

Life on the Edge: elites, wealth, and inequality in Sonora, 1871-1910

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Abstract

This paper's contribution is a reconstruction of the distribution of wealth employing a sample of wills from El Colegio de Sonora database for the years 1871-1910. We show that the rapid industrialisation/modernisation process that ensued in northern Mexico during the late 19th and early 20th century lead to a continuous increment in wealth concentration at the top of the distribution, going from a Gini index measure of 0.48 in 1871 to 0.79 in 1910. Rather than a fundamental (kuznetsian) necessity, however, our data suggests a critical role played by the political economy at the time in a gerschenkronian fashion and highlight the importance of the control of natural resources on inequality dynamics. The paper hereby engages with and contributes to the ongoing discussion about the role of economic and political elites in inequality dynamics and their reproduction over time.

Keywords: inequality, wealth inequality, elites, Mexico, wills, Sonora, social structure

JEL codes: D63, E01, I3, N36, P16

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I. Introduction

Inequality is one of the most critical problems of our time. This is not because it is a particularly new phenomenon; inequality has been present since humanity started to organise in societies. Rather, its importance lies precisely in this very persistence throughout history. Despite undergoing manifold changes in form and level, the unequal distribution of resources as such constantly looms large. To properly understand its current levels, as well as its dynamics over time, we need to go back in time to examine how the forces in our societies have shaped the evolution of inequality. When thinking in historical times, the primary determinant of inequality in agrarian societies is wealth inequality. As Bengtsson, Missaia, Olsson and Svensson (2017) argue, wealth is a crucial determinant of the standard of living. This is because in agrarian or pre-industrial societies people's livelihoods hinge on their production, rather than wage labour; subsistence agriculture was the main activity for the bulk of the population. Therefore, it is wealth, rather than income, which best traces inequality trends in pre-industrial times.

To increase our understanding of contemporary inequality dynamics, in this paper we reconstruct and examine the wealth distribution in the Northwestern Mexican state of Sonora during the late nineteenth and early twentieth century based on a unique dataset we create based on recorded wills. We have both historical and practical reasons for focusing on Sonora. The historical motivation is that, although a far and disconnected region of Mexico, Sonora would eventually play a prominent role in the modernisation of the country: along with Chihuahua and Coahuila, it was one of the northern states that risen in rebellion and spurred large revolutionary armies that fought during the Mexican Revolution, ultimately emerging victorious. Their elites aimed to transform the country's institutions and its economy, and in the process, they attempted to follow the example of their northern states. Theirs was a world of the extension of the agrarian frontier, of modern agriculture, mining, and manufacturing. The modernisation process after the Mexican Revolution keeps up the idea of the Porfirian regime of small owners, yeomen farmers as a class that could transform the country and combine it with the ever-existent crony capitalism and a new corporatism to drive modernisation.

Additionally, local developments in these rather isolated northern States preceded national changes by a couple of decades, providing a prototype of sorts. Studying Sonora is therefore akin to analysing an earlier, small-scale version of the type of modernisation the country would experience

over the 20th century. Sonora is a portrait of violence against indigenous populations, the Yaqui, the Mayo and the Seris, and the intermingling of political with economic power (Voss 1982, Aguilar Camín 1996).

Besides this historical ‘convenience’, we have a powerful practical reason. The study of wealth inequality through time, with all the challenges it presents, has recently gained impetus with works such as Piketty (2014) and Lindert and Williamson (2016). Most of these works focus on a subset of (predominantly high-income) countries, as their rich administrative records allow the authors to rely on large datasets to perform in-depth analysis. Nonetheless, for countries without statistics dating from centuries ago, other proxies for wealth need to be used. Such is the case of wills and probate inventories. While fraught with limitations of their own and less straightforwardly translatable into our contemporary accounting habits, they show us a glimpse of the concentration of wealth at different points in time.

Following Lindert (1981), with regards to the employment of wills and probates to perform historical economic analysis, the best is to start from the most accessible data. Collecting wills and probates is a time-intensive activity and also an expensive one as it is often required to travel around the geographical area of interest to collect them. In that sense, Sonora represented a serendipitous opportunity as El Colegio de Sonora had already collected a database of more than 1400 wills from the years 1790 to 1910. In this study we take advantage of these available data.

Mexico was undergoing a transformative period during the last decades of the 19th and the first ones of the 20th century. What we know as modern Mexico became determined during that period or is in some way directly associated with the period; this is particularly true for its social, economic, and political life. Similar to Levy (2016) in her study of the southern state of Yucatán based on a set of probate records from 1850-1900, we find the period to be crucial with regards to how it forms both the economic and political elites of a time of explicitly aspired modernisation, as well as the most vulnerable and often forgotten populations. Our data highlights the ethnic divide expressed at its crudest form in the Yaqui war, and shows how inequality can worsen under conditions of ‘progressive’ institutional change, putting particular emphasis on the role of local elites in these processes.

To this end, in the following Section II we describe our methods, data and analysis. Section III presents the dynamics of wealth inequality in a frontier society and the group dynamics, and Section IV conclusions and extensions. Section V references and section VI appendix.

II. Data, methods, and analysis

For this study, we rely on the quantitative and qualitative analysis of a large wills database for Sonora spanning from the late 18th to the early 20th Centuries described below, which we complement with historical accounts of the region, particularly with regards to their elites.

i. The wills database

Without statistical records available to estimate inequality before modern reporting started in 1989 with the ENIGH¹, we follow the strategy pioneered by Lindert (1981) and Lindert & Williamson (1983) to convert administrative proxies like probates into comparable units for the contemporary population instead. The use of administrative data, from tax records to probates has been in popular use to the study in inequality over the last years, for example, Piketty (2014), Lindert and Williamson (2016), Alvaredo, Atkinson & Morelli (2018).

In our estimates, we employed the underutilised wills collected by El Colegio de Sonora under the leadership of Ignacio Almada Bay from 1996 to 2005. The full database contains 1492 wills that lapse from 1786 to 1910. From this resource, we selected a sample of all wills from 1871 to 1910, in a total of 1134 observations. From the 1134 observations, we extracted the variables corresponding to the gender, occupation, municipality, socioeconomic status or class, year, age, and the estimated value of the assets contained on each will.

Table 1: The original sample

No.Wills	Female	Male	Total Wealth Captured (pesos)	Average Wealth	Min. Wealth	Max. Wealth	Years	Average age
1134	458	675	5805894	11729	0	861578	1871- 1910	61.58

Source: Sample taken from the El Colegio de Sonora will database

¹ Household income survey from the Mexican National Statistics Office, INEGI.

This first sample suffered from several problems that required correction. First, not all assets on the wills were expressed in monetary value, often including objects listed without valuation, farm animals, cattle, houses, terrains and in some cases money or the value of the assets. The lack of information regarding prices or values forced us to seek reasonable proxies in the historiographic literature from which to impute and calculate a monetary value for each will. The process was cumbersome, but we were able to employ different sources of the time, historical statistics from sources such as the federal budget for 1874, historical statistics, books and for several objects different wills at the same database that contained the valuation or prices. When foreign currency appeared on the will, such as German Marks and Austrian florins, we used the historical exchange rates from the Bank of Japan², Bank of Sweden³ and Jan Tore Klovland⁴ to calculate cross-exchange rates to convert them to American dollars and then from dollars to current pesos of the year of the registry.

Since the Mexican economy at the time was extremely disconnected, prices differed from region to region. For that reason, we avoided the problem of constructing a prices index to transform values into real pesos. Since the objective of this study is to showcase the evolution of the distribution of wealth, not the living standards, having real or constant pesos makes no difference (it would only matter if we attempted to compare the wellbeing of the people intertemporally).

A second problem with the collected sample is that we were only able to measure or proxy the monetary value of their wealth for 43% of the observations. Therefore, we had to take a subsample from the original sample limited to the observations that contain a wealth value. This procedure shrunk our database but left it with a comparable number of observations to Levy (2016) with 339 observations for the state of Yucatan and Frank (2004) with 669 observations for Brazil. Instead of performing a year by year analysis as we originally intended, we opted to group data in eight quinquenniums to aggregate sufficient data to construct a distribution for each period.

² "Reference Book of Financial Matters" of the Financial Bureau of the Ministry of Finance of Japan.

³ Exchange rates, prices, and wages, 1277–2008 by Håkan Lobell.

