between municipalities that did have a pueblo is explored, the more they had, the larger income they appear to have today; those counties that encompass three or more

⁹Table 9 shows the summary statics expressed in figure 4

Figure 4: Income Distribution in Counties According to Number of Historical Pueblos



pueblos have larger incomes today than those that didn't have any.

There are several confounding factors that are unaccounted in the graphs. After all, as I have expressed in the narrative section, the geographical distribution of pueblos is not random. Nonetheless, the comparison between figures exemplifies the strategy I am implementing: there is variation between the amount of pueblos a county has had (which is positively correlated with having larger incomes). I will exploit it to assess the association between pueblos per county and county income today. The premise being that modern counties encompassing more historical pueblos were better able to solve collective action problems (hence they continue to be tied into a unified political jurisdiction today), either because they inherited a greater tradition of local self-organization¹⁰ and/or because they were able to solve ethnic rivalries and cooperate in subsequent periods of time. Alternatively, I also use indigenous population data in the 18th century to test for an alternate transmission channel: pure economies of agglomeration, through increasing returns, could create a path dependence process. I use Spanish city data as a baseline standard to which the relevance of indigenous settlements can be compared. The influence of colonial city settlement is undoubtedly still being felt: Most of the largest and most important cities within Mexico today, were also the largest and most important cities in 18th Century New Spain. The

¹⁰A direct nexus between being a precolonial *altepetl* that was a *Cabecera*, being autonomous in colonial times, and a successful safeguarding of such autonomy after independence

process and channels that made them relevant is complex and beyond the prospect of this study, yet it serves as a reliable comparison of importance.

A first scenario to be tested is the following:

$$Y_{tdy} = \alpha + \beta_0 \text{Pueblo} + \beta_1 \text{PuebDensity} + \beta_2 \text{CityD} + \beta_3 \text{CityDensity} + \chi + e$$

Where Y_{tdy} is 2010 income, PuebloD is a dummy variable that takes value 0 when a county does not encompass any historical pueblo, and 1 when it does, PuebDensity is the indigenous density relative to the modern municipal jurisdiction (total amount of population living in pueblos in the 18th century divided by the county area where they would be located today), CityD is the presence of an 18th century city in a given county today, CityDensity is same as the pueblo density but with the population living in the Spanish cities, χ is a vector of control variables, and e is the error term.

Alternatively, and following the discussion above, I also test:

$$Y_{tdy} = \alpha + \beta_0 \# \text{Pueblos} + \beta_1 \text{PuebDensity} + \beta_2 \text{CityD} + \beta_3 \text{CityDensity} + \beta_4 (\# \text{Pueblos} \wedge \text{PuebDensity}) + \chi + e$$

It has the same specifications as the baseline scenario, except for the fact that it substitutes the pueblo dummy for the actual number of pueblos that are encompassed in a given county. It also adds an interaction term between the number of Pueblos and the pueblo density: it is to be expected that the relevance of a pueblo is dependent on the population that pueblo had in the past.

4.1 Endogeneity and Controls

The OLS specification leaves ample room for endogeneity due to potential correlation between the main explanatory variables and the error term. The original establishment of pueblos was not random, it was self-selected. The coefficients of the pueblo variable can be confounding the relevance of the pueblo with other non-observed variables. The historical literature can help in trying to minimize the problem: It is known that the first colonial Pueblos were conformed out of the preexisting pre-Hispanic polities, *altepetls* in

nahua language; it is also known that after the late 16th century epidemics, the indigenous population was heavily decimated and the pueblo system was exogenously reconfigured by the Spaniards. What are the main potential variables that could explain the original place of settlement and its posterior reconfiguration? Geography and the presence of close Spanish localities. Controlling for these two aspects will result in a more accurate identification.¹¹ As of now the geographical controls are the average latitude and altitude of the county that encompass the pueblos¹². Altitude will tend to control for the known fact that most Mesoamerican cities were settled in high altitude terrains.

A second problem that could bias the results is the omission of variables that, while being correlated with a pueblo, have an impact today, but only through modern channels. It is a well established fact in the empirical literature, that being indigenous and living in rural areas are among the two main predictors of poverty within Mexico (Pereira and Soloaga, 2017). It is the case, as it is to be expected, that the location of 18th century indigenous pueblos is highly correlated with municipalities that are predominately indigenous today (see appendix). The literature also maintains that current discrimination and geographic isolation are the two main explanations of why this is so (Pereira and Soloaga, 2017). Controlling for them will show a correct identification of the past-to-present channels.

