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# The Evolution of Inequality in Mexico: 1895-1940

by

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## Abstract

The evolution of inequality in Latin America, particularly in Mexico, is a topic of growing interest among economists, economic historians and policy makers. For the Mexican case, this study empirically estimates, for the first time, the evolution of Mexican inequality before 1950. This thesis produces a new database and employs it to construct social tables for four benchmark years, 1895, 1910, 1930 and 1940. The evidence points to inequality being a political phenomenon; inequality levels change as policies change. Over the long run, the evolution of inequality displays a strong persistence. The results are in line with a new branch of the literature that identifies the importance of land ownership for inequality dynamics. The study of the evolution of inequality in this period contributes to derive valuable lessons from developing countries with large agrarian populations and challenge some of the dominant theories of inequality.

Keywords: Income Inequality, Social Tables, Mexico, Mexican Revolution.

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# Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Why Mexico? .....	1
1.2	Research Problem.....	3
1.3	Research Questions .....	4
<b>2</b>	<b>Literature Review.....</b>	<b>7</b>
2.1	Theories of Inequality .....	7
2.2	Historical Inequality Studies of Mexico.....	9
<b>3</b>	<b>Data, Sources and Methods.....</b>	<b>12</b>
3.1	Social Tables .....	12
3.2	The 1895 and 1910 Social Tables .....	14
3.3	The 1930 and 1940 Social Tables .....	20
3.4	From Social Tables to the Lorenz Curves and the Gini Index .....	29
<b>4</b>	<b>Results .....</b>	<b>30</b>
4.1	Summary of Results .....	30
4.2	The Evolution of Mexican Income Inequality .....	30
4.3	History is the rock upon which economic theories survive or are broken .....	46
<b>5</b>	<b>Conclusions and Further Discussion .....</b>	<b>49</b>
5.1	Inequality as a Political Choice .....	49
5.2	Persistent Inequality? .....	53
	<b>References .....</b>	<b>56</b>
	Archival and Statistical Sources.....	56
	Articles and Books .....	60
	<b>Appendix A: Social Tables Construction and Alternative Measurements. ....</b>	<b>69</b>
	<b>Appendix B: Alternative 1930 Social Table.....</b>	<b>72</b>
	<b>Appendix C: Code and Data .....</b>	<b>78</b>

# List of Tables

<i>Table 1: 1895 Social Table (rounded numbers)</i> .....	18
<i>Table 2: 1910 Social Table (rounded numbers)</i> .....	19
<i>Table 3: 1930 Social Table (rounded numbers)</i> .....	23
<i>Table 4: 1940 Social Table (rounded numbers)</i> .....	26
<i>Table 5: Mexico's inequality (Gini index) 1895,1910,1930 and 1940</i> .....	30
<i>Table 6: Strikes and resolutions 1920-1936</i> .....	39
<i>Table 7: Incomes and ratios between occupational groups, Mexican pesos</i> .....	44
<i>Table 8: 1930 Social Table: within inequality robustness check (rounded num.)</i> .....	72
<i>Table 9: Comparison 1930 (Table 3) vs 1930 (Table 8)</i> .....	77

# List of Figures

<i>Figure 1: Winners and losers: real gains by occupational group 1895-1910.....</i>	<i>34</i>
<i>Figure 2: Mexico's Lorenz curves 1895 &amp; 1910 min max levels .....</i>	<i>36</i>
<i>Figure 3: Mexico's Lorenz curves 1895 min max levels. ....</i>	<i>36</i>
<i>Figure 4: Mexico's Lorenz curves 1910 min max levels. ....</i>	<i>37</i>
<i>Figure 5: Winners and losers: real gains by selected occupational groups 1930-1940 .....</i>	<i>42</i>
<i>Figure 6: Mexico's Lorenz curves 1930 &amp; 1940 min max levels. ....</i>	<i>43</i>
<i>Figure 7: Mexico's Lorenz curves 1930 min max levels. ....</i>	<i>43</i>
<i>Figure 8: Mexico's Lorenz curves 1940 min max levels. ....</i>	<i>44</i>
<i>Figure 9: The evolution of inequality in Mexico: 1895-2016 .....</i>	<i>50</i>
<i>Figure 10: The vicious cycle of inequality .....</i>	<i>55</i>
<i>Figure 11: Examples of aggregated occupational categories. ....</i>	<i>69</i>
<i>Figure 12: Relative winners and losers by occupational categories 1895-1910.....</i>	<i>70</i>
<i>Figure 13: Relative winners and losers by selected occupational categories 1930-1940....</i>	<i>70</i>



# 1 Introduction

## 1.1 Why Mexico?

Latin America is arguably the most unequal region in the world and Mexico is one of the most unequal countries. Mexico, a Spanish colony for three centuries and an independent country for the following two, provides an important case for the study of inequality. Mexico is the second most populated country in the region and the second-biggest economy. It has the second highest per capita income and is arguably one of the most unequal, if not the most unequal country in several measurements. For example, it has one of the highest shares of concentrated income and wealth at the top 1 per cent of the distribution, close to 22 per cent (Esquivel, 2015) and female participation in the labour market is among the lowest with just 45 per cent (OECD).

The debate on whether Latin American countries' high degree of inequality go back to the colonialism of the sixteenth century and its extractive institutions (Sokoloff & Engerman 1997; Acemoglu, Johnson & Robinson 2001, 2002), or if it has a more recent origin. Some economic historians argue that the origins of present day Latin American inequality are in late nineteenth century commodity booms exports (Williamson 2010, 2015; Dobado, 2010). In this view, it is the ownership of natural resources like silver, oil and some agricultural production the factors that constitute the primary source behind the region high inequality levels.

A study of Mexico, besides its importance by itself, can also contribute to the general debate on historical inequality. It becomes relevant to state that Mexico was partially industrialised in the late nineteenth century, which according to the industrialisation-dominated literature (Kuznets, 1955) should lead to increasing inequality. The country also experienced a political and social revolution at the beginning of the twentieth century; the Mexican Revolution arguably had distributional effects as the modern inequality literature theorises (Acemoglu, Robinson & Johnson, 2001, 2002; Piketty, 2014; Scheidel, 2017). Furthermore, it produced the first constitution that incorporated social and labour rights; the Constitution of 1917 and a post-revolutionary regime trapped in a fragile equilibrium. For all its bloodshed, the revolution left untouched most of the industrial apparatus of the Porfirian era, and with them, a large part of

the economic elite. Simultaneously, the new regime had the substantial compromise of improving living standards, redistribute land and a more inclusive political agenda, which allowed the lower social classes to get a seat at the table. Keeping this equilibrium would be one of the central tenets of the nationalist post-revolutionary regime and a driver of the development process over the twentieth century.

To study the evolution of inequality we construct social tables for the benchmark years of 1895,1910,1930 and 1940. These are the first comprehensive inequality estimates for Mexico before year 1950. The construction of social tables is a method which proceeds by combining income estimates for social groups, with information about each group's share of the population from censuses. This is the standard approach in economic history studies of inequality (Lindert & Williamson, 2016; Gómez de León & De Jong, 2018). By using this approach, we can provide new inequality estimates for the years 1895-1940, a turbulent period in Mexican history. These benchmark years encompass the formative period of the modern Mexican state, a time that forged the economic, political and social life of modern Mexico. It allows us to trace the evolution of inequality between the Porfirio Díaz's dictatorship during the last decades of the nineteenth century, to the consolidation of the post-revolutionary Mexico near the end of the first half of the twentieth century.

This thesis will contribute to the existing economic and economic history literature of inequality by providing, for the first time, estimates for the level and trend of Mexican inequality of income between 1895 and 1940. It will contribute to the discussion on the relevance of the most prominent theories about inequality by calling into question their adequacy and providing an alternative view of the mechanisms that drive inequality, particularly the relevance of land ownership in understanding inequality dynamics. Moreover, it contributes to the policy discussion of inequality reduction by exploring the political economy of Mexico and its relevance for countries going through an industrialisation process today. Its final contribution is to show that Mexico's political economy and the specific policies introduced throughout the 1895-1940 period produced different levels of inequality, as well as producing different sets of winners and losers. It will show that the Mexican Revolution was a pathway that created, for a brief period, the conditions for a more egalitarian society. Thus, this thesis will argue that the level of inequality is a political choice and not a necessary feature of economic development.