⁴ Historical exchange rate data 1819–2003

Table 2: The working sample

No. Wills	Female	Male	Total Wealth Captured (pesos)	Average Wealth	Min. Wealth	Max. Wealth	Years 1871- 1910	Average age
495	198	297	5805894	11729	0	861578		62.46

Source: Sample taken from the sample taken from the El Colegio de Sonora will database

Another critical problem to solve with the remaining data before we could adequately analyse it was that, like most wills and probates databases, they overrepresent the older and wealthier population and underrepresent the young and the poor (see average age and wealth in Table 1 and 2). This over/under-representation produces unbalanced databases that can either overestimate or underestimate inequality (Lindert 1981, Lindert & Williamson 2016, Bengtsson, Missiaia, Olsson & Svensson 2017).

There are several strategies to solve the representation problems, some more appropriate than others depending on the available data. One of these approaches is to employ the age reported on the observations and multiply each observation by the inverse mortality rate for that age group (Bengtsson, Missiaia, Olsson & Svensson 2017, Bengtsson, Missiaia, Nummela & Olsson 2018). This procedure results in a database that gives more weight to the younger population so we can generalise the analysis with more confidence. For the wills database collected by El Colegio de Sonora, this approach is inappropriate as several observations lack age, and thus was discarded.

The alternative approach we ultimately followed is to consider the known or “true” social class structure in the country and employ it as a weighting factor to balance the sample (Lindert 1981, Bengtsson, Missiaia, Nummela & Olsson 2018). Ideally, we would have used the class structure shares for Sonora, but they were not available. Therefore, we rely on the national social structure and employ it as a reasonable proxy. We obtained the shares for the upper, medium, and lower classes from Iturriaga (2012). Iturriaga estimates the class structure of Mexico for the year 1895, and we took the shares for that year as a benchmark for the state of Sonora. This data solves half the problem; the other half requires us to reclassify the observations as either upper, medium, or lower classes.

The sample we took contains a class categorisation assigned by the notary for most observations, but for some, the class was not annotated on the will. We decided to classify those missing observations based on their wealth; for that purpose, we took the median wealth of the classified

observations⁵. If the value of wealth in the observations without classification were near the median for a class, we would classify it as such.

Now with the full sample classified, we employed an analogue of the social tables method (Milanovic, Lindert and Williamson, 2011) as employed by Castañeda & Bengtsson (2020) for the case of Mexican incomes. The result is a sample balanced by class or social structure, that can be employed to derive the synthetic measures of inequality such as the Gini and Theil indexes. See also Table C in the Appendix for further details (Section VII).

III. The dynamics of wealth inequality in a frontier society.

Mexico at the time was under Diaz dictatorship, which continued and expanded the liberal policies of Juárez and Lerdo attempting to modernise Mexico. Díaz tried to create a class of yeomen farmers and encouraged national and foreign investors (from US and Europe) to do business in Mexico under preferential treatment, enjoying protection and different degrees of market power.

Natural conditions in the vast Sonora State, tucked between deserts, the Gulf of California and the border with the USA at the utmost Northern end of Mexico, were always harsh: its arid climate, unforgiving desert landscapes that cover over 90% of its surface, and a majestic Sierra Madre virtually cutting it off the rest of the country have concentrated much of its population around the remaining fertile lands, and pushed most cities towards the milder coastal areas. At the turn of the 20th Century, its population was sparse and concentrated in the cities of Hermosillo, Álamos, Arizpe and Guaymas. Predominately an agricultural society since long before the Mexican Revolution (starting in 1910), over the last decades of the 19th century, Sonora was experiencing a profound transformation. It was a distant territory, not well integrated within the Mexican national economy. As Coatsworth (1981, 1989) points out, the complex and rugged geography of Mexico, the existence of the *alcabala* tax⁶ between states (finally repealed until 1896), the lack of reliable transportation and the concerns for safety due to widespread banditry around the country prevented the integration of the national economy. Sonora's extensive territory, 179,355 square

⁵ We consider wills with a wealth above 10,000 pesos as upper class, wills with wealth between 1,000 and 9,999 and middle class and will with wealth bellow 1,000 pesos as lower class.

⁶ The *alcabala* was a tax on intra-state commerce, dating back to the colonial period, there were several attempts to repeal it during the 19th century, but ultimately all failed until 1896.

kilometres, was extremely rich in natural resources – a richness that eventually led to the development of the mining industry, cattle production and vast agricultural lands, all profitable aspects of the vertical integrated *hacienda* economy.

However, the wealth in its territory was not readily available for the small population of Sonora. There was plenty of lands, but not plenty of water for irrigation. The constant fighting with the indigenous population, the Yaqui and Mayo people, and the frequent incursions of the Apache, meant a permanent threat of conflict, which forced the white colonisers to employ part of their resources towards the defence of life and property.

Towards the end of the 19th Century, however, these constraints started to relax, allowing for an increasing polarisation of wealth among the population. Its initially oscillating tendency quickly settles for an unambiguously increasing long run trend. Mapping the inequality dynamics that emerge from our dataset of Sonora at the end of the 19th and the beginning of the 20th century, we estimate a 63% increase in inequality as measured by the Gini index over four decades. This result deserves a more in-depth analysis of the trajectory of the concentration of wealth. Thus, in the following we examine the main inequality trends at the time and lay out the political circumstances that drove the economic modernisation of Sonora, and the significant political economy arrangements that made the *hacendado* class (the large landowners) and the financiers the main winners and the indigenous population and peasants the principal losers.

i. A trend towards increasing inequality

Far from a constant feature of developing contexts, the wealth distributions we find are in fact dynamic and highly contingent on contextual circumstances. Sonora, like the rest of Mexico at the time, was an agrarian society. Such societies are characterised by land ownership being the main factor that drives the dynamics of inequality (Castañeda & Bengtsson 2020, Turchin & Nefedov 2009, Bengtsson, Missiaia, Olsson & Svensson 2017). From Table 3, we can observe the evolution of wealth inequality in Sonora from 1871 to 1910. The results show an expected increase over time as the region endures a process of economic modernisation.

Inequality displays the hallmark evolution driven by kuznetsian forces (Kuznets 1955), but with a twist, the political economy shaped the evolution. The command of natural resources, political connections and exploitation of the indigenous population drove the inequality upwards.

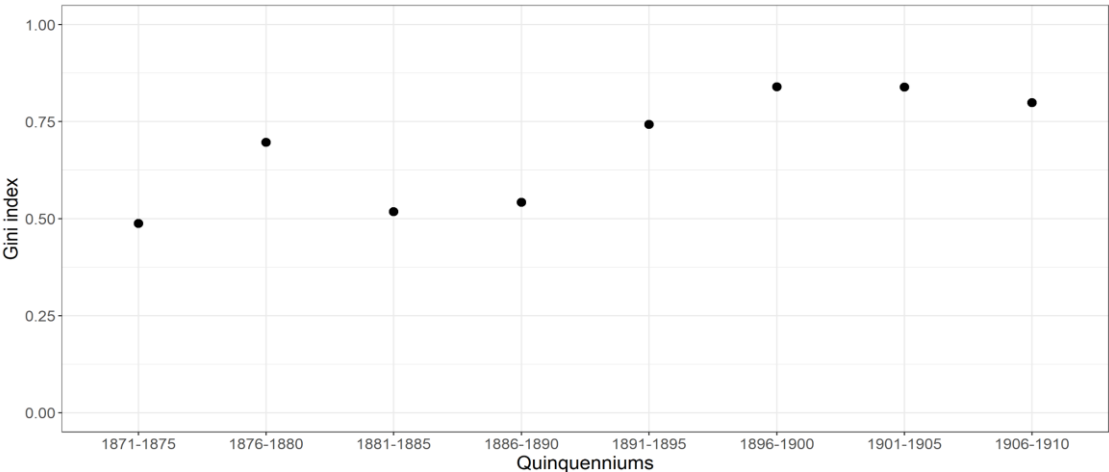
Table 3: Wealth distribution, 1871-1910

Years	Gini Wealth	Theil Wealth	10/90 Ratio
1871-1875	0.4878	0.8151	42.99
1876-1880	0.6964	1.8624	146.89
1881-1885	0.5176	1.0076	57.18
1886-1890	0.5417	0.9376	50.19
1891-1895	0.7429	2.2045	197.45
1896-1900	0.8397	2.8658	394.01
1901-1905	0.8388	2.6387	382.92
1906-1910	0.7989	2.3496	274.36

Source: Authors’ calculations based on the wills database, see section IV. Data, methods, and analysis and the Appendix (section VII) for details.