Adding particular controls, notwithstanding its theoretical relevance, doesn't entirely solve the aforementioned problems. Therefore I cannot speak of a causality path from pueblos to economic outcomes today. Yet the evidence I provide still allows me to speak of a robust and relevant correlation that is difficult to explain without understanding the legacy pueblos have had.

¹¹I'm in the process of constructing the proximity distances between Pueblos and Spanish cities/Spanish treasuries

¹²I'm in the process of gathering data for rainfall, topographic ruggedness, distance to coast and waterways, and temperature

5 Results

Throughout the section, I use the Rojas (2016) data for cities, because it allows for a fairer institutional channel comparison.¹³ Yet the results are pretty robust to the inclusion of Abad and Zanden (2016) data; after all, most of the cities in both sets are located in middle Mexico.

Table 1 shows the baseline scenario results, which replicate the comparisons made using Figure 4. It corroborates the preliminary assessment that what appears to be a strong negative relationship between having a pueblo history and income, is just an artifice produced by omitted variable bias. After controlling for geographical and current poverty predictors, the relationship between pueblo legacy and income today disappears.

A second relevant result is the recognition of colonial indigenous density as a strong predictor of larger income today - its coefficient is robust through all specifications and its equivalent to those of the colonial city density. The New Spanish economy at the time, just like any society before the industrial revolution, operated under Malthusian constraints. Moreover, the market was really fragmented, most of settlements operated under self-subsistence mechanisms. Therefore it is possible to assess the prosperity of a given pueblo through the amount of population it sustained. Consequently, we can interpret the results as evidence of the importance of agglomeration effects; it supports the intra-national persistence of fortune literature (Maloney and Caicedo, 2015): Regions that were rich in the past are still richer today.

Table 2 shows results for the second scenario, which exploits variation in the number of pueblos a county had. The # Pueblo coefficient, although statistically insignificant for most specifications, remains far more robust than the Pueblo Dummy in table 1. After controlling for other relevant factors (geography and indigenous %) the coefficient becomes large and significant. Why is only after the controls are set that the pueblo number becomes relevant? I sketched the answer in section 4.1: counties that had more pueblos are correlated with more indigenous population today, which we know is a strong predictor of poverty today.

¹³It biases the comparison in favor of testing the political relevance of a city, rather than just the urban agglomeration effect.

Table 1: Income impact in Current Counties of Having a Colonial Settlement as Historical Heritage

Dependent Variable	(1) Income	(2) Income	(3) Income	(4) Income	(5) Income
Pueblo Dummy	-1749.5*** (-9.11)	-1736.7*** (-8.55)	-859.7*** (-4.36)	70.64 (0.47)	71.49 (0.48)
Pueblo Density (Pop/km2)		24.1797*** (4.71)	32.3*** (6.63)	15.2384*** (4.07)	241.9718 (0.15)
Pueblo Dummy \wedge Pueblo Density					-226.7322 (-0.14)
City B	9071.5*** (10.13)	6147.1*** (5.51)	5508.7*** (5.31)	3989.7*** (5.16)	3989.6*** (5.16)
City Density (Pop/km2)		39.8634** (3.20)	45.8909*** (3.96)	15.127 (1.73)	15.1273 (1.73)
Latitude (Degrees)			448.4*** (17.58)	416.2*** (21.04)	416.3*** (21.03)
Altitude (Km)			-31.98 (-0.31)	-669.1*** (-8.32)	-669.6*** (-8.32)
2010 % Indigenous				-5361.1*** (-21.13)	-5361.1*** (-21.13)
2010 Rural Dummy				-2928.8*** (-22.10)	-2929.4*** (-22.09)
2010 County Density (Pop/Km2)				1.345*** (20.86)	1.345*** (20.85)
Cons	9176.5*** (55.58)	9206.3*** (57.30)	-590.9 (-0.99)	2081.0*** (4.48)	2080.1*** (4.47)
N	2456	1992	1992	1992	1992
R^2	0.070	0.074	0.200	0.559	0.559