Although the primary focus of this research is quantitative, it will heavily rely on history to interpret the data whenever a contextual analysis is required. The thesis will demonstrate that neither of the main theories for the origins of inequality in the continent, the inherited institutions one, nor the Kuznets hypothesis or commodity booms exports and others, can explain on their own the phenomenon of the Mexican inequality over the end of the nineteenth century and the first half of the twentieth. It will present that inequality was not constant; it changed as policies changed.

## 1.2 Research Problem

The study of inequality in historical context is of special importance for the current understanding of inequality. The dynamics of inequality take time to fully develop, the hard swings in the distribution of income are often difficult to observe in the short term but become more evident over the long run. In that sense, to understand inequality through time we require to adopt the frame of mind of those who study “social time”, that is the evolution of the structures of society (Braudel, 1976).

In a world in which inequality is a concern at national and global levels, case studies like the Mexican one are valuable sources of knowledge to aid us in understanding the circumstances that produce changes in the levels of inequality. Today, developing countries can learn from the experience of other developing countries. Researchers that wish to study this evolution can find in historical inequality studies tools to ponder upon the main theories that attempt to explain the causes and cures for inequality and its consequences.

In the light of history, it is possible to test the validity of theory, the possibilities for generalisation and the special cases that enrich our understanding. Mexican history provides us with an opportunity to see these inequality theories in action. The historical inequality literature in the world points to several channels through which the income distribution suffers changes, nonetheless, not all countries’ histories are well-suited for the dominant explanations.

In addition to contributing to the inequality debate around the world, Mexico is an important case of study because it is one of the largest developing countries in the world, both in the size of its population and the size of its economy; it has a rich history and a prevailing complicated

political environment. Moreover, Mexican historical inequality is not well known, studies tend to focus on recent decades due to the accessibility to reliable income statistics. Therefore, the levels of inequality that prevailed before 1950 remain unexplored. At the same time, the Porfiriato (the 30 years of Porfirio Díaz rule), the Mexican Revolution and the start of the post-revolutionary regime are among the most studied periods in the non-inequality literature. Given that the literature focuses substantially on living standards, economic conditions and the links of those to political and social events, not having an actual account of inequality levels before 1950 results in a serious void of information that limits the understanding of the periods.

Ensuing from this discussion, the research problem of this thesis is to establish the relationship between existent inequality levels and social, political and economic changes experienced over the end of the nineteenth century and the first half of the twentieth.

### 1.3 Research Questions

This thesis will attempt to answer the following questions related to the evolution of inequality:

- a) What was the level of inequality from the late porfiriato to post-revolutionary Mexico, 1895-1940?
- b) Can inequality be explained by structural change forces alone? Alternatively, could it be the result of the political-economy process?
- c) Did the Mexican Revolution produce a change in the levels of inequality? Moreover, if it changed, through which channels?
- d) Did the agrarian reform lead to higher incomes among the agrarian population and thus had impact in the inequality levels?
- e) Did the introduction of labour and social rights lead to higher wages and thus had influence in the inequality levels?

What is the logic behind questions a) and b)?

Nineteenth century Mexico was predominantly an agrarian society, for that reason the primary driver of income was the ownership of land and the resources associated with it, minerals like gold and silver and agricultural output (Wilkie, 1990; Turchin & Nefedov, 2009). It had a

disconnected economy due to geographical factors, lack of infrastructure and the prevalence of artisan manufacturing (Haber, 1989). Also, the unstable political environment promoted backwardness. As a poor agrarian country, it is logical to expect low levels of inequality. Not much surplus income could be extracted from the vast majority of the population. Though, economic elites, particularly at regional level, because of the lack of state capacity, could have taken extraction to the possible maximum (Milanovic, 2006; Milanovic, 2011; Milanovic, Lindert & Williamson, 2011).

At the end of the nineteenth century things started to change. An industrialisation process started to take place during the last two decades of the century, under the Porfirio Díaz's government. This process takes a form closely related to that described by Alexander Gerschenkron in his masterful work, *Economic Backwardness in Historical Perspective*. An economic and political elite colluded to take the driving seat in the economy, ensuring monopoly rents, protection from international trade and preventing the organisation of workers (Haber 1989; Kuntz, 2002; Beatty, 2002; Bortz, 2002; Haber, 2002). This political and economic structure combined with the strong economic growth from the period, most certainly produced an increase in the levels of inequality.

The trend the social tables reveal about the levels of inequality can expose the answer to this alleged evolution. Either the evolution was more Kuznetsian, related to a Smithian growth take off, or more Gerschenkronian, intertwined with rents, political power, inappropriate technologies in capital intensity and scale, repression and exploitation

What is the logic behind questions c), d) and e)?

The Mexican Revolution, a byproduct of the collapse of the delicate institutional equilibrium of the Porfirian regime is a perfect case to assess one of the more recently prominent hypotheses, the reduction of inequality through history by means of the destruction produced by wars and revolutions (Turchin, 2007; Turchin & Nefedov, 2009; Scheidel, 2017). According to this view, violence is often a malign source of levelling. Popular beliefs or even misguided myths about the Mexican Revolution argue that the Revolution was not only chaotic, it brought large-scale destruction of the productive economic apparatus. Nevertheless, what most of the historiography shows is that in terms of lives it was extremely costly, but in terms of physical capital and its owners, it left them untouched. Could it be then that this great levelling force was absent?

An alternative way of viewing the levelling produced by the Revolution is to consider the effects of the new Constitution. The 1917 Constitution, conceived by the Revolution, was the first in the world to introduce social rights (González de Aragón, 2017), among them the rights to education and healthcare, labour rights and the ownership of the nation over its natural resources. In turn, these new set of rights had an impact on policies that over time transformed the country. At the same time, the new regime found that if it wanted to appease the country at the revolution aftermath, major land reform was needed, and state capacity required to be built. Consequently, these motivated policy changes such as new taxes, the creation of the “ejido” as a communal property right instrument and mechanisms for workers to create political pressure like legalised strikes and labour rights. These mechanisms have impact on inequality (Piketty & Saez, 2003; Piketty, 2014) and partly depend on elite convenience (Acemoglu, Robinson & Johnson, 2001). The more detailed social tables that can be constructed from 1930 and onwards, make the exploration of those channels feasible.

Why focus on this period? Those years would see the development of most of the structural transformations experienced over the last hundred years, which are in tension with the changes implemented from the 1980s forwards. A tension that is reemerging as Mexico’s new government looks towards the past for positive experiences that can be replicated. The second reason is practical as fortuitously, enough data exists to reconstruct occupational groups, wages and some other forms of earnings. The present works constructs a new dataset of those variables. Finally, the Mexican experience is not due to its exceptionalism and is in many ways familiar to how current developing countries are industrialising and how some did through history. This research will add knowledge to the existing literature improving our understanding of the development process in this type of setting and its effects around the world.

## 2 Literature Review

### 2.1 Theories of Inequality

Several competing theories can explain the changes in the income distribution. First, we have the long-time workhorse of inequality studies, the Kuznets hypothesis (Kuznets, 1955), which relates inequality to the process of economic development.

Kuznets argued that as a country develops, moving from agrarian societies with traditional economic sectors towards industrial societies with modern economic sectors, inequality would increase. Then after some level of development is attained, inequality should decrease as development continues. The full relationship takes the shape of an inverse U. The Kuznets hypothesis is often taken as an argument for considering inequality as a normal by-product of the economic development process in a society.

With the expansion of the inequality studies around the world over the last decade, the Kuznets hypothesis has been questioned. A plethora of studies show developed countries with rising levels of inequality, this fact challenges Kuznets as these countries' inequality levels decreased decades ago and then rose again. Leading the critic of Kuznets ideas, we find the work of Piketty and Saez (2003), Alvaredo, Atkinson, Piketty and Saez (2013), Piketty (2014) for a series of developed countries with decreasing and then increasing inequality. Milanovic, Lindert and Williamson (2011), Álvarez del Nogal and Prados de la Escosura (2013), Milanovic (2016), showing us what is now called “Kuznets waves”. Gómez de León and De Jong (2018) and Bengtsson, Missiaia, Nummela and Olsson (2018), documenting for Germany and for Finland that inequality follows a different behaviour than those theorised by Kuznets (1955).