The evolution of wealth inequality displays a trend that supports the historiographic literature of the economic development of Sonora in the late 19th century and the early 20th. A stable and high but not extremely high concentration of wealth from the first 20 years of the period moving from 0.4878 in the 1871-1875 quinquennium, to 0.5417 in the 1886-1890 quinquennium. An increase of 11% over two decades. Then a sharp increase from 0.5417 to 0.7989 in the years after the defeat of Cajeme and the control over the water resources of the Yaqui and Mayo rivers. A 47% increase on the Gini index.

Figure 1: The evolution of inequality in Sonora 1871-1910



Source: Authors’ calculations based on the wills database, see Appendix (section VII).

How can we explain the evolution of wealth inequality displayed on Table 3 and Figure 1⁷? Which mechanisms gave it that shape? As documented by Aguilar Camín (1996) and Stuart Voss (1982), the upper class of Sonoran society consolidated large estates at the beginning of our period of analysis comprising 1871-1910, with some fortunes being the product of stealing the lands of the indigenous population over previous decades and the policy of land reclamation that was encouraged by both the Díaz Federal Government and the local authorities in which large extensions of land could be bought at low prices⁸.

The political connections enabled the economic elites to thrive on the country (Haber, 1989, 2002, Knight 1999, Kuntz 2002, Beatty 2002) and begun to invest heavily on industries, from railroads and mining to banking and agricultural production (Wasserman 2015). However, the case of Sonora had a significant difference from the general industrialisation process that was taken place in the country during the Porfirian regime. Sonora was a harsh place, and the coloniser and their economic elites faced strong opposition from the Yaqui and Mayo people. A long and costly war, the Yaqui war, had to occur to fully unleash the forces of industry and modernisation on the state.

From 1885 the political elites both at Federal and local level started a war against Cajeme, the leader of the indigenous population and after defeating him and arranging a peace accord with his successor the large landowners of Sonora secured the command of the Yaqui and Mayo rivers. With the waters of the rivers under control, the value of their lands and their productivity exploded (Aguilar Camín 1996). Although the war against the indigenous population continued in the form of Yaqui guerrilla warfare and frequent insurrections over the next decades, the face of Sonora changed, cities grew and towns spawned from the new economic activities, and an economic boom ensued.

The distributional changes caused by these developments are reflected in our empirical data, neatly tracing inequality dynamics. As such, starting out with a wealth Gini of 0.49 in the first quinquennium, there is a clear break in the trend, first with a high but somewhat stable wealth inequality during the first two decades of the period, with only a brief break in the trend in the 1876-1880 quinquennium when inequality significantly increases and moves from 0.4878 to

⁷ Both Table 3 and Figure 1, should be taken as a lower bound estimation, historiographic evidence of elite incomes signals that wealth at the top probably was even higher, for more information see the Appendix section.

⁸ Aguilar Camín (1996) mentions prices as low as 1 peso per hectare.

0.6964.⁹ Nevertheless, the spike rapidly moves back as the 1881-1885 and 1886-1890 quinquenniums are closer to the one at the beginning, 0.5176 and 0.5417, an 11% increase overall the two decades.

This pattern is consistent with the general historiography. Sonora at the time was yet to experience its economic boom. It was still very disconnected from the economies of California and Arizona in the US, and the rest of Mexico as the first railroad line was finished in 1881 and only connected the cities of Guaymas and Hermosillo in Sonora, it reached Nogales in 1882. It will be until the 1890s and 1900s decades that the railroad will be significantly extended to connect Sonora and its main cities to both the rest of Mexico and the US.

Therefore, the combination of the lack of connectivity, the arid land, and the lack of control of water resources to increase the land productivity prevented an even higher accumulation of wealth. Unproductive land has a lesser value, without connectivity is harder to trade and move raw materials for industry or transport the extraction from the mines. Without these conditions, Sonora was not that attractive to foreign investment and was constrained by the availability of capital for investment.

In Figure 2 and 3, we can see this development more clearly. Figure 2 and 3 contain the Lorenz curves from the 1871-1890 period. Figure 2 compares the quinquennium of 1871-1875 to the one of 1876-1880. We observe the spike in inequality registered on the 1876-1880 quinquennium, it is driven by an improvement in the levels of wealth of the middle and upper classes, and it displays a first-order Lorenz dominance that signals it is unequivocally a more unequal distribution than the one from 1871-1876.

Figure 3 compares the 1881-1885 quinquennium and 1886-1890 one. In this figure we observe an apparent stabilisation of inequality, the Lorenz curves almost lie entirely on top of each other, this points to a weak first-order Lorenz dominance as it is not automatically clear which distribution is more unequal. In the end, the picture from those first two decades strongly points toward a highly unequal but stable concentration of wealth.

⁹ Due to the data constraints as explained on the previous subsection even if we cannot claim that the actual estimated values are accurate point values, we can have confidence that they display the most likely trend of the evolution of inequality during the 1871-1910 period. For more data analysis details and robustness checks, see the Appendix (section VII).

It is during the second part of the period, the next two decades when the inequality trend changes, and we observe a consistent fast rising level of wealth inequality. Again, this trend is entirely consistent with the historiographic literature of Sonora economic transformation. As we argue in this sub-section, the defeat of Cajeme (the leader of the Yaqui) in 1885 allowed the control of the Mayo River, and with that, the floodgates of investment on irrigation were open. In the desartic terrains of Sonora control over water is as important as control over land. Natural resources play a prominent role in the evolution of inequality as they enable rents to be extracted and productivity in a key sector such as mining or agriculture, to increase.

As cities and towns began to grow and spawn we observe the classical centripetal forces that drive urbanisation to gain momentum, as Krugman (1979) argues, the centripetal forces of commerce and industry attracts people and requires connectivity to move raw materials and goods. It is when the railroads finally connect the Sonoran cities scattered through the desert to the US and other places around Mexico that the real economic boom occurs. That boom driven by colossal capital investment on industry takes the capital gains of the economic elites local and foreign to the height it reached as described by Voss (1982) and Aguilar Camín (1996).

That process enabled the pattern observed in Figures 4 and 5. We see in Figure 4 that wealth inequality shoots up to a staggering 0.7429 Gini Index value in the 1891-1895 quinquennium and then jump again to 0.8397 in 1896-1900. The second Lorenz curve of this period displays first-order Lorenz dominance and is driven by gains for the middle and upper class. As we explain in the next section, the political and economic elites over this period strongly favour local oligarchs and enable lesser entrepreneurs to profit from the economic boom they engineered.

In Figure 5, we see the stabilisation of this trend, as inequality in the 1901-1905 quinquennium remains roughly on the same level as the one in the 1896-1900 period, 0.8387 value. Then in the next quinquennium, the one from 1906-1910 it decreases by 4.8%. Nevertheless, as we can observe, the Lorenz curves slightly intersect, which means that there is no first-order Lorenz dominance, and is more difficult to tell which wealth distribution is more unequal. For that reason, we can argue with confidence that after inequality skyrocketed in the second half, it reached a stable plateau.