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

It is necessary to control for it, to find a truer relation between a past pueblo and income today through persistence channels. [4] shows that having one more pueblo is associated with a direct increase of 113 dollars in per capita income. The figure is quite relevant if we put it into perspective: A one SD increase in the number of pueblos (roughly 2 pueblos) is correlated with a 225 dollar increase in 2010 per capita income. That is half the impact latitude has on income (the relevance of the north-south divide in Mexico is palpable, as seen in Figure 6). Comparing against the national per capita GDP, which in 2010 was 7,966 dollars, means that the impact of pueblos is about 3% of that figure. If we compare it to the GDP per capita of indigenous regions, the importance of a SD increase in number of pueblo amounts for 5 %. A sizable difference.

The pueblo population density is robust and significant across most of the specifications. After controlling for other relevant factors, its coefficient is comparable to that of city density. It reconfirms the notion that a regional path dependence process may exist: Mexico's colonial heritage is not limited to the impact large cities have had, but it spreads through all regions - including those that were mainly indigenous pueblo communities.

Specification [5] adds an interaction term to [4]: The impact of pueblos on income may depend directly on the population density (a plausible hypothesis). The term is positive and significant. Its interpretation is not directly intuitive, given that both variables are continuous. Figure 5 provides a graphical visualization. It plots the predicted effect of pueblos on income given a set of pueblo densities. Both variables are positively related, and they both have a positive correlation with income today. The results suggests that disentangling the transmission channel of the importance of past indigenous communities is hard to asses: there is a complementarity between the number of pueblos and the total amount of population living in them. Both operate in tandem as a predictor of larger income today.

Finally, table 3 shows results for different dependent variables. Both the number of pueblos and pueblo density are positively related with more years of schooling and larger development (Captured by the HDI which incorporates a more nuanced perspective on schooling, income and mortality rates). The results confirm that the relationships found in

Table 2: Income impact of Colonial Settlements in Current Counties

Dependent Variable	(1) Income	(2) Income	(3) Income	(4) Income	(5) Income
# of Pueblos	12.21 (0.34)	-7.537 (-0.20)	62.16 (1.81)	112.8*** (4.43)	22.32 (0.70)
Pueblo Density (Pop/Km2)		11.8071* (2.33)	26.6523*** (5.55)	14.1547*** (3.86)	-3.6066 (-0.69)
# Pueblos \wedge Pueblo Density					9.3647*** (4.71)
City B	8981.0*** (9.82)	6105.0*** (5.37)	5295.0*** (5.07)	3737.1*** (4.85)	3842.3*** (5.01)
City Density (Pop/Km2)		38.2234** (3.01)	44.7815*** (3.84)	13.9573 (1.61)	15.4054 (1.78)
Latitude (Degrees)			478.8*** (19.20)	420.1*** (21.67)	418.0*** (21.67)
Altitude (Km2)			-123.3 (-1.17)	-721.3*** (-9.03)	-727.6*** (-9.15)
2010 % Indigenous				-5419.7*** (-21.85)	-5295.3*** (-21.34)
2010 Rural Dummy				-2964.1*** (-22.46)	-2967.8*** (-22.61)
2010 County Density(Pop/Km2)				1.328*** (20.66)	1.289*** (19.99)
Cons	7862.9*** (73.38)	8135.6*** (69.70)	-1744.0** (-3.14)	1954.4*** (4.42)	2096.1*** (4.75)
<i>N</i>	2456	1992	1992	1992	1992
<i>R</i> ²	0.038	0.040	0.194	0.563	0.568

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 5: Interaction Effects # Pueblos and Pueblo Density