A competing mechanism for the Kuznets hypothesis is Piketty's formulation of  $r > g$ , popularised in his book *Capital in the Twenty-First Century* and recently supported by the work of Jordà, Knoll, Kuvshinov, Schularick, and Taylor (Forthcoming). The  $r > g$  theory suggests that the return of capital in a broader definition is, during normal circumstances, greater than the rate of economic growth. This relationship implies that the owners of capital can accumulate wealth and assets at a faster rate than the population, which can only rely on wages and salaries

typically tied to the overall performance of the economy, also known as the rate of economic growth. If this mechanism is mainly at play, we should observe that the income of the owners of capital rises faster than wages and skews the distribution upwards. A relevant side of this theory of inequality is the relationship between capital owners and the political process, to paraphrase Adam Smith (2004[1776], p.32) quoting Thomas Hobbes, wealth is power, and wealth has the tendency to use that power to keep accumulating.

Another competing theory that shares with Piketty the relationship with political power, is the new institutional approach. The Work of Engerman and Sokoloff (1997, 2012) and Acemoglu, Robinson and Johnson (2001, 2002) argue that the existence of extractive institutions explains inequality. The new institutionalists argue that the levels of inequality in present time Latin America can be traced back to the colonial period under the Portuguese and Spanish empires, an inheritance that can explain the high levels of inequality we observe to this day. There is no dispute, the colonial past had enormous influence in countries development paths; path dependency is a real thing. However, these types of arguments have been criticised from different approaches. First, by the standing position of the Latin American ECLAC school (Cardoso & Falleto, 1967) because it simplifies the existent political economy relating to whom, under what circumstances and for what purposes institutions can be used to obtain returns.

Second, it has been criticised empirically by Williamson (2010, 2015) and Dobado (2010) because when measuring inequality in colonial times employing the social tables from Milanovic, Lindert and Williamson (2011) inequality was not significantly different in Latin American than in other regions of the world. Instead they consider that inequality can be traced back to the commodity boom exports of the late nineteenth century.

Finally, another approach to explaining inequality has been proposed by Scheidel (2017) in his book *The Great Leveler*. Scheidel argues that through history, inequality has only been reduced in a significant way by what he calls the negative forces of levelling: famine, war, plague and revolution. This hypothesis suggests that inequality decreases at a high cost, for example, through the destruction of capital in the First and Second world wars, the massive loss of life consequence of the Black Death or the revolutionary violence seen in the Russian and Chinese Revolutions, which included lofty radical agrarian reforms. The evidence from World War I and World War II and the subsequent compression of the income distribution in Europe and the United States back this hypothesis. The evidence of compression in the after wars period is plenty, it can be found in Piketty and Saez (2003), Alvaredo, Atkinson, Piketty and Saez (2013),

Piketty (2014), Milanovic (2016) and Jordà, Knoll, Kuvshinov, Schularick, and Taylor (Forthcoming).

No single theory can explain the evolution of inequality in every country and at every time. Inequality as a social phenomenon is highly dependent in context. Specific patterns, empirical regularities and relationships might hold through time, but they are not physical laws, the evolution of inequality responds to changing circumstances. Finding what mechanism explains the specific evolution one is looking at is an essential part of the research agenda around the inequality literature. Different theories could apply at the same time, often mechanisms act in a way to reinforce themselves, other mechanisms might act in the opposite direction making the changes in inequality dependent on what mechanism dominates.

## 2.2 Historical Inequality Studies of Mexico

The study of inequality in Mexico dates back a long time, the first attempt to measure the income distribution was made in 1957 and published in 1960 by the Mexican economist Ifigenia Martínez under the title “The income distribution and the economic development of Mexico” (*La distribución del ingreso y el desarrollo económico de México*). In this essay, Martínez registers an increase in the concentration of income among the top quintile of the population and loss of income on the first two quintiles between 1950 and 1958.

After Martínez’s pioneering attempt to measure inequality, only the work of Fernando Rosenzweig (1989) acknowledged that inequality was a rising problem in Mexican society. Inequality often was relegated to the sociological rather than the economic literature. More than half a century has passed since that original attempt; in recent times, inequality as a topic has experienced a revival. The world’s political backlash after the financial crisis of 2008-2009 made inequality an appealing topic once more; over the last decade, several studies have been published.

Among this new rising literature is Campos-Vazquez, Chavez and Esquivel (2016), employing income survey data and modelling the top of the distribution to account for top incomes truncated on surveys since 1990. Reyes Turuel and López (2017), crossing information from income surveys, tax incidence, economic censuses and national accounts to reconstruct the income distribution in 2014. Bustos and Leyva (2017), employing income surveys and tax

records to derive the distribution of income for the year 2012. Del Castillo Negrete Rovira (2017), adjusting income and consumption surveys with national account data for the period 2004-2014. Finally, Velez-Grajales, Monroy-Gómez-Franco and Yalonetzky (Forthcoming), developing a methodology to estimate inequality of opportunity finding that it accounts for a large portion of the inequality or results.

The results of these studies are staggering, all corrections done to the income surveys measurements estimate a higher Gini coefficient than normally reported in official estimates, a range going between 0.59 to 0.80, contingent to the type of adjustment performed to the data, and if extended up to 1950, to a level that ranges in between 0.55 and 0.65 for most of the years. Although these corrections are not the official measurement and are subject to different critiques, they overwhelmingly support the notion of an increasing inequality developed over the past half century.

These branches of the literature can only go back with confidence to 1988, as income surveys become unreliable before that period and tax records are not available. Still, there have been attempts to measure inequality at least back to the time of the pioneering work of Martínez (1960). Székely (2005) measures income inequality from 1950 up to 2004 by enabling comparability between surveys that date before the introduction of the ENIGH (National Survey of Incomes and Expenditures) in 1989, accounting for the different definitions of monetary income and the differences in the underreport from the population. Székely finds that from 1950 to 1984 inequality followed an inverted U pattern as Kuznets (1955) theorised, an expected result given the fact that this period experienced the fastest economic growth in Mexican history, known as the “Mexican miracle”. Nonetheless, after 1984 the pattern breaks and inequality rises again to decrease after the year 2000. All studies agree in this later evolution of inequality. If we employ Lakner and Milanovic’s (2013) world income database covering from 1988 to 2008, in order to analyze the data for Mexico, it is possible to observe the same pattern.

Measuring inequality since 1950, with no doubt has been a daunting challenge in the economic and economic history literature that focuses on Mexico and measuring further back in time has been an even harder challenge. Few studies have attempted to measure income or wealth inequality before 1950, going back to the nineteenth century. And those who have done so did it employing proxies for the income distribution, such as heights and real wages. As a result of the many difficulties that the reconstruction of statistics encounters, for example,



representativity of the sources, the lack of a fully monetised economy, lack of data and unknown reliability of existing sources, the study of the income distribution at those times has been largely neglected.

One of the few studies that claims to estimate inequality since the nineteenth century is López-Alonso's (2015). Employing height data from military and passport records López-Alonso reconstructs the evolution of living standards from 1850 to 1950. López-Alonso (2015) claims that heights are the most reliable proxy for the distribution of income at the time because real wages data is scarce and tax records are non-existent. As a drawback from this study is the fact that the anthropometric literature, particularly heights, might suffer from systematic biases based on unobservable characteristics as shown by Bodenhorn, Guinnane and Mroz (2017). For the case of military records, this systematic bias issue might not be a problem if the military was composed of conscripts, but in the Mexican case, it was often that the military was composed of volunteers. On the other hand, the passport sample is clearly biased towards the top of the distribution. Therefore, from these samples to infer the entire income distribution is problematic. López-Alonso (2015) recognises these potential issues. However, maintains the claim of heights as the best proxy as her results show higher classes growing taller while poor people were stunted.

Another recent study attempting to measure inequality in the long run is the one by Blaynat, Challú and Segal (2017). The authors employ real wages from 1800 to 2015. The study shows the evolution of real wages and how for a long-time the real wage did not increase by much. They argue that in this evolution, the responsible force is not the Kuznets process. Instead, changes in the evolution of inequality, especially after the Mexican Revolution, are linked to the political process. The reliance on real wages has its problems, for example, for a considerable long period as the one covered by the study, waged data is often scarce, centred around specific cities or regions; because of that, its representativity can be questioned. Prices fluctuated regionally, that implies that a generalisation is problematic. However, these problems are typical for this type of data, and better sources are not common. Blaynat, Challú and Segal (2017) provide us with a remarkable reconstruction of the living standards and clues of how inequality evolved through independent Mexico, but do not provide us with an actual income distribution.