Figure 2: Lorenz curves 1871-1875 vs 1876-1880

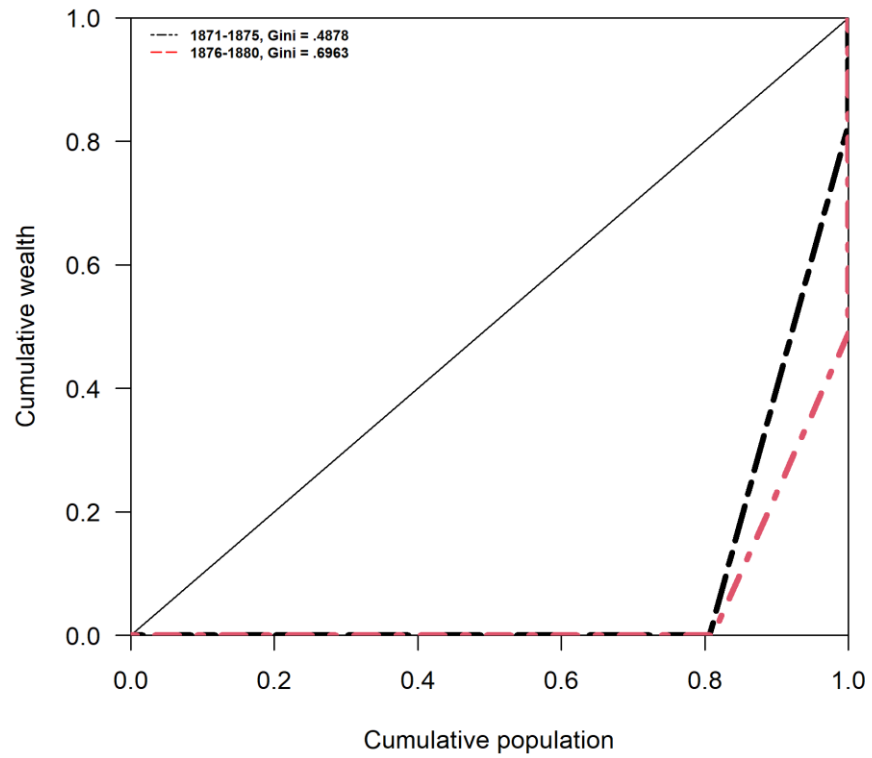
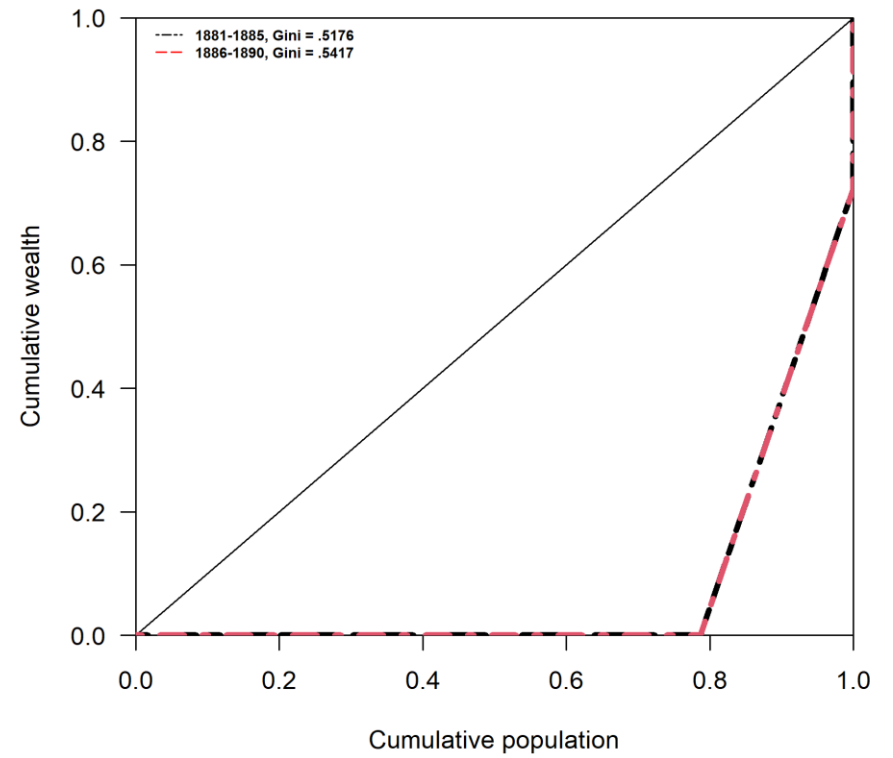


Figure 3: Lorenz curves 1881-1885 vs 1886-1890



Source: Authors' elaboration.

Figure 4: Lorenz curves 1891-1895 vs 1896-1900

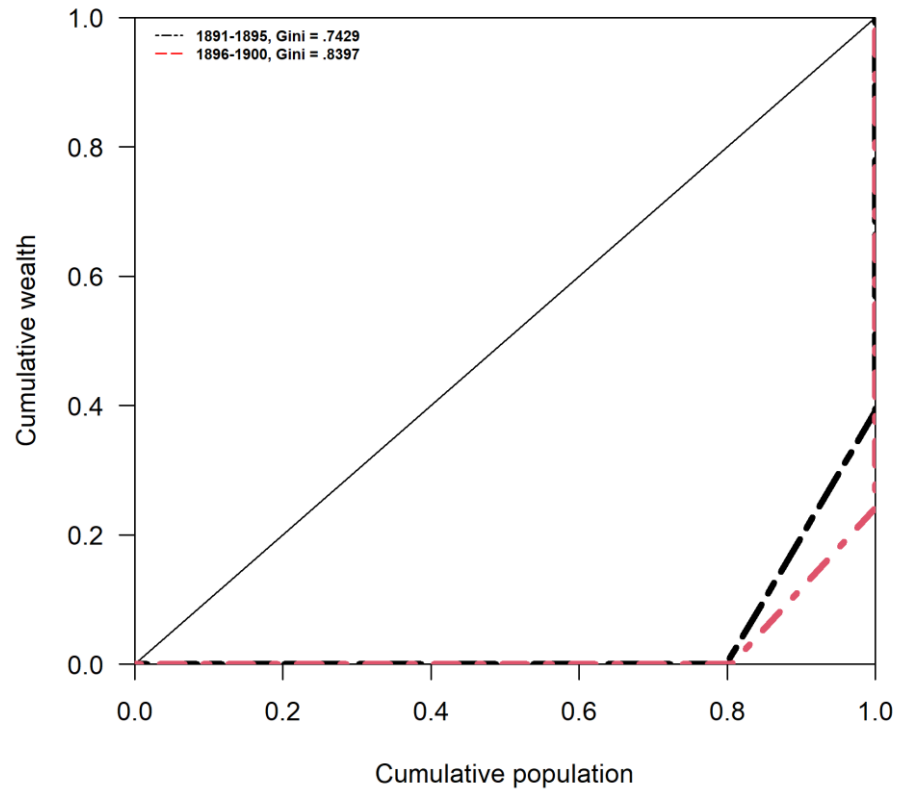
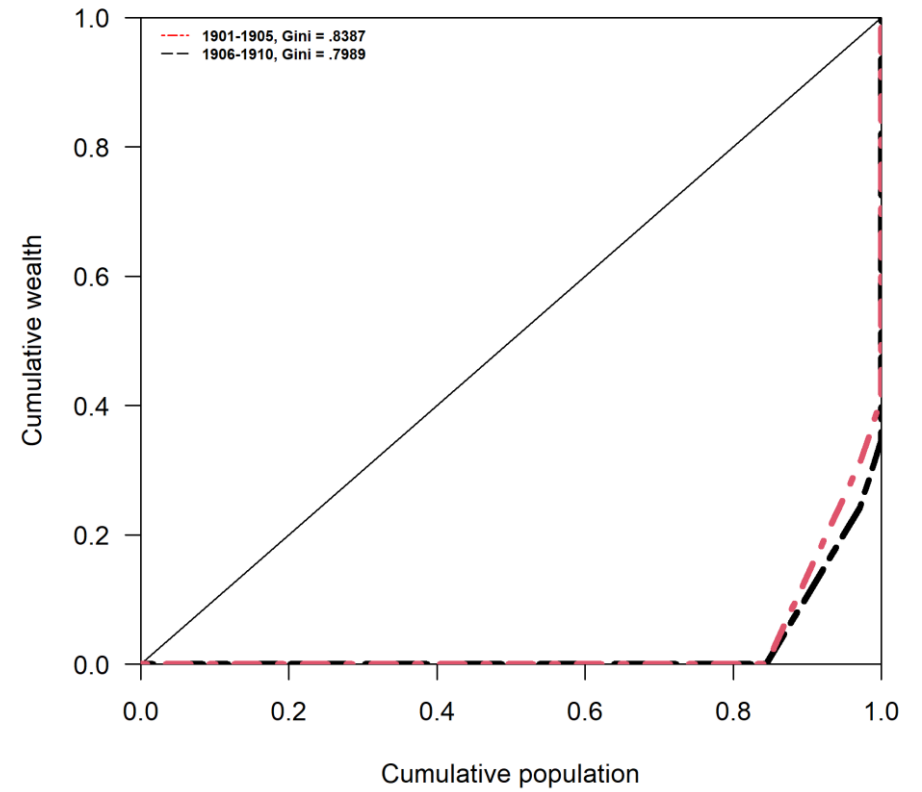


Figure 5: Lorenz curves 1901-1905 vs 1906-1910



Source: Authors' elaboration.

ii. The winners and losers of economic modernisation

Starting in the 1880s and attracted by the promise of abundant resources to be readily exploited and appropriated, Sonora started seeing an influx of settlers predominately from the US, Germany, Great Britain, and other industrialised countries. Haber (1989), Wasserman (2015) and Castañeda & Bengtsson (2020) examine the role played in the country by American investors and the so-called *barcelonetes* (European investors encouraged to come to Mexico by the Díaz government). These were mainly businessmen looking to make their fortunes with investments in mines and large-scale *hacendado* agriculture.