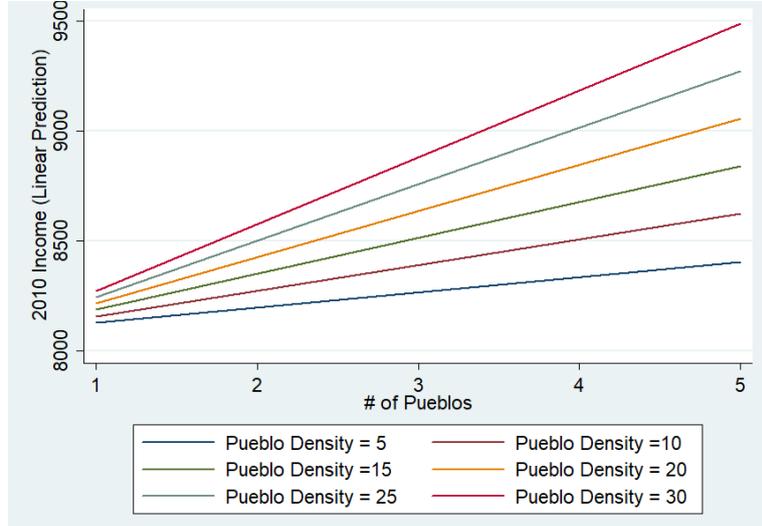


table 2 are not mere coincidence. The positive correlation between pueblos and inequality is worth noticing. It corroborates the relation found by Magaloni et al. (2018)¹⁴. It can also be considered as evidence in favor of interpreting the variable "number of pueblos" as a proxy for differences in the trajectory of the hierarchical relations between indigenous communities (the relationship of pueblos as *cabeceras* and *sujetos*). The presence of more pueblos, being interpreted as a legacy of more hierarchical societies, can also help explain a tradition of larger inequality.

6 Robustness

In order to appraise the robustness of the results, and add detail into the mechanisms behind the impact of pueblos on income today I follow two strategies: First, I assess the main geographical determinants of the pueblo locations. Given the potential for self-selection, it is important to acknowledge the relation geography may have had in incentivizing the erection of settlements in particular places (either by the old pre-hispanic tribes, and/or by the Spaniards). The results can provide information on the biases that geography may be

¹⁴The authors test the long term impact of cochineal producing pueblos in the Oaxaca region and found, similarly as I do, that they positively correlate with inequality

Table 3: Inequality, Education and Economic Activity: Impact of Colonial Settlements in Current Counties

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Gini Index	Gini Index	Schooling	Schooling	Econ Active	Econ Active
# Pueblos	0.00310*** (9.06)	0.00309*** (7.19)	0.0643*** (7.05)	0.0339** (2.98)	0.267*** (5.18)	0.234*** (3.62)
Pueblo Density (Pop/Km2)	-0.00012* (-2.43)	-0.000121 (-1.71)	0.01141*** (8.69)	0.005456** (2.90)	0.03507*** (4.73)	0.02860** (2.68)
#Pueblos \wedge Pueblo Density		0.00000885 (0.03)		0.003138*** (4.40)		0.003411 (0.84)
City B	0.0280** (2.71)	0.0281** (2.71)	1.142*** (4.14)	1.178*** (4.29)	2.956 (1.90)	2.994 (1.92)
City Density (Pop/Km2)	0.00000313 (0.03)	0.00000327 (0.03)	0.000321 (0.10)	0.000806 (0.26)	0.000267 (0.02)	0.000794 (0.05)
2010 % Indigenous	-0.00273 (-0.82)	-0.00272 (-0.81)	-2.351*** (-26.50)	-2.309*** (-26.00)	-7.572*** (-15.09)	-7.527*** (-14.92)
2010 Rural Dummy	0.00846*** (4.77)	0.00846*** (4.77)	-0.966*** (-20.45)	-0.967*** (-20.57)	-4.202*** (-15.74)	-4.203*** (-15.74)
Latitude (Degrees)	-0.000646* (-2.48)	-0.000646* (-2.48)	0.118*** (17.02)	0.117*** (17.00)	0.289*** (7.37)	0.288*** (7.35)
Altitude(Km)	-0.0104*** (-9.68)	-0.0104*** (-9.67)	-0.143*** (-5.01)	-0.145*** (-5.10)	-0.867*** (-5.37)	-0.870*** (-5.38)
2010 Density (Pop/Km2)	0.00000205* (2.38)	0.00000205* (2.35)	0.000370*** (16.07)	0.000356*** (15.44)	0.001000*** (7.69)	0.000985*** (7.51)
Cons	0.431*** (72.52)	0.431*** (72.33)	4.995*** (31.55)	5.043*** (31.92)	43.67*** (48.78)	43.72*** (48.72)
N	1990	1990	1992	1992	1992	1992
R^2	0.099	0.099	0.539	0.544	0.280	0.280

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

adding into the main results. Second, gathering insights from the historical literature on the development of indigenous communities (from pre-hispanic times to conquest to colonial era to post-independence), I rerun the main regression specifications but with subset of the data: I subdivide it into two groups, one based on the Mesoamerica/Aridamerica distinction¹⁵ and one based on a high/low altitude differentiation¹⁶. It is a well-known fact that pre-columbian mesoamerican indigenous communities were very different from those in Aridoamerica: they were mostly sedentary, and had larger and more complex societies. It is also recognized that

¹⁵The geographical discrimination is proxied by the ancient colonial divisions: I consider Mesoamerica to be composed of the Kingdoms of Mexico, Galicia, and the regions of Yucatan and Soconusco. Aridamerica are all territories that are above. Figure 8 in the Appendix shows the map.