## 3 Data, Sources and Methods

### 3.1 Social Tables

To overcome the limitations that previous historical inequality studies have shown for the Mexican case, we construct social tables for 4 benchmark years. Social tables display a relation between social classes or occupational groups and the number of members in each class and their mean income. These characteristics allow social tables to provide comprehensive inequality measures like the Gini index and other synthetic indicators. Social tables deal with the whole income distribution, not just top incomes as fiscal data do or as subgroups of the population that heights and real wages cover.

Social tables constitute an effective tool for the reconstruction of past income distributions, the versatility of the instrument is dependent on the different types of data sources for both the construction of the income earners and the degree of variation we can capture over time. Therefore, they are a tool that can adapt to the necessities and resources available to the researcher. Some researchers choose to construct them employing previous social tables, like Milanovic (2010) with the *Tableau économique de Quesnay* of year 1758 or Lindert and Williamson (1982, 1983) and Allen (2016, 2018) with the England and Wales table from Gregory King of year 1689. Other researchers opt for the construction of their own tables from different sources, like Bértola (2009). Some of these tables are static (Bértola, 2009), that is they do not change in a year to year basis. Others like Rodríguez Weber (2014, 2016) are dynamic, employing interpolation methods as the source of variation. The present work is a hybrid of static and dynamic social tables. For the 1895 and 1910 pair, social tables retain the same structure, and for the 1930 and 1940 pair, the structure is almost the same, this fact adds a dynamic element to the analysis as we can trace winners and losers between years, but without making yearly variations between the two sets of tables, a strategy comparable to Londoño (1995).

However, social tables do have important limitations. A first limitation is that as each occupational category is assigned its mean income, the within-group inequality is

underestimated. A second one is that when we lack gender information within categories, gender inequality is also underestimated. Also, a third limitation is the higher informational requirements to construct the social tables. Usually, due to the last limitation, it is required to employ a different set of primary and secondary sources that diverge in its quality and therefore introduce margins of error in our estimations. For the reasons above stated, constructing social tables has much in common with exercises that attempt to reconstruct national accounts (Gómez de León & De Jong, 2018). For the same reason, the measurements that are derived from social tables are better understood as revealing trends rather than accurate point estimates.

Nevertheless, there are ways to mitigate these issues to estimate the trend with more precision. First, regarding within-group inequality, to mitigate the underestimation that comes from assuming the mean income for all members of a category, it is necessary to produce as many categories as possible. The more disaggregated the occupational categories are, the less of a problem within-group inequality becomes. Second, when we lack gender distinctions in the occupational data, it is not possible to state the gender inequality; nonetheless, we can employ historiographical sources like sociological and anthropological studies to infer possible occupations or roles that would likely have more female participation. Third, the older the statistical sources, the more problems they might have regarding representativity among regions and the whole population, they might suffer from divergence in prices and might not contain the full amount of income, particularly for agrarian societies, in which a fraction of income was earned in kind. To mitigate these possible issues with the sources, it is necessary to employ as many primary sources as possible such as archival research and contextual sources of the time.

In constructing the social tables for Mexico in the years 1895, 1910, 1930 and 1940, we encounter all the issues stated above. To construct them we applied the following methodology:

First, we followed the seminal work of Milanovic, Lindert and Williamson (2011) to search for social classes or occupational groups that could rank from richest to poorer in a comparable manner through the periods of our interests. For a Latin American society of the late nineteenth century, sources are more available than for ancient civilisations and earlier pre-industrial societies. So, locating trustworthy sources for occupations, incomes and the size of the population is needed. Like Bértola, Castelnovo, Rodríguez Weber and Wilebald (2009) and Rodríguez Weber (2014, 2016), we turned first to the official censuses of the time. Like Rodríguez Weber (2014) we encountered different occupational structures at different times,

so we followed his strategy of producing two sets of tables according to their similarities. The first one for 1895 and 1910 and a second one for 1930 and 1940.

## 3.2 The 1895 and 1910 Social Tables

For Mexico, the first official census dated back to 1895 and was produced by the General Directorate of Statistics of the Díaz's government (Dirección General de Estadística). Two more censuses were conducted by the Díaz's government, the 1900 and 1910 census. The censuses of 1895 and 1910 possess the same structure, registering 149 occupational categories, the 1900 census does not possess the same structure, reporting more aggregated categories, thus making it less precise for our purposes, the questionnaires are different, and the general quality and depth of information is inferior. For both 1895 and 1910, there is information of the number of women working on each category, but incomes are not differentiated; So, in practical terms we cannot distinguish gender differences in incomes, just in participation.

The 1895 and 1910 years are suitable for this study, as 1895 was the middle point of Díaz long rule and 1910 was the last year of his administration and the year the Mexican Revolution begun. However, there is no income information for each category. Therefore, we had to collapse the occupational categories of the census into 19 occupational categories that broadly represent the employment structure, for example, manufacturing workers, peasants, military and so forth.

The income data comes from the Social Statistics from the Porfiriato (Estadísticas Sociales del Porfiriato) and Mexico's Historical Statistics (Estadísticas Históricas de México). The first is a set of statistics that range from 1877 to 1910, generated by the General Directorate of Statistics and can be requested in a digital format at the Institute of National Statistics, Geography and Information (INEGI). The first source is problematic as these statistics have an unknown methodology. For this reason, we opted for the second source developed by INEGI and based on the work of Fernando Rosenzweig (1963), available in digital format at INEGI. This second source also has its problems, for example, the salaries it reports are based on the most populated cities and regions, although at country level it is of good enough representativity, yet it is not regionally representative. Another shortcoming of this source is the fact that Mexico's rural population accounts for half the population and part of its income was in kind.

Ideally, we would prefer to obtain the incomes from sources like Lindert and Williamson (2016) from a mixture of tax sources and other occupational registers; nonetheless, that is not possible for the Mexican case. However, following Lindert and Williamson (2016), we assume that certain occupations worked only part of the year to account for the part of income obtained in kind (subsistence agriculture and domestic work), for example, peasants. Therefore, we adopt a working year of 250 days plus 115 days of in kind income, the in kind income is assumed to be equal to the general minimum wage per day available at Mexican Historical Statistics.

To complement Mexico's Historical Statistics, we used a combination of primary historical sources and secondary historiographic sources. For salaries and wages of the bureaucracy and other professional occupations, we follow Rodríguez Weber (2014, 2016) and first look for the available statistic yearbooks; we find the statistic yearbooks of 1893 and 1894, and the payrolls from government offices like the payroll of the General Directorate of Statistics documented in INEGI's "Los primeros cien años: Dirección General de Estadística" (INEGI, 1994). We also look at private hiring advertising like the one from the Engineers' School of Guadalajara (Escuela de Ingenieros de Guadalajara), available from the National Newspaper Archives (Hemeroteca Nacional de México).

For top incomes, the large landowner class "hacendados", the industrialist class and the merchant-financiers "barcelonetes", we had to employ another mix of primary and secondary sources. For hacendados, we rely on both the Social Statistics from the Porfiriato and Mexico's Historical Statistics account of the number of hacendados, around 830-850 men and their families, and the number of "haciendas" (large estates) under their control. We know that land was highly concentrated and most of the fertile land was owned by the hacendado class. We make the conservative assumption that 50 per cent of the production value of the land was produced on these large estates to approximate the income of this class; it is a conservative assumption as several historiographic sources describe the incredible wealth of this class, for example: Coatsworth (1976), Meyer (1986), Haber (1989,1992), Katz (1998). Providing more context for the concentration of land, Markiewicz (1985) describes the extensive process of land grabbing and privatisation and how the hacienda economy dominated and extended through large segments of the economy.

Besides, archival sources from the Madero family, one of the most prominent and wealthy hacendado families of the country, were consulted: The Historical Archive Francisco I. Madero (Archivo Histórico Francisco I. Madero) from the Mexican Ministry of Finance (SHCP) and

the Madero Family's Digital Fund (Fondo Digital Familia Madero) property of the Zambrano family, available at the Ministry of Finance. The archives show a yearly income close to our estimates and up to twenty per cent higher for some years. Even more in favour of our estimates, Wasserman (1985) studying the life of Enrique C. Creel, one of the most powerful and wealthy individuals at the time, suggests that the income of the hacendado class could be above our estimates.