Sonora's very low population density was matched with high land abundance. This constellation led to a land-rent – wage ratio favourable to workers. As Katz (1974) argues, *hacendados* faced shortage of workers in their fields and having to compete with the mining industry for them, they needed to offer higher wages. The historical statistics from Mexico reveal that the average minimum wage for the north pacific region amounted to 0.43 pesos in 1900, but according to Aguilar Camín (1996), in Sonora American investors paid between 2 and 6 pesos.

This high wage economy relative to the rest of the country allowed the lower classes to save a little bit more and accumulate resources, which could explain why inequality did not surge that drastically yet: initially, everybody seemed to gain from these newly emerging economic circumstances. Our will sample from the El Colegio de Sonora database classifies about 15% of all wills as pertaining to the lower classes.¹⁰ Considering that members of the lower classes do not generally tend to leave wills, and wills and probate inventories tend to overrepresent the rich (Lindert 1981, Bengtsson, Missiaia, Olsson & Svensson 2017), the actual size of the lower class population is arguably much larger, 90% according to Iturriaga (2012). What this indicates, however, is that a segment of the lower classes could actually accumulate some wealth, too. The higher wages combined with a less dynamic economy could hence explain why inequality is less severe from 1871 to 1890.

Notwithstanding, this begs the question of why the same labour scarcity and the higher wage- rent ratio do not continue having the same effect from 1891 through 1910. A number of factors seem to have coincided to change this dynamic from the 1890s onwards. One possible explanation is

¹⁰ The 15.1% is the share of the population that is identified as lower class in the wills database. However, the database is unbalanced as it overrepresent the upperclass in the population. A process to correct for the unbalance was required, see the Appendix (section VII). However, the fact that we can find a relatively large share of lower-class wills before adjustments to the sample signals that even among the lower class there were differences in wealth.

that after the defeat of Cajame and the persecution of the Yaqui and Mayo people, the *hacendado* class and other landed classes lost the backbone of the labour force in the region (Aguilar Camín 1996). Between the decades of 1830 and 1860 the indigenous population was the target of severe campaigns to incorporate them to the labour force due to the population scarcity, often stopping short of slavery (Tinker Salas, 1997). After the Federal government persecution of the rebellious Yaqui and their expulsion to the south to be more easily exploited in the henequen plantations in Yucatán, the landed elites decided to hide the Yaqui and Mayo so they could keep them working. Since they were a persecuted group, they did not have any leverage and could be more easily exploited.

A second possible explanation for the substantial increase in wealth inequality could be related to the vast amounts of money being invested by the community of by now established foreigners with ever-increasing political influence and economic weight. In contrast to an assumed dichotomy between colonial institutions modelled over home country examples, if foreign settlers were to physically remain in the ‘new’ lands, and extractivist foreign elites uninterested in local circumstances beyond the fulfilment of their wealth expansion objective (Acemoglu, Johnson & Robinson 2001), we find a significant wealthy migrant community not only adjusting to local institutions and circumstances, but actively forming alliances with the local elites, thriving alongside these in both economic and political terms. Our wills database shows a significant number of foreigners who made their lives in Sonora and lavishly profited from commerce, mines, railroads, and cattle production (see subsection iii for a more detailed portrait of the economic elites at the time). As the owners of larger plots of land, together with the local elites, they benefited enormously from the economic boom in Sonora. This benefit is reflected by the dramatic increase of agricultural produce over the turn of the century, as indicated in Table 4.

Table 4: Maize, wheat and chickpea production and merchandise move through trains, 1894-1907

Year	Maize (hl)	Wheat(kg)	Chickpea(hl)	Merchandise (tons)
1883	-	-		24,202
1894	262,398	539,407	11,942	66,834.50*
1907	356,680	13,328,650	48,607	331,452
Growth	35.93%	2370.98%	307.03%	1269.52%

Source: Statistical yearbooks of Mexico, 1894-1907. *Average of the merchandise moved in 1893 and 1895.

While benefiting the producers of these products, price hikes simultaneously meant higher living costs for the rest of the population, which saw costs of their staples increase dramatically thanks to continuous speculation over basic goods, particularly wheat, on behalf of the region's elites. This behaviour led to repeated wheat shortages when merchants fought among themselves for control over rents, employing relentless tactics to inflate prices and monopolise production (Tinker Salas 1997) whose costs were to be burdened not only by their competition, but mainly by the poorer population.

Companies such as the Richardson Construction Co., an American company which owned 176,000 hectares of land near the Yaqui River (Aguilar Camín 1996), serve as examples of the disparate compensation, not only with regards to the difference between owners and workers of these production sites, but significantly between workers of Mexican and foreign origin. While its American owners were among the main beneficiaries of the unfolding economic panorama thanks to their ownership of both the train concessions and the agriculturally essential irrigation systems enjoying preferential access to the river, their workers did not fare quite as well. Moreover, if we look at wages as reported in Romero Gil (2001), data show that in Sonora American workers in the Cananea copper mine, likewise owned by the foreign consortium of the Cananea Consolidated Copper Company, earned wages more than two times higher than Mexican workers.¹¹

Table 5: Daily wages at the Cananea mine 1907

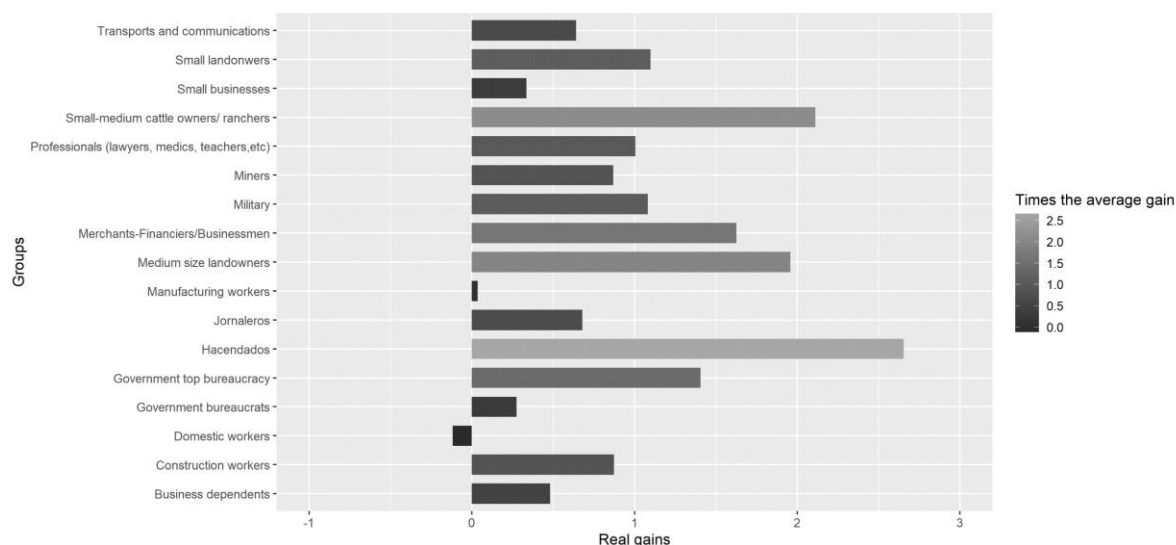
Department	Wages for Americans	Wages for Mexicans
Mining	12.00	5.50
Smelting	12.00	5.00

Source: Data from Romero Gil (2001)

The resulting patterns of strong gains for the economic elites and stagnation or even losses for the rest of the population are confirmed by the trends of income inequality in the country during the same period. Mapping the winners and losers of the contemporary developments, Castañeda & Bengtsson (2020) report strong income gains for the *Hacendado* class, the financiers, and the top government bureaucracy, lesser gains for most of the groups and losses for low income groups such as domestic workers, as displayed in Figure 6.

¹¹ Nonetheless, wages for Mexican workers were still significantly higher than in the rest of the country, thus attracting labor from other states on the look for higher incomes.