¹⁶The high/low distinction is centered around being larger or smaller than the median altitude for mexican counties.

altitude played an important part in setting natural obstacles for indigenous assimilation into the Spanish/Non-Indigenous Mexican population.

Table 4 shows an OLS regression of the geographical determinants of colonial settlements and its densities all across the Mexican territory. The result confirms the historical intuition: first, pueblos tended to be located in high altitude areas and were not really north-driven; second, Spanish cities, were far more spread and preferred to be located in valleys (not in high altitude zones). Pueblos then tended to be located in zones that today correlate with low income through modern channels (current isolation makes them more vulnerable). Controlling for it in the main specification was necessary to address these issues. The important corollary is that if colonial pueblos self selected into geographical areas that today are correlated with bad prospects for growth, then our main regression results could actually be understating the importance of the pueblo legacy!

Tables 5-6 replicate the regression, but subdividing the dataset into Mesoamerica and Aridoamerica.¹⁷ The results are similar with some particularities: First, both pueblos and cities within Mesoamerica have a small association with latitude, but not those in Aridoamerica. Altitude, however, plays an even bigger role in Aridoamerican pueblos than in Mesoamerica in terms of pueblos settlement (The North-western Mountain Range is higher than any other in Mexico).

Table 4: Geographical Determinants of Pueblos, Cities and its Populations

Dependent Variable	(1) # Pueblos	(2) Pueblo Density	(3) City AvZ	(4) City Density AvZ	(5) City R	(6) City Density R
Latitude (Degrees)	-0.0622*** (-4.30)	-0.729*** (-6.30)	0.000200 (0.38)	-0.0527 (-0.08)	0.000917 (1.60)	-0.0303 (-0.05)
Altitude (Km)	0.479*** (8.14)	4.67*** (9.78)	0.00485* (2.24)	3.11 (1.20)	0.000690 (0.30)	3.06 (1.18)
Cons	2.437*** (7.79)	16.5*** (6.45)	-0.00260 (-0.23)	-0.283 (-0.02)	-0.0103 (-0.83)	-0.872 (-0.06)
N	2460	1992	2460	2456	2460	2456
R^2	0.037	0.073	0.002	0.001	0.001	0.001

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The second relevant robustness scenario is to see the differentiated impact of colonial

¹⁷Table 6 only shows the Rojas (2016) dataset because the Abad and Zanden (2016) data doesn't identify any Aridamerican city

Table 5: Mesoamerica: Geographical Determinants of Pueblos, Cities and its Populations

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	# Pueblos	Pueblo Density	City AvZ	City Density AvZ	City R	City Density R
Latitude (Degrees)	0.0152 (0.56)	-0.776** (-3.23)	0.00239* (2.29)	0.202 (0.16)	0.00235* (2.31)	0.203 (0.16)
Altitude (Km)	0.410*** (6.37)	5.01*** (9.00)	0.00401 (1.63)	3.21 (1.09)	0.000990 (0.41)	3.18 (1.08)
Cons	1.095* (2.09)	17.0*** (3.66)	-0.0422* (-2.11)	-5.18 (-0.22)	-0.0378 (-1.94)	-5.38 (-0.22)
N	2161	1695	2161	2157	2161	2157
R^2	0.019	0.049	0.004	0.001	0.003	0.001

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Mesoamerica is calculated by the overlapping of current counties to the colonial borders that encompassed the territories of Kingdom of Galicia, Kingdom of Mexico, Captaincy of Yucatan, and the region of Chiapas, which at that time belonged to the Captaincy of Guatemala

Table 6: Aridoamerica: Geographical Determinants of Pueblos, Cities and its Populations