For the bacerlonetes, the industrialists, we had to construct their income to include labour and capital income. Capital income was obtained by combining different sources. For the labour income we employed the work of Galán (2010), which reports the salaries of the owners of different textile companies and stores in the state of Veracruz and Mexico City. Then, we crosscheck with the archives from Mexico's City Historical Archive of Notaries (Archivo Histórico de Notarías de la Ciudad de México) that reports salaries and capital shares. In Mexico, mercantile societies are created through a public deed by the public notary by means of a constitutive act. In the document, the purpose of the society and the name and number of shares of the partners are registered; then the document is stored in the public registry of commerce and available at notary archives. From the capital shares we compute the value of capital and employing Haber (1989) estimates of the rate of return to capital from the leading firms in Mexico between 1896 to 1938, we derive the capital income for this class.

Finally, two other classes or occupational groups that prove important to discuss are domestic employees and people without occupation. Domestic employees account for a large share of the population, 15 per cent in 1895 and 29 per cent in 1910. We do not find reports of wages for this class, so they had to be constructed. To do so, we took the average of the different cleaning, cooking and general assistant jobs on the payrolls and derive from it a daily wage that we applied for 250 days plus the minimum wage for 115 days to cover income in kind.

The without occupation group required more thought as to be included in the social tables. The group represents 41 per cent and 36 per cent of the population in 1895 and 1910 respectively, therefore it is significant. Some authors like Bolt and Aboagye (2018) and Bolt and Hillbom (2016) count them; other authors like Gómez de León and De Jong (2018) and Rodríguez Weber (2014, 2016) do not count them. Since this is a subsistence level group, counting them or leaving them behind biases our inequality estimates upwards or downwards. Not counting them implies the assumption that inequality within that group would be the same as the average of the groups included. Counting them implies that there is a difference. As argued by Gómez

de León and De Jong (2018) if we count them, we might suffer from double counting people who live on a family income like school children and wives and as a result overestimate inequality. Nonetheless, not counting them leaves a significant portion of the population out and since we cannot distinguish the true unemployed from the double counting, we would be probably underestimating inequality.

After some thought, instead of looking at this as a problem, we consider it as something that can be exploited to have more accuracy in the estimates. We decide to compute the tables in both ways, with and without the unoccupied people. In this way, we obtain a floor and a ceiling of the levels of inequality. The average of both, being the level and trend, we will employ in our analysis and that avoids large under and overestimations of inequality.

To impute a monetary income to the subsistence class, we avoid the problems related to the representativity of prices in a not fully interconnected economy. The challenge in establishing a basket of goods for which prices are representative for the whole country is appropriately documented by Bortz and Águila (2006), López-Alonso (2015), Challú and Gómez-Galvarriato (2015) and Arnaut (2018). Instead, we assume the following: 400 dollars from 1990 per year equivalent in pesos of the time as the subsistence level following Milanovic, Lindert and Williamson (2011).

For more in detail description and analysis of the 1895 and 1910 social tables, see section 4.- Results and Appendix A.

<b>Table 1: 1895 Social Table (rounded numbers)</b>			
	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1895 (Mexican Pesos of 1895)</b>
1	Hacendados (large landowners)	0.01%	105,403.50
2	Merchants-Financiers/Businessmen (mostly barcelonetes)	0.02%	14,208.71
3	Government top bureaucracy	0.03%	3,500.00
4	Rancheros (medium size landowners)	0.75%	1,610.25
5	Small businesses	0.13%	1,234.04
6	Professionals (lawyers, medics, teachers)	0.47%	894.25
7	Small cattleowners	0.06%	836.99
8	Small landowners	2.30%	710.43
9	Government bureacrats	0.25%	686.50
10	Hacienda foreman	0.51%	662.81
11	Arrieros (transporters)	0.59%	400.00
12	Manufacturing workers	5.87%	382.50
13	Business dependents	2.62%	300.00
14	Miners	0.94%	254.38
15	Domestic workers	15.49%	249.60
16	Construction workers	0.53%	175.31
17	Peasants	27.70%	171.76
18	Military	0.34%	115.31
19	Without occupation	41.39%	47.81

*Source: Author's own calculation*



<b>Table 2: 1910 Social Table (rounded numbers)</b>			
	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income1910 (Mexican Pesos of 1910)</b>
1	Hacendados (large landowners)	0.01%	249,183.22
2	Merchants-Financiers/Businessmen (mostly barcelonetes)	0.02%	27,119.15
3	Government top bureaucracy	0.02%	6,335.00
4	Small cattleowners	0.05%	2,536.32
5	Small businesses	0.10%	2,150.00
6	Professionals (lawyers, medics, teachers)	0.43%	1,460.00
7	Rancheros (medium size landowners)	0.97%	1,451.73
8	Small landowners	1.33%	1,189.11
9	Hacienda foreman	0.38%	898.48
10	Government bureacrats	0.17%	875.00
11	Miners	0.69%	588.48
12	Manufacturing workers	4.96%	460.00
13	Business dependents	1.94%	420.00
14	Arrieros (transporters)	0.59%	400.00
15	Construction workers	0.96%	249.60
16	Peasants	21.15%	275.98
17	Domestic workers	29.22%	272.48
18	Military	0.24%	192.23
19	Without occupation	36.99%	56.68

*Source: Author's own calculation*

### 3.3 The 1930 and 1940 Social Tables

For the 1930 and 1940 social tables we encounter some of the same challenges and some new ones, but also advantages not available before. For these years we find in the censuses 98 registered occupations; some could be divided into smaller categories to produce 101 occupational categories. As in the previous censuses, we do not find incomes for each category, and although we have the number of women for each group, the lack of salaries left us with the same situation as before regarding gender inequality. However, for these years we have a richer statistical environment at our disposal.

First, following Rodríguez Weber (2014, 2016) we search for the statistic yearbooks, finding the ones for years 1930, 1938, 1941 and 1946. In them, we find wages for different occupations which allow us to assign mean incomes to most of the categories. To crosscheck these incomes and to complement the missing ones we employ the industrial censuses of 1930 and 1940 that contain data from industries and the agrarian and ejidal censuses of 1935 and 1940.

From the ejidal censuses we can identify a new class that emerged after the Mexican Revolution and the agrarian reform of the 1920s, the “ejidatarios”, a type of communal landowners. In the ejidal census, we find the number of ejidatarios and the value of production of their land from which we can derive their mean income. From the agrarian census of 1930, we can obtain the new number of large landowners now defined as owning more than 5 hectares of land and the small landowners who owned less than 5 hectares of land. We derive the mean income from these categories, from the average value of production of each type of property.

Counting with more sources of information like the industrial censuses makes our estimations more robust. The Industrial censuses have a problem that we turn into an advantage. The 1930 industrial census reports its data at the state level, so, we had to aggregate it at the national level for each industry. The process was time-consuming but worth it, the data of incomes and number of people in each occupation categories matches or closely matches the population census, from this we can conclude the estimates are robust. Also, we find a practical advantage in the way the data was disaggregated; it allows us to mitigate even more the underestimation of within-group inequality.

As explained earlier, one of the main limitations of social tables is the underestimation of within-group inequality. Large social tables like the 1930 and 1940 ones mitigate this because of the inclusion of more than 100 groups. However, exploiting the fact that for some occupation's incomes fluctuate among states, due to the still not fully connected labour market, we can introduce some within-group variations. To allow for the maximum possible variation, we take the minimum and maximum registered incomes and the number of individuals who earned them and kept the rest on the mean income. Theoretically, this should increase inequality as within-group inequality increases. The results prove our theory, but the increase was marginal, and therefore, at the same time we can consider the results robust providing a nice extension to the 1930 table that can be consulted on Appendix B.

For the top incomes, we employ the same Haber (1989) series of rates of returns between 1896 and 1938 and use the average growth rate to project the series up to 1940. The industrial censuses give us information about owners in each industry and labour incomes. Nonetheless, most of the income comes from capital gains. In 1924 the income tax was introduced in Mexico (Márquez, 2015) and later, an inheritance tax was introduced in 1926. Incomes between 2,000 and 5,000 pesos paid a 2 per cent tax rate, for incomes equal to 500,000 or beyond, they could pay up to 12 per cent; the inheritance tax ranged between 4 and 40 per cent. We account for this by deducting taxes from the incomes accordingly. However, the overwhelming majority of the occupational categories do not enter any tax bracket and the inheritance tax was burdensome to collect, therefore for the inheritance tax we performed no adjustment.