Figure 6: Winners and losers in Mexico, 1895-1910



Source: Elaborated with data from Castañeda & Bengtsson (2020)

A consequence of this process of industrialization leading to new opportunities for wealth creation and higher wages among certain groups and simultaneous falling behind of others was the pulling away of an emerging middle-income group from those at the bottom. While clearly the largest wealth gap remained between the rich owners of capital and land compared with the rest, the main *change* in distributional dynamics over the period considered concerns the increasing difference between businessmen and those workers with some resources and likely regular incomes, compared with peasants, miners, domestic servants and other low income groups that could not rely on savings in times of crises. Table 6 depicts the increase in the wealth ratio between the upper, middle, and lower classes wealth based on our wills database.

Table 6: Wealth ratios among social classes

Class ratio	1871-1875	1876-1880	1881-1885	1886-1890	1891-1895	1896-1900	1901-1905	1906-1910
Upper to Lower	47.61	142.42	35.01	39.66	59.47	77.19	127.5	83.98
Upper to Middle	6.72	22.42	7.50	3.68	9.20	9.00	8.50	5.59
Middle to Lower	7.08	6.35	4.66	10.77	6.46	8.57	15	15

Source: Author's elaboration.

A third possible mechanism working in conjunction with the previous two consists in the increased profitability of land holdings for the local economic elites, enabled by political connections and military force to open and connect the cities and towns of Sonora to the southwest American economy. A classical mechanism for growing inequality in the Latin American context is the

expansion of the agrarian frontier. It explains the high levels of inequality during the 19th century in countries such as Chile after the War of the Pacific (Rodríguez Weber 2018), Argentina and Uruguay (Bértola, Castelnovo, Rodríguez Weber & Wilebald 2009). The expansion of the agrarian frontier as a mechanism for growing inequality highlights the impact of an oligarchic modernisation project.

Perhaps the best example of this mechanism is the two times governor of Sonora from 1887-1891 and 1895-1899, and eventual vice-president of Mexico, Ramón Corral.¹² He presided over the conquest of the Yaqui and Mayo people, the grand irrigation projects to extend land use and productivity, the attraction of foreign capitalists and the capacity to pass the political power to his associates. He became a financial adviser to American investors and was able to earn more than 600,000 pesos per year (Aguilar Camín 1996). To put it in context, 600,000 pesos in 1897 is two thousand times the median wealth of the lower classes in our database during the 1896-1900 quinquennium; two hundred times the median of the middle-class wealth; and twenty-two times the median of the upper-class wealth.

iii. Mechanisms of wealth preservation among the elites

Similar to the disequalising results of the henequen boom in Yucatán occurring roughly at the same time, as reported by Levy (2016), modernisation in Sonora thus also resulted in higher inequality for the local population, where an economic and political elite was able to ‘monopolise’ its benefits by monopolising not only means of production, but its inputs (such as water) and leave the rest of the population run dry. It is important to stress that this result is not based on a natural law or necessity but on the specific policy decisions made at the time, as well as the disproportionate power accumulated by a small wealthy elite and their particular practices.

The entanglement of economic and political power pursued through both conscious status-increasing strategies and serendipitous external developments expectedly led to the consolidation of a small wealthy elite including the main *hacendados*, but also an upwardly mobile emerging bureaucratic segment deriving their economic wealth from political capital, and some financiers taking advantage of their positions as brokers for international trade. Such is the case of will owner No. 881 in 1887, for instance, who recalls having served as chief of police in Hermosillo in 1865 during the French invasion, and explains bookkeeping favours he granted to his “dear old friend

¹² After his two periods as governor of Sonora, Corral ended in 1904 as vice president of Mexico a position that further enabled him to do profitable businesses like other members of the elite such as his fellow cabinet member, Enrique C. Creel.

Juan Camou” (of the influential and wealthy Camou brothers) among other businessmen, ostensibly out of a sense of responsibility for the country, although we might speculate that these favours were repaid in kind. The crony capitalism of Corral and his successors enabled the local oligarchies to thrive and profit as agricultural production, mining and the railroads became more important. Eventually, only 74 people among the richest families, and related between them and to the governors of the state, dominated the Congress of Sonora from 1879 to 1911 (Aguilar Camín 1996).

Moreover, this interconnected oligarchy also thrived thanks to particular cultural patterns of elite reproduction, enabled by a context of friendly relations between the political and economic sectors, few social obligations, little oversight, favourable regulatory environment and inheritance practices that encouraged the creation of wealth dynasties. Beyond helping us understand the inequality dynamics of the time, our wills database gives unique insights into the mechanisms of status reproduction among the dominant groups in Sonora.

In Sonora, like in other parts of the country since colonial times, notaries operated as a de facto cadastral system, recording all transactions affecting ownership of land. They also provided the only reliable records on property ownership until the emergence of public property registries in the late 19th Century (Levy 2016). The classification system they apply to organise their clients into upper, middle and lower class groups refers mainly to their wealth (and possibly additional characteristics such as occupation, in some cases). However, from examining the contents of the wills we are able to make reach some conclusions about social customs and cultural traditions among wealthy groups at the time.

Comparing the wealthy individuals from different social groups list for their inheritance shows that not only is there a difference in the sheer quantity of assets owned, but the types of resources vary significantly, especially between the upper and lower classes. As shown in Table 7, while those poorer people leaving wills¹³ typically own a small plot of land for subsistence agriculture including their little house, possibly with a cow and maybe a horse, upper class individuals leave elaborate testaments of many pages dividing the many houses, ranches, lands, herds of marked cattle (their personal brand) as well as financial assets, and increasingly large life insurance and often substantial amounts of cash. In general, their endowments contain many more and more varied items, including in some cases exotic goods like “pearls made in Europe” worth 13,500

¹³ As wills databases are skewed towards those leaving wills, i.e. they overreport richer people, we make population adjustments for our data, as reported in Appendix A.

pesos, “instruments and books” for 8,000 pesos (compared to a house on main street bought for 500 pesos) and the monetised value of children’s education in Europe, as in the case of will No. 972 from 1873, as well as watches, gold and jewellery – in some cases, the ranches come with the service personnel “belonging to it” (‘servidumbre’), as in the case of will No. 969 in 1873, included.

Likewise, while they often report owning a wooden or metal chest where they keep all their property titles and other important documents indicating the preventive elaboration of wills and legal procedures (or, as in the case of will No. 1078 from 1883, “the property title in question is hidden between my papers in a metal can, which is kept inside a larger wooden box”), wills of poorer individuals often describe the widow or offspring of a deceased reporting belongings to the notary, who writes them down in the moment.

Table 7: Typical inheritance content among social classes.

Class	Type of goods in wills
Upper	Several houses (3-5), one or more ranches, agricultural lands, rights over the use of water (irrigation channels), several heads of cattle(40-100+), several horses, business stock, life insurance both in pesos and US dollars, cash (500-1000+ pesos).
Middle	A house, some cash (100-500 pesos), property rights over plots of land, small agricultural lands, some heads of cattle (10-30), house items, ongoing agricultural produce, fractions of land or houses.
Lower	Few heads of cattle (1-12), a house, small plot of land, 1-2 horses, cloths, some furniture.

Source: Author’s elaboration from a random sample from El Colegio de Sonora wills database.

The social stratification system of pre-revolutionary Mexico was based on a racialised class structure with somewhat fuzzy boundaries based on cultural and racial-somatic characteristics (Nutini 1995). Sonoran elites at the time were either foreign-born and recent migrants, or non-indigenous Mexican. The only entry in our entire database featuring a person with identifiably Yaqui surname belongs to a labourer from Álamos described as “poor” by the record. Although they had been the legitimate owners of their lands prior to the arrival of Spanish missionaries, the indigenous populations of the region had been impoverished by the massive land grabbing during our period of modernisation.

Due to these circumstances, wealth concentration is high to begin with, and tends to increase over time. Depending on the year, over the time period considered, between 4 and 20 individuals (less than 20% of our wills) control up to 93% of all the wealth recorded in the database. Inheritance practices among this upper class reveal a mechanism of intergenerational wealth protection, as in

the setting up of perpetual incomes for family members (for instance, will No. 877 from 1894 grants lifelong incomes of “\$500 in American gold” to his three siblings) and trusts. Likewise, the incorporation of clauses as to when grandchildren inheriting some wealth will be able to access their funds, and sometimes even what they are allowed to use them for, or the prohibition to sell certain assets, aims to insure the family wealth. For instance, several declare that should their spouses (usually widows) remarry, they will lose the right to their heritage, or, as in the case of will No. 1331 from 1901, who instructs for his grandson to be allowed to recover expenses for his education upon turning 20.