	(1)	(2)	(3)	(4)
Dependent Variable	# Pueblos	Pueblo Density	City R	City R Density
Latitude (Degrees)	-0.0388 (-0.87)	0.00258 (0.33)	-0.00283 (-0.97)	-0.0249 (-0.69)
Altitude (Km)	0.708*** (4.18)	0.115*** (3.85)	-0.00564 (-0.51)	0.00436 (0.03)
Cons	1.347 (1.13)	-0.0257 (-0.12)	0.0948 (1.22)	0.756 (0.78)
N	299	297	299	299
R^2	0.056	0.054	0.005	0.002

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Aridoamerica is calculated by overlapping the current Mexican counties that did not belong to Mesoamerica, as expressed in last table (mainly the territories of Nueva Vizcaya, Nueva Navarra and Nuevo Santander)

Table 7: Income Impact of Colonial Settlements in Mesoamerica, Aridamerica, Low and High Altitude Zones

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Mesoamerica	Mesoamerica	Aridamerica	Aridamerica	Low Alt	Low Alt	High Alt	High Alt
# Pueblos	131.7*** (5.14)	43.88 (1.34)	109.7 (0.84)	0.423 (0.00)	-16.98 (-0.46)	-18.53 (-0.37)	220.5*** (6.60)	123.0** (2.90)
Pueblo Density (Pop/Km2)	15.4261*** (4.34)	-0.4707 (-0.09)	-402.5474 (-0.52)	-1533.757 (-1.67)	19.2209 (1.77)	18.7901 (1.30)	13.1850*** (3.34)	-2.1931 (-0.38)
# Pueblos \wedge Pueblo Density		8.4468*** (4.30)		341.2831* (2.25)		0.247 (0.04)		8.1671*** (3.69)
City R	5020.9*** (5.72)	5172.6*** (5.92)	-1819.2 (-1.13)	-1814.4 (-1.13)	2517.6** (2.71)	2522.4** (2.69)	5836.6*** (4.83)	5762.9*** (4.80)
City Density R (Pop/Km2)	7.9562 (0.90)	9.0953 (1.04)	160.9151 (1.19)	160.4231 (1.20)	-85.9502*** (-5.38)	-85.9904*** (-5.37)	15.3631 (1.36)	18.0292 (1.61)
Latitude (Degrees)	474.9*** (13.53)	474.1*** (13.58)	226.9** (3.14)	240.2*** (3.34)	421.0*** (20.55)	420.9*** (20.47)	401.4*** (9.92)	404.0*** (10.05)
Altitude (Km)	-632.4*** (-7.60)	-642.3*** (-7.76)	-506.2 (-1.73)	-504.2 (-1.74)	-1097.0*** (-6.81)	-1096.8*** (-6.80)	218.9 (0.77)	146.0 (0.52)
2010 % Indigenous	-5205.7*** (-21.42)	-5104.1*** (-21.01)	-11899.4*** (-4.11)	-14563.7*** (-4.69)	-5415.4*** (-16.55)	-5414.2*** (-16.48)	-5066.0*** (-12.88)	-4927.9*** (-12.56)
2010 Rural Dummy	-2525.6*** (-18.00)	-2539.9*** (-18.19)	-5207.6*** (-15.02)	-5110.3*** (-14.73)	-3001.8*** (-18.22)	-3002.1*** (-18.19)	-2557.7*** (-12.44)	-2569.5*** (-12.58)
2010 County Density (Pop/Km2)	1.243*** (19.34)	1.207*** (18.72)	2.322*** (9.02)	2.315*** (9.06)	3.096*** (16.52)	3.096*** (16.49)	1.130*** (16.07)	1.100*** (15.65)
Cons	547.0 (0.80)	676.9 (0.99)	8288.2*** (4.24)	8006.4*** (4.12)	2131.9*** (4.53)	2134.8*** (4.49)	69.98 (0.07)	282.7 (0.27)
<i>N</i>	1695	1695	297	297	1020	1020	972	972
<i>R</i> ²	0.527	0.532	0.637	0.643	0.653	0.653	0.530	0.536

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

pueblos on income if we discriminate between regions (Mesoamerica/Aridamerica[1-4]) and altitude (below/above the median altitude, below it [5-8]) Table 7 shows the results. Although the pueblo coefficient is positive for both mesoamerican and aridoamerican regions, it is both larger and more significant in the former than in the latter. The impact of pueblo density is actually far more relevant, as it is positive for Mesoamerica but negative for Aridamerica.¹⁸ All in all, the results would suggest an interesting scenario: although there is persistence dynamics from pueblos and pueblo densities within Mesoamerica, there appears that there is indeed a North-South "reversal of fortune" story here. The narrative confirms Maloney and Caicedo (2015) insight that Mexican northerner regions trajectory can not be explained by Mexican intra national dynamics alone - its ascendancy could be better explained by their closeness to the US.