As for the large landowners, the hacendados group was modified due to the elite dispersion and the formation of a new elite after the Mexican Revolution, yet we follow the process described above employing the agrarian census to classify this population by the number of hectares they owned and the average land production value. As an important consideration, after the revolution many hacendados were able to return to their lands (Katz, 1998). Although most of the land probably went to new hands, either to a new elite or redistributed to the landless population, the expropriated hacendados could choose the land they were going to keep. For this reason, we assume that they chose the land with the highest production value; we use this assumption to derive their incomes.

For the domestic workers we used Hidalgo's (2018) wage estimates and for the without occupation group we followed the same logic as in the construction of the 1895 and 1910 social tables. We constructed the social tables with and without the unoccupied to have the floor and

ceiling level of inequality, compute an average of both and employ it as our level and trend for the analysis.

For more details and analysis of the 1930 and 1940 social tables, see section 4.- Results and Appendix A and B.

**Table 3: 1930 Social Table (rounded numbers)**

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican Pesos of 1930)</b>
1	Large landowners	0.02%	51,560.04
2	Very high government bureaucracy	0.00%	27,000.00
3	Businessmen	0.10%	25,653.40
4	Cattle owners	0.45%	97,34.82
5	High government bureaucracy	0.00%	9,450.00
6	Professionals (lawyers, teachers)	0.03%	5,000.00
7	Government bureaucracy	0.02%	3,510.00
8	Small landowners	0.33%	2,822.66
9	Medics	0.09%	2,806.00
10	Electric machines makers	0.01%	2,237.04
11	Forestry	0.09%	1,782.42
12	Management employees	0.08%	1,535.17
13	Printing and lithography workers	0.05%	1,429.67
14	Government workers	0.38%	1,350.00
15	Metal manufacturing workers	0.07%	1,303.21
16	Electricity workers	0.10%	1,228.42
17	Science, Artistic and Literature professionals	0.18%	1,200.00
18	Chemical industry workers	0.01%	1,165.64
19	Oil industry workers	0.03%	1,165.64
20	Paper industry workers	0.01%	1,150.58
21	Edification workers	0.37%	1,098.91
22	Metallurgy industry workers	0.04%	1,069.47
23	Mining workers	0.27%	1,039.78
24	Glass industry workers	0.00%	1,028.98
25	Cigar industry workers	0.02%	1,020.46
26	Cigarettes industry workers	0.02%	1,020.46
27	Photography and cinematography employees	0.01%	1,011.29
28	Oil industry workers (exploration)	0.01%	967.00
29	Pharmaceutical industry workers	0.00%	966.75
30	Crystal industry workers	0.01%	962.26
31	Wood industry workers	0.02%	901.22
32	Rubber manufacturing workers	0.01%	898.05
33	Coffe toasters	0.02%	887.50
34	Bank employees	0.00%	871.70
35	Salt mining workers	0.02%	860.43

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican Pesos of 1930)</b>
36	Sand mining workers	0.01%	860.43
37	Beer and Wine industry workers	0.04%	856.16
38	Bread bakers	0.24%	851.67
39	Non-specified industry workers	0.02%	840.00
40	Land transport carriers	0.59%	825.00
41	Cooking oil and vegetal butter industry workers	0.01%	806.23
42	Customs employee	0.00%	800.00
43	Matchsticks makers	0.01%	785.58
44	Soap industry workers	0.03%	776.54
45	Ice and ice-cream industry workers	0.02%	756.72
46	Glue industry workers	0.00%	727.38
47	Military	0.47%	700.00
48	Smiths and smelters	0.19%	664.00
49	Tiler makers	0.01%	664.00
50	Shredders of cotton and other fibers	0.07%	647.31
51	Air transport carriers	0.00%	645.00
52	Hair combs and buttons makers	0.00%	621.63
53	Upholsterers	0.00%	620.91
54	Canned food industry workers	0.01%	619.31
55	Entertainment industry workers	0.01%	617.00
56	Dry cleaening workers	0.08%	602.94
57	Boudoir workers	0.11%	602.94
58	Policemen and firefighters	0.06%	600.00
59	Flours, starches, pastes and starches workers	0.02%	597.88
60	Yarns, fabrics and prints workers	0.35%	579.84
61	Tanners and taxidermists	0.05%	577.02
62	Hosiery, stockings, shirts workers	0.03%	574.14
63	Dairy industry workers	0.01%	565.91
64	Shoemakers	0.29%	546.05
65	Manufacture of cardboard and cardboard artifacts workers	0.01%	544.64
66	Manufacturing of construction materials workers	0.05%	542.87
67	Trimmings and galleries workers	0.00%	531.09
68	Paints, varnishes and inks workers	0.00%	527.72
69	Servants	1.13%	527.00
70	Clothing, hats and clothing for women makers	0.28%	507.54

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican Pesos of 1930)</b>
71	Postmen, telegraphists and telephone operators	0.02%	500.00
72	Sweets, chocolate and syrups workers	0.03%	499.36
73	Peasants	17.20%	496.40
74	Carpenters	0.39%	496.23
75	Yarns, fabrics and twists of hard fibers workers	0.15%	486.88
76	Sellers	1.62%	467.20
77	Butchers	0.08%	465.18
78	Sea transport carriers	0.04%	465.00
79	Jewelry makers	0.03%	464.94
80	Furniture makers	0.02%	452.96
81	Service sector employees (hotels, restaurants)	0.02%	450.00
82	Other industries	0.01%	436.05
83	Saddlers	0.04%	434.40
84	Vehicle manufacturing workers	0.03%	425.71
85	Domestic workers	31.56%	421.60
86	Hunters and fishers	0.04%	420.00
87	Tonic makers	0.02%	413.92
88	Occupations not sufficiently specified	1.25%	407.00
89	Clothing and hats for men (excluding palm hats) makers	0.14%	406.34
90	Brooches, brushes, brooms, sieves makers	0.01%	391.75
91	Attendants	0.10%	387.00
92	Oils and greases for industrial use makers	0.00%	382.76
93	Manufacture and repair of scientific and precision apparatus workers	0.00%	317.14
94	Dough, tamales, tortillas and atole makers	0.09%	313.93
95	Ejidatarios (peasants with communal property rights)	3.24%	308.57
96	Explosives, gunpowder, pyrotechnics or rocketry makers	0.02%	304.66
97	Potters	0.09%	255.04
98	Manufacture and repair of musical instruments	0.00%	143.89
99	Manufacture of art objects.	0.00%	125.21
100	Sugar, alcohol and brown sugar or brown sugar	0.34%	122.03
101	People without occupation	36.35%	108.33

Source: Author's own calculation.

**Table 4: 1940 Social Table (rounded numbers)**

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1940 (Mexican Pesos of 1940)</b>
1	Businessmen	0.11%	85,007.69
2	Very high government bureaucracy	0.00%	70,147.22
3	High government bureaucracy	0.00%	49,098.14
4	Large land holders	0.68%	32,315.74
5	Cattle owners	0.39%	22,072.50
6	Explosives, gunpowder, pyrotechnics or rocketry makers	0.00%	11,179.62
7	Small land holder	2.25%	8,782.83
8	Government bureaucracy	0.03%	6,719.43
9	Medics	0.02%	6,403.79
10	Oil industry workers (exploration)	0.12%	5,438.39
11	Professionals (lawyers, teachers)	0.02%	5,174.60
12	Bank employees	0.05%	4,822.58
13	Postmen, telegraphists and telephone operators	0.04%	4,766.30
14	Electricity workers	0.05%	4,449.61
15	Management employees	0.10%	4,383.99
16	Air transport carriers	0.01%	4,322.62
17	Customs employee	0.00%	4,287.90
18	Manufacture and repair of musical instruments	0.00%	4,219.39
19	Pharmaceutical industry workers	0.01%	3,982.00
20	Science, Artistic and Literature professionals	0.19%	3,945.40
21	Metallurgy industry workers	0.10%	3,743.41
22	Manufacture of art objects (from ivory, tortoiseshell, bone, horn, shell, feather, etc.)	0.00%	3,739.82
23	Crystal industry workers	0.01%	3,735.01
24	Printing and lithography workers	0.04%	3,731.08
25	Yarns, fabrics and prints workers	0.00%	3,601.36
26	Cigarettes industry workers	0.02%	3,463.02
27	Land transport carriers	0.48%	3,459.87
28	Metal manufacturing workers	0.08%	3,334.23
29	Electric machines makers	0.00%	3,328.56
30	Rubber manufacturing workers	0.02%	3,323.78
31	Clothing, hats and clothing for women makers	0.00%	3,254.42
32	Photography and Cinematography employees	0.05%	3,225.17
33	Mining workers	0.29%	3,224.89
34	Chemical industry workers	0.06%	3,158.50
35	Glass industry workers	0.02%	3,143.56