Although not all wealthy families at the time had as many children as will holder No. 1051 from 1879, who, between two marriages and extramarital offspring counted a total of 23 children, it was common for nuclear families to be significantly larger than the contemporary 3.8-person household size (INEGI). While dividing overall wealth among that many household members would delude wealth concentration slightly, it nevertheless helps create a solid foundation for future generations’ wealth creation. In descending order of frequency, belongings tend to be left to: the wife; the children in equal parts; disproportional amounts to unmarried children, particularly daughters; to nephews and other foster children, grandchildren (particularly when their parents passed away); to siblings; and to parents. This means that there is a dynastic transfer of wealth, keeping it ‘in the family’.

The endogamy of the upper classes can also be observed when considering the origins of their wealth: many rely on significant endowments from their parents and/or in-laws, either directly or through their spouses’ inheritance. Moreover, strategic alliances to increase wealth can be observed not only via inheritance or business relations with friends, but importantly in terms of the assortative marriage patterns documented. Marriage patterns are an important factor in the consolidation of inequality in two somewhat opposing trends: on the one hand, assortative mating can diminish intrahousehold inequality, one of the most important dimensions with regard to gender inequality, but is also one of the factors leading to undercounting of inequality (as it is usually not included in inequality accounts based on *household* incomes). On the other hand, it contributes significantly to overall inequality, as the union of two individuals that both bring wealth into the union taking into account the household multiplier effect, disproportionately improves this household’s situation over others.

Although the majority of wills belongs to men, and the rich women included in the sample are mainly widows relying on their inheritance, a significant amount of capital is brought into

marriages by women, either in the form of dowry or prior inheritance and in rare case through business income – sometimes even outstepping the initial capital endowment of the will owner, as in the case of will No. 890 in 1878, where the owner’s wife contributes double of his original capital.

Combining their respective funds allows for spectacular growth of the estate. As will owner No. 972 in 1873 declares, “after celebrating our marriage, with the capital each one of us introduced into the union, and which together amounts to 69,600 pesos we have started businesses such as our commercial activity, transportation firm [diligencias], horsecart lines, investment in and promotion of cattle, horse and mule breeding in our several ranches etcetera. [...] These businesses have provided us with a bit of profit that has enabled us to acquire a couple of urban fincas and real estate in the bay area, as our respective property titles certify, as well as furniture, personal belongings and whatever else exists on our realty.”

Such understatement of wealth owned is not uncommon: will No. 1153 from 1903 prepares his heirs for modest shares “considering the scarcity of my resources”, and No. 546 in 1876 speaks of “the few cattle I own” (which amount to more than 40 oxen yokes, plus horses and “eight carts in good conditions with ten mules each, as well as 15 or 20 spare mules”). Although this false modesty contrasts with the ostentatious listing of his livestock, it might reflect contemporary cultural values of expressed frugality. Irrespective, such practices also serve the purpose avoiding too much scrutiny into their affairs, or of diverting attention from their exceptional privilege compared to their employees as well as the general population.

However, a certain amount of philanthropic activity can be observed as well, where donors wish to give to: the poor; churches and other semi-public institutions; graveyard monuments; or friends. As such, No. 1342 in 1906 declares that 10% of his wealth shall be given to the “proletarian class”, additional to the 5000 pesos he gifts towards the reconstruction of the church of Sahuaripa, 1000 pesos to the city’s poor, and another 1000 pesos to the poor of Mulatos (whereas his billiard table went to his nephew).

In some rare occasions, wealthy donors consider their staff, as for instance will No. 200 from 1886: “I declare that once all the above conditions [with regard to his inheritance] are fulfilled, it is my wish that our old and faithful servant Mrs. P.U. shall receive 200 pesos, and that 400 pesos shall be distributed with prudence among the poor of this city.”¹⁴

¹⁴ This and the rest of the translations were done by the authors.

These philanthropic urges are not always altruistic. Will No. 890 from 1878 wishes that “100 pesos shall be distributed among the poor that in solemnity come to mourn at my funeral” and No. 475 in 1871 orders for parts of his endowments to be spent on religious paraphernalia to the wellbeing of his’ and his dear wife’s soul. Nonetheless, he also designates the leftovers of his assets (after distribution among his heirs) to become “handouts to the poor that really deserve it”. Will No. 538 from 1890 specifies that 200 pesos of his riches should be given to the nurse taking care of him in the hospital, and the rest divided between the hospital and its owners (likewise, No. 1122 and No. 1130 from 1898 and No. 877 from 1894, among others, dedicate parts or the entirety of their wealth to the hospitals of their respective cities). Despite their sometimes minimal consideration, these philanthropic deeds show that rich people at the time were certainly aware of the vast inequality surrounding them, and at least at times felt obliged to address this situation both for ethical reasons, considerations of justice or calming of consciousness and personal protection even after death.

Taken together, these cultural traits of Sonoran elites helped perpetuate their situation in times of increasing polarisation and wealth concentration, by fostering strategic wealth alliances with spouses, other family members and political or business friends; by investing in vast portfolios of transferable capital in the form of means and inputs of production in a context of rapid modernisation (as well as education of their children); and by displaying a minimum of philanthropy to soothe class differences and promote social cohesion, as in the cases of giving to public health, or religious institutions, where their function can be seen as a substitute for absent public services.

IV. Conclusions and extensions

This paper contributes to the historiography of the evolution of historical inequality in Mexico by introducing new estimates of wealth inequality for the period 1871-1910. It combines quantitative and qualitative approaches to the study of the political economy of inequality. It explores an important period in the economic and political history of Mexico that foreshadows the changes that were to come at the national level. The combination of macroeconomic and individual wealth-enhancing mechanisms produced the very high levels of wealth concentration that we observe in Table 1 and Figure 1 and the pattern from less severe inequality to extreme inequality. The result is an increase in inequality due to the modernisation process that Kuznets (1955) expected, yet with a twist of Gerschenkron (1952) expectations, as cronyism enabled enormous amounts of capital to accumulate fast, promote rapid modernisation and concentrate wealth at the top.

To some degree the beginning of the modernisation of the Sonora economy reflects the changes that the rest of Mexico was enduring or was about to. The expansion of the agrarian frontier at the expense of local communities, large infrastructure projects, the increased technological upgrading of the agricultural sector and the coalescence of political and economic interests with higher wages and opportunities for a segment of the working population, foreshadow the corporatist arrangement that will tend to dominate the whole country after the end of the Mexican Revolution.

The role of the economic and political elite reveal itself to be as constant in the Mexican history as it is today. The Sonora's economy of the late 19th century and the beginning of the 20th was dominated by an oligarchy, a trend that is present at almost all Mexican states to these days. Ernest Labrousse in his theory of revolutions used to say that one should not judge a revolution by what it changes, but for what it leaves the same, Sonora after the revolution continued to be ruled and the economy driven by a few names, much like in the times of Corral.

Access to further sources of data, such as probates and wills, business payrolls, accounting books and so on could improve these estimates and push research of historical inequality forward for more Mexican states, allowing us to gain a better understanding of the origins of our persistent inequality, its dynamics and finally learn from our past mistakes to build a more egalitarian society.

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VI. Appendix

Table A: The unbalanced sample.

	1871-1875		1876-1880		1881-1885		1886-1890		1891-1895		1896-1900		1901-1905		1906-1910		
Class	Wealth	Share	Wealth	Share	Wealth	Share	Wealth	Share	Wealth	Share	Wealth	Share	Wealth	Share	Wealth	Share	
Upper	45951.59	55.254%	259264.02	89.312%	149119.66	63.593%	140267.37	75.842%	885635.5156	97.200%	1055903.86	82.546%	1893997.94	92.308%	646627.93	83.883%	
Middle	22842.5	27.5%	6858	2.362%	26831.7	11.443%	33612.2	18.174%	19860.11	2.180%	36565.08	2.858%	116313.14	5.669%	58723.617	7.618%	
Lower	962	1.157%	2756.0001	0.949%	437.6	0.187%	1292.00000	1	0.699%	4601.5	0.505%	6469	0.506%	8642.08	0.421%	21287.52	2.761%
No info	13408	16.1%	21413.8	7.377%	58100	24.777%	9775.5	5.286%	1050	0.115%	180237.7	14.090%	32865	1.602%	44231.36	5.738%	
Total	83164.09	100%	290291.82	100%	234488.96	100%	184947.07	100%	911147.1256	100%	1279175.64	100%	2051818.16	100%	770870.427	100%	

Table B: Wealth distribution (unbalanced), 1871-1910

Years	Gini Wealth	Theil Wealth
1871-1875	0.67877	0.85437
1876-1880	0.80619	1.50251
1881-1885	0.67605	0.88572
1886-1890	0.65853	0.78032
1891-1895	0.88202	2.06171
1896-1900	0.91601	2.876
1901-1905	0.906	2.30259
1906-1910	0.80982	1.49848

Source: Tables A and B, Authors' elaboration employing a sample taken from El Colegio de Sonora wills database.