Specifications [5-8] show the clear importance of altitude as a factor determining the impact of pueblos. The # of pueblos coefficient becomes even larger in the high altitude areas but is negative and not significant in low altitude zones. The pueblo density coefficient, while not being significant in low altitude areas, is still robust and similar to the main regression results. The implications are interesting and give credit to our empirical strategy: the number of pueblos within a county do identify institutional channels that are not entirely related to other different causal mechanisms. Pueblo density impacts in similar manner across all specifications, notwithstanding the placement of the pueblo itself. Location of a pueblo, however, does change the impact it has on today's income. High altitude areas, being more isolated, allowed for the endurance of local communities as a self-organizing and autonomous entities (Garcia Martinez, 2004; Garcia Martinez and Martinez Mendoza, 2012).

7 Discussion

Mexico's history could not be understood without referring to the resiliency of its indigenous institutions. The pre-hispanic geopolitical context was complex, fraught with conflict and

¹⁸The interaction term in [4] is positive and abnormally large because the effect of pueblo density alone is negative and even larger

hierarchical relations among communities. After the conquest of the Aztecs, the Spanish had to adapt to the indigenous geopolitical context that had preceded them. They built their own State dependent on a division of political areas: a Spanish and an Indigenous one (based around the pueblos). The latter remained largely autonomous for all the colonial period. Mexico's independence brought an end to that system, yet the indigenous communities readopted and formed the basis of what today are counties. Ancient pre-hispanic polities became pueblos, and pueblos became the counties.

The foundation of the paper rests on the contention that the number of historical pueblos per modern county is a pertinent proxy of the level of colonial indigenous settlement complexity. And hence that these pueblos do in fact reflect a larger level of self-organization capacity (with larger potential to solve collective action problems). I show that this proxy is positively correlated with larger income, more development (larger HDI), more years of schooling, but also more inequality. I provide evidence that the assumption (More Pueblos \rightarrow More Complexer Indigenous Settlements) is true. The effect it has on income varies according to historical intuition: Pueblos matter the most in the historical Mesoamerica area and in higher altitude zones. The former is important because it confirms that pueblo's self-organization capacity comes from pre-hispanic times (Aridamerica, largely nomad before the Spanish conquest, with no state capacity tradition, shows that in it Pueblos have no significant effect on current income). The latter matters because it provides evidence of the importance of current isolation. Localities that are inaccessible today have greater chance of sustaining their local practices.

I contrast the results of the pueblo legacy with the importance of population density. There is a general level of persistence in Mexico's south and middle regions: more population density in the past predicts larger incomes today, independent of the altitude or other factors. That is not generally true for the Northern part of Mexico, whereas pueblo density seems to be less relevant as predictor of income today. North's development has different legacy.

There are several potential biases that my empirical analysis could not be capturing. The most relevant one is the idea that establishing a pueblo could be correlated with un-observables. I suggest that geography may be the most important biasing factor, yet

pueblos tended to settle areas that nowadays are negatively correlated with income. Other geographical unobservables could have the same properties. The effect I found would then be underestimating the true effect pueblos have had. Which means that pueblos could be more important than what I'm concluding. I cannot, however, conclude that my results are causal. Yet, the association I found seems robust.

The paper is a work in progress. I'm currently working on getting intermediary data (the effect of pueblos in the porfirian era *Departamentos* based on the 1895 censuses). I am also gathering data on more controls (rainfall, temperature, ruggedness), and I'm working on detailing the narrative part of the text.