	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1940 (Mexican Pesos of 1940)</b>
36	Nonspecified industry workers	0.11%	3,047.19
37	Dry cleaning workers	0.11%	3,047.19
38	Government workers	0.37%	2,991.91
39	Sellers	2.46%	2,868.67
40	Paper industry workers	0.03%	2,851.30
41	Manufacture of cardboard and cardboard artifacts workers	0.03%	2,851.30
42	Hair combs and buttons makers	0.00%	2,849.28
43	Upholsterers	0.00%	2,825.58
44	Clothing and hats for men (excluding palm hats) makers	0.00%	2,816.06
45	Other industries	0.01%	2,808.17
46	Vehicle manufacturing workers	0.00%	2,780.41
47	Entertainment industry workers	0.06%	2,722.53
48	Matchsticks makers	0.01%	2,715.21
49	Beer and Wine industry workers	0.04%	2,700.29
50	Trimmings and galleries workers	0.00%	2,656.48
51	Potters	0.00%	2,581.38
52	Dairy industry workers	0.00%	2,578.86
53	Soap industry workers	0.02%	2,551.11
54	Yarns, fabrics light fibers	0.39%	2,510.53
55	Paints, varnishes and inks workers	0.00%	2,492.01
56	Tiler makers	0.01%	2,472.38
57	Forestry	0.09%	2,451.26
58	Edification workers	0.05%	2,378.69
59	Ice and icecream industry workers	0.01%	2,371.33
60	Hosiery, stockings, shirts workers	0.01%	2,332.73
61	Servants	0.92%	2,298.04
62	Tanners and taxidermists	0.02%	2,294.58
63	Saddlers	0.02%	2,294.58
64	Jewelry makers	0.00%	2,283.89
65	Cooking oil and vegetal butter industry workers	0.01%	2,249.82
66	Flours, starches, pastes and starches workers	0.01%	2,235.89
67	Manufacture and repair of scientific and precision apparatus workers	0.00%	2,155.00
68	Sea transport carriers	0.02%	2,127.37
69	Tonics	0.01%	2,097.75
70	Furniture makers	0.00%	2,075.65
71	Manufacturing of construction materials workers	0.02%	2,071.94
72	Bread bakers	0.05%	2,003.48
73	Carpenters	0.02%	1,974.20
74	Wood industry workers	0.00%	1,947.49

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1940 (1990 USD)</b>
75	Yarns, fabrics and twists of hard fibers workers	0.03%	1,945.62
76	Canned food industry workers	0.01%	1,926.25
77	Military	0.51%	1,921.65
78	Sweets, chocolate and syrups workers	0.01%	1,893.95
79	Sand mining workers	0.01%	1,890.94
80	Glue industry workers	0.00%	1,868.82
81	Oils and greases for industrial use makers	0.00%	1,868.82
82	Cigar industry workers	0.00%	1,829.45
83	Boudoir workers	0.09%	1,753.80
84	Sugar, alcohol and brown sugar or brown sugar	0.09%	1741.52
85	Policemen and firefighters	0.06%	1729.48
86	Oil industry workers (refining)	0.00%	1729.06
87	Coffe toasters	0.00%	1557.03
88	Domestic workers	32.01%	1539.69
89	Service sector employees (hotels, restaurants)	0.07%	1492.85
90	Smiths and smelters	0.00%	1430.36
91	Peasants	10.58%	1360.72
92	Occupations not sufficiently specified	1.86%	1325.65
93	Brooches, brushes, brooms, sieves makers	0.00%	1298.35
94	Shoemakers	0.01%	1261.17
95	Hunters and fishers	0.05%	1106.39
96	Ejidatarios (peasants with communal property rights)	6.21%	1096.80
97	Salt mining workers	0.01%	1014.86
98	Butchers	0.04%	872.46
99	Dough, tamales, tortillas and atole makers	0.08%	664.22
100	People without occupation	38.06%	399.83

*Source: Author's own calculation.*

### 3.4 From Social Tables to the Lorenz Curves and the Gini Index

After the construction of the social tables, what is left to do is to derive from them the income distribution. For this purpose we employ the Mehran method, based on the work of Farhad Mehran (1975) to obtain the Gini index based on the observed points of the Lorenz curve.

The Gini index or coefficient is a measurement ( $G$ ) defined as the ratio of the mean of the difference to two times the mean of the income distribution (Mehran, 1975). Formally it can be stated in the following manner:

$$G = \left(\frac{1}{2\mu}\right) \int \int |x - y| \partial F(x) \partial F(y) \quad (1)$$

Where  $F$  is the cumulative income distribution function and  $\mu$  is the average income.  $G = 1$  means absolute inequality and  $G = 0$  absolute equality.

Employing the Mehran method described in Mehran (1975), the so-called geometric method is the best approach in our case to approximate the Gini value, because it is specially constructed to address the problem of mean incomes that suffer from possible large margins of error as is the case with incomes constructed from social tables.

The Lorenz curve is a graphical representation of the income distribution, it plots the cumulative income and cumulative population. The construction of the Lorenz curves allow us to observe the changes that take place along the entire distribution giving us a deeper level of detail than just employing the Gini index. The Lorenz curve can be formally defined in the following manner:

$$L(y) = \frac{\int_0^y x \partial F(x)}{\mu} \quad (2)$$

Where  $L(y)$  is the cumulative distribution and  $\mu$  is the mean income.

To make these computations we employ the RStudio package INEQ. For the code and the data workflow of the calculations and the construction of the Lorenz curves consult the Appendix C.

## 4 Results

### 4.1 Summary of Results

The evolution of Mexican Inequality is strikingly stable over time, especially when we compare it to the post 1950 measurements. Inequality fluctuates around the same levels since the beginning of the twentieth century, with only small continuous improvements over the first decade of the twenty-first century. The only distinctive period of significant reduction being the aftermath of the revolution, 1910-1930.

From the construction of the social tables for the four benchmark years of 1895,1910,1930 and 1940 we obtained the following Gini index values:

	<b>1895</b>	<b>1910</b>	<b>1930</b>	<b>1940</b>
<b>Min</b>	0.32751	0.4583	0.3112	0.4168
<b>Max</b>	0.48862	0.6188	0.4516	0.5259
<b>Average*</b>	0.40806	0.5386	0.3814	0.4713

\*As stated in Section III, we will take the average Gini as our unit for the analysis to avoid the possible biases of the minimum and maximum level estimations.

*Source: Author's own calculation*

### 4.2 The Evolution of Mexican Income Inequality

At the middle point of the Díaz's government, 1895, the Gini index reached a value of 0.408, a level that appears low compared with other Latin American societies of the time, like Chile with a Gini index of around 0.50 (Rodríguez Weber 2014,2016). Nonetheless, it is a high level

if we consider that Mexico at the time was an agrarian society, with over 70 per cent of the total population and over 50 per cent of the working population in rural areas (Estadísticas Históricas de México, Tomo I). A large part of the population was working and living on haciendas, not owning land and suffering strong exploitation from both government and landed elites. It becomes relevant to ponder upon how the Mexican society reached that point?

The first half of the nineteenth century was particularly chaotic for the new Mexican republic. After independence, the per capita GDP collapsed according to Coatsworth (1989), the Independence War cost Mexico 4.2 points of its GDP and 21 percent in per capita terms. That was equivalent to losing, between 1820 and 1845, 0.5 points of per capita income each year. Other sources, like Salvucci and Salvucci (1993) point to a cost that exceeds 50 per cent of GDP. Then, it is not hard to imagine that an economy on such a context experiences a severe decline on well-being.

Naturally, after several conflicts, including civil wars, two prolonged foreign interventions, one from the United States during the Mexico-American War of 1846 and the second one during the French intervention of 1862-1867, and the War of Reform 1857-1860. After half a century of permanent political and military conflict, the Mexican economy suffered from backwardness and poor living standards.