Table C: The working sample balanced by social structure.

Class	1871-1875		1876-1880		1881-1885		1886-1890		1891-1895		1896-1900		1901-1905		1906-1910	
	True share	Avg. wealth	True share	Avg. wealth	True share	Avg. wealth	True share	Avg. wealth	True share	Avg. wealth	True share	Avg. wealth	True share	Avg. wealth	True share	Avg. wealth
Upper	0.0144	11491.53	0.0144	57175.38	0.0144	21146.51	0.0144	11587.5	0.0144	77154.81	0.0144	161309.82	0.0144	115616.08	0.0144	47795.96
Middle	0.0778	3021.8	0.0778	3872.72	0.0778	3182.24	0.0778	3697.27	0.0778	3387.35	0.0778	3726.01	0.0778	5264.83	0.0778	2835.1
Lower	0.9078	337.56	0.9078	415.59	0.9078	425.46	0.9078	304.5	0.9078	407.9	0.9078	418.86	0.9078	315.68	0.9078	184.54

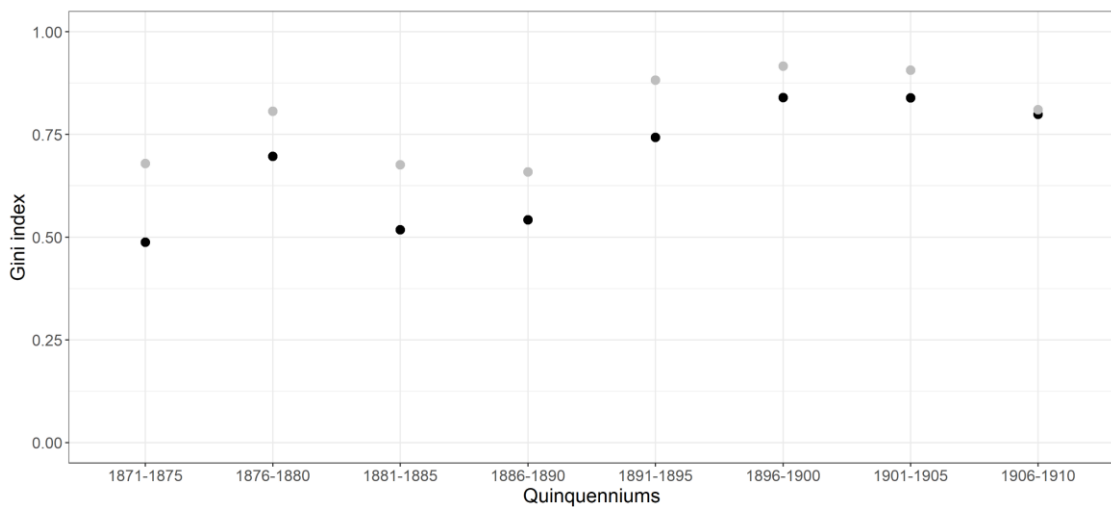
Source: Authors' elaboration employing Iturriga (2012), Estructura social y cultural de México. Cuadro 6, p. 50.

i. Robustness checks

Working with scarce data and exploiting it as much as possible is the bread and butter of the economic historian and the social scientist in historical contexts. The lack of information and imperfect sources should make us doubt any claim of a point estimate. For that reason, rather than take the levels of inequality reported as point estimates, they should better be considering just a trend estimate.

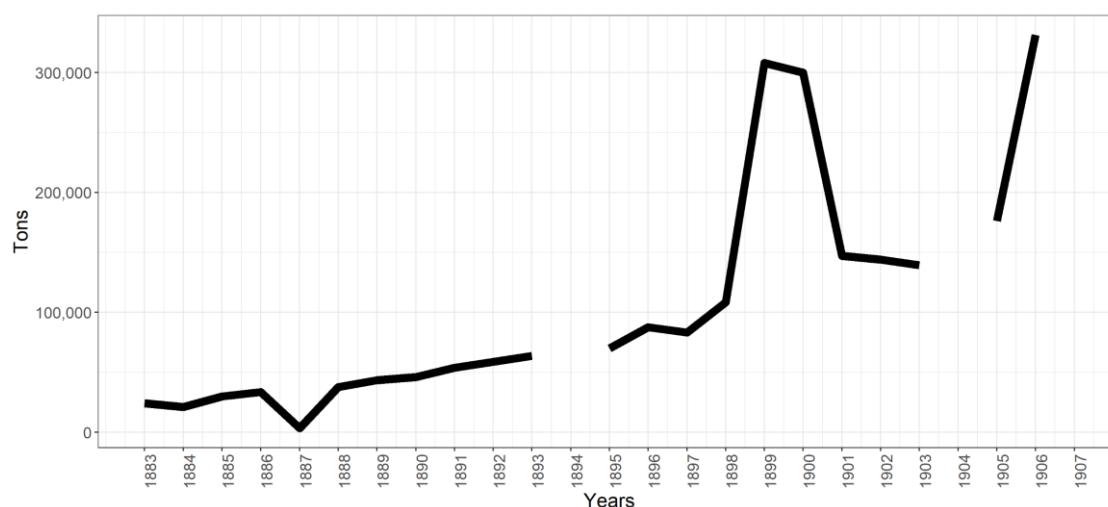
In Figure A we observe the wealth inequality trend from two samples taken from the same database from El Colegio de Sonora. One left unweighted and the other being our preferred estimate, the weighted one. The unweighted estimate displays the same trend but with higher levels of inequality. As we mentioned on section IV, the over or under estimation of inequality is a common issue of the wills databases and probate inventories. The fact that both databases display a similar pattern through time is a strong indication that even if the actual values are likely to be incorrect the trend is correct.

Figure A: Wealth Gini, Sonora 1871-1910, unweighted (grey) vs weighted (black) samples.



Source: Authors' elaboration.

Figure B: Merchandise moved through the railroads, Sonora 1883-1906



Source:

Statistical Yearbooks, Ferrocarriles. 1894-1907.

Figure B displays a pattern of growth that is consistent with our wealth inequality estimates. As Sonora got connected and the production of minerals, agricultural produce such as maize, wheat and chickpea increased, the volume of merchandise that moved within the railroads grew, and with it the profits.

Another way to check the validity of the wealth estimates is to compare them with the incomes at the time. Torres Mora (1987) give us a glimpse into those incomes, the author gives some lists of prominent Sonoran merchants and their reported sales for some years, for example 1906. The merchants' incomes roughly scale down in a similar pattern to our wealth registries, with few staggering earnings rapidly going down to more modest ones, however none of them could be considered to be so low as to be poor.

Table D: Merchant sales, Guaymas 1906.

Merchant	Liquid Assets (pesos)	Annual sales
Ramón Ayon.	15,000	30,000
Abascal y cia.	15,000	15,000
Víctor Aguilar	10,000	36,000
Bley hermanos.	100,000	365,000
Juan Bojórquez.	25,000	1,000,000
José Bustamante.	8,000	36,000
Max Bohmer.	5,000	25,000
Abelardo Camou.	60,000	25,000
Jesus S. Carranza.	10,000	12,900
M.P. Carrillo y hermanos.	10,000	18,000

Conrado Gaxiola y cia.	10,000	18,250
F. Loaiza y cia.	62,500	36,500
Fernando Espiniza e hijos.	15,000	18,250
Gonzáles Rodríguez y cia.	10,000	10,950
Horvilleur Camou y cia.	62,500	36,500
M. James y cia.	62,500	36,500
May hermanos.	62,500	36,500
Muñoz hermanos.	25,000	18,500
José María Paredes.	15,000	18,500
Porchas y Monge.	15,000	15,000
Palafox Rico y cia.	15,000	12,500
Roldán y Honrado.	62,000	36,000

Source: Torres Moya (1987). *Entrepreneurs in Nineteenth Century Sonora, Mexico*. PhD. Dissertation. University of California Irvine