A Appendix

Figure 6: 2010 Income in 2005 PPP Dollars by County

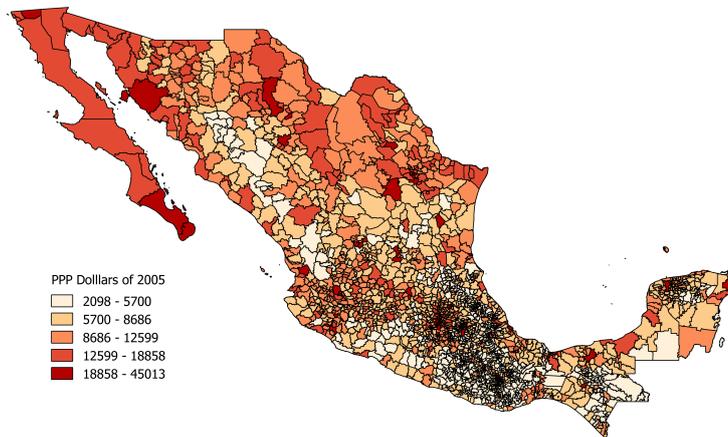


Figure 7: Number of Colonial Pueblos encompassed in current Counties

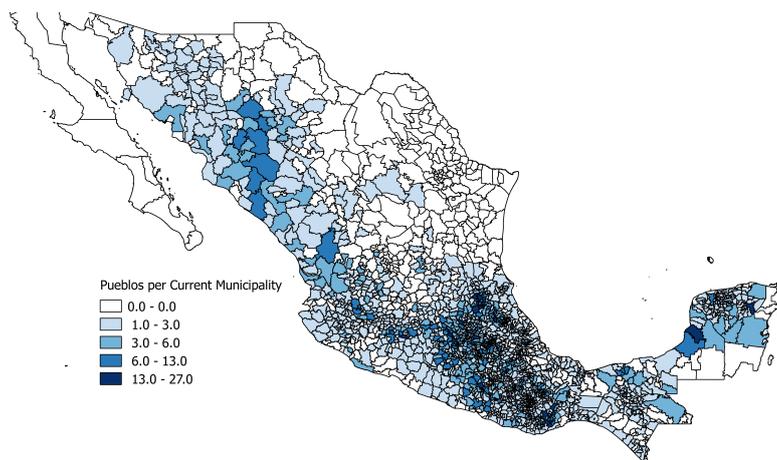


Figure 8: Colonial Jurisdictions pre Intendencias in Mexico



Table 8: Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	Obs	Mean	Median	St.Dev	Min	Max
Pueblo	2456	0.7373984	1	0.4401372	0	1
# Pueblos	2460	1.814364	1	2.426259	0	27
Pueblo Density (Pop/Km2)	1992	7.6777	0.14413	18.4654	0	315.9041
Cities A	0.0077236	0	0.087516	0	0	1
City AvZ Density (Pop/Km2)	2456	2.7166	0	104.77	0	5,166.051
Cities R	2460	0.089431	0	0.0941632	0	1
City R Density (Pop/Km2)	2456	0.0025131	0	0.1045346	0	5.166051
Latitude (Degrees)	2460	20.02603	19.33219	3.342089	14.64395	32.49197
Altitude(Km)	2460	1.302012	1.467725	0.8225642	0	3.01339
2010 % Indigenous	2456	.1780799	0.0137745	.287472	0	0.9513274
2010 Rural Dummy	2456	0.3782573	0	0.485051	0	1
2010 County Density (Pop/Km2)	2456	276.2995	51.87804	1172.143	0.14	17,555.56
2010 Income (PPP Dollars)	2456	7,965.58	7,175.357	4332.043	2,097.806	45,012.62
Gini Index	2454	0.4120448	0.4082906	0.0390422	0.2856981	0.590808
Years of Schooling	2456	6.651458	6.505	1.526562	2.03	13.52

Table 9: Income According to # of Pueblos, Summary Statistics

# Pueblos	(1) Obs	(2) Mean	(3) Median	(4) St.Dev	(5) Min	(6) Max
1	936	7102.869	6370.78	3658.793	2097.806	30265.07
2	328	7328.588	6706.122	4104.515	2147.106	32609.23
1 - 2	1264	7161.442	6419.752	3779.134	2097.806	2097.806
3 - 5	385	8030	7089.701	4809.589	2119.042	45012.62
6-12	145	8901.09	7873.395	4908.984	2919.22	24622.06
13-27	20	9543.835	8241.654	5646.63	3305.379	21712.6

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