After 50 years of chaos and stagnation, Benito Juárez's government started to work on how to transform Mexico into a capitalist industrial economy. The economy suffered from a deteriorated road network, so in the last segment of Juárez's government there was an effort to channel resources towards rebuilding them, however the process was slow. The lack of money and the turbulence of local political and military leaders and bandits prevented the further integration of the economy.

After some failed attempts to take power, Porfirio Díaz succeeded in 1877. Díaz's policies were not significantly different from those attempted by his predecessors. He realised the need to communicate the country; he started to centralise power and deployed the Rurales, a type of militarised police created by Juárez, to combat banditry on the roads. In addition, he reformed the "alcabalas", a type of inner trade tariff, diminishing their effect on inner trade. These developments signalled the possibility of a more integrated market and thus, promoted the confidence of foreign investors. With all the foreign investment that began to arrive in the 1880s decade, more railroads were built. The railroads integrated parts of the economy that up until

that moment were uncommunicated. Coatsworth (1981) estimates that freight rates fell 200 per cent under Díaz's government. Even though Mexico arrived late to the nascent wave of globalisation, it rapidly adopted the new technologies of the Industrial Revolution.

Mining was one of the winner sectors of this transformation, the export of silver, similarly to the colonial times, was one of the significant sources of revenue in the economy. Simultaneously, this connectivity allowed the expansion of the hacienda economy to service the mines and other industries that began to flourish. The booming economy stimulated commerce and the creation of financial intermediaries and industries to service the sophisticated taste for European fashion, art, and other forms of conspicuous consumption of the new Porfirian elite.

Mexican liberal reformers had a strong sense of what the country needed to scape its backwardness after they prevailed during the conflicts of the first half of the nineteenth century. They saw a solution in the construction of a class of yeomen farmers (Haber, 1989) that could propel the development of a capitalist industrial nation. The tool for this construction was blunt, they confiscated land that belonged to the indigenous rural population.

When foreign investment began to flow through the country, it generated speculation over the value of land. The government at the times of Juárez seized large amounts of communal land, this policy was accelerated under Díaz. In 1883, the government passed new laws that allowed private companies to survey land that was considered "unused" for the government. In exchange for this surveillance, these companies could keep a third of the surveyed land, the rest would go to the government (Haber, 1989).

Afterwards, the government could sell that land or assigned its use to productive projects. In this way, grand extensions of land ended in the hands of a tiny minority that had enough resources either to buy them, surveyed them or just were close enough to the government so that the land could be assigned to them. As Markiewicz (1985) describes it, between the Juárez's government and 1892, 82 per cent of the rural communities, mostly of indigenous roots, were incorporated into haciendas that found in them precious labour to be exploited.

The rural population did not welcome the expropriations and often rebelled against them. Coatsworth (1981) explores in many details these rebellions and how the government had to resort to brutal repression to contain them and protect the interests of the hacendados and the foreign investors. The policy of expropriation of land, combined with the violence that expelled

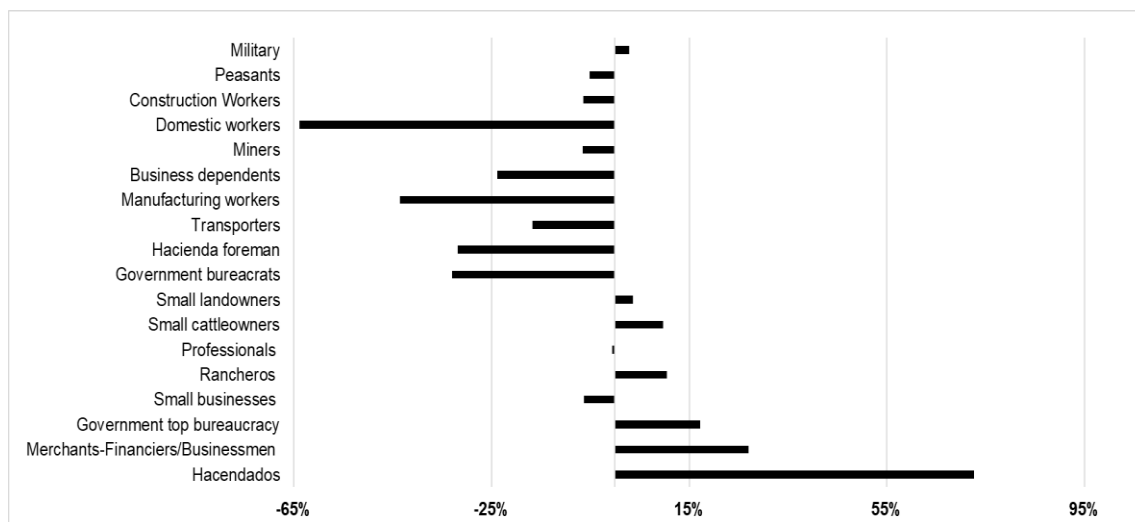
segments of the population out of the provinces, created a flux of internal migration that arrived to the cities looking for waged jobs in the newly created industries. In this way, the booming economy of the time and the brutality of the Díaz's government provided the conditions for a proletariat class to rapidly emerge.

A structural change took place in the second half of Díaz's government. The economy started to expand reverting the first half of the century contraction. After 1895, the second half of the Porfiriato, the industrialisation of the economy begun. Nonetheless, to sustain industrial production in a national market that lacked purchasing power, the creation of monopolies was required (Haber, 1989). Díaz's government suffered from what is called the "commitment problem" (Haber, 2002). The government required to attract private investment to promote economic growth and strengthen his rule, but the state could not establish a rule of law; taxes were often unreliable and local elites strong. To solve the commitment problem, Díaz resorted to textbook crony capitalism, using political power to create rents that in turn provided a stable enough compromise from both sides.

Mexican industries could not export; they were not competitive so in order to survive they required protection from foreign competition (Haber, 1989; Beatty, 2002; Kuntz, 2002). Another factor that contributed to the creation of a tight economic elite was the high cost of capital. Mexican financiers often had close links with the government and used those relations to extract rents and create networks of businessmen that controlled the significant firms around the country. In certain ways, the Mexican financiers were the State, as government required them to finance itself. At the same time, they controlled most industries and banks, to the point of dictating the fiscal, monetary and commercial policies of the country (Haber, 1989).

Politically created rents stimulated an enormous concentration of income and wealth, as only a tiny minority with access to resources and political influence controlled the value creation in the economy. The high levels of inequality were not only a product of economic development as theorised by Kuznets (1955), but also a result of the political economy. Businesses were vertically integrated from the hacienda economy, where firms obtained raw resources and materials for the factory floors. On the other hand, workers experienced some wage gains. Nonetheless, the high rates of inflation of the last years of the Porfiriato vanished them. Hence, in 1910, the year the Mexican Revolution begun, our social tables register a Gini index of 0.538 on average, with a maximum possible level of 0.618. Either value represents the highest Gini index recorded in Mexican economic history.

*Figure 1: Winners and losers: real gains by occupational group 1895-1910*



*Source: Author's own calculation.*

Figure 1 displays something similar to the Ravallion and Chen (2003) and the Milanovic and Lekner (2013) growth incidence curves. These “growth incidence bars” show the income gains that each occupational group had between 1895 and 1910 according to our social tables. Hacendados, the merchant financiers and the top echelons of government were the clear winners and the workers and peasants the clear losers.

When looking at the reconstruction of the rate of returns done by Haber (1989), for some of the leading firms during the 1902-1910 period, we find a rate of return that moves around 7 per cent for most years and from 1896-1910, yields on stocks that average 5 per cent. This finding is in line with Piketty’s hypothesis of  $r > g$  (Piketty, 2014) as GDP per capita growth was on average 2.1 per cent (Bolt et al. 2018, The Maddison Project Database).

Piketty’s hypothesis, that if the rate of returns exceeds economic growth the capital holders, in our story the Mexican merchant-financiers and large landholders, will accumulate resources at a faster rate than the rest of the economy, appears to be vindicated.

Recently published evidence from Jordà, Knoll, Kuvshinov, Schularick, and Taylor (Forthcoming) shows that except for World War II,  $r > g$  has been the norm for the last 150 years. For the Mexican case, it is a suitable candidate for explaining the leap in inequality levels that we observe in the 1895 and 1910 social tables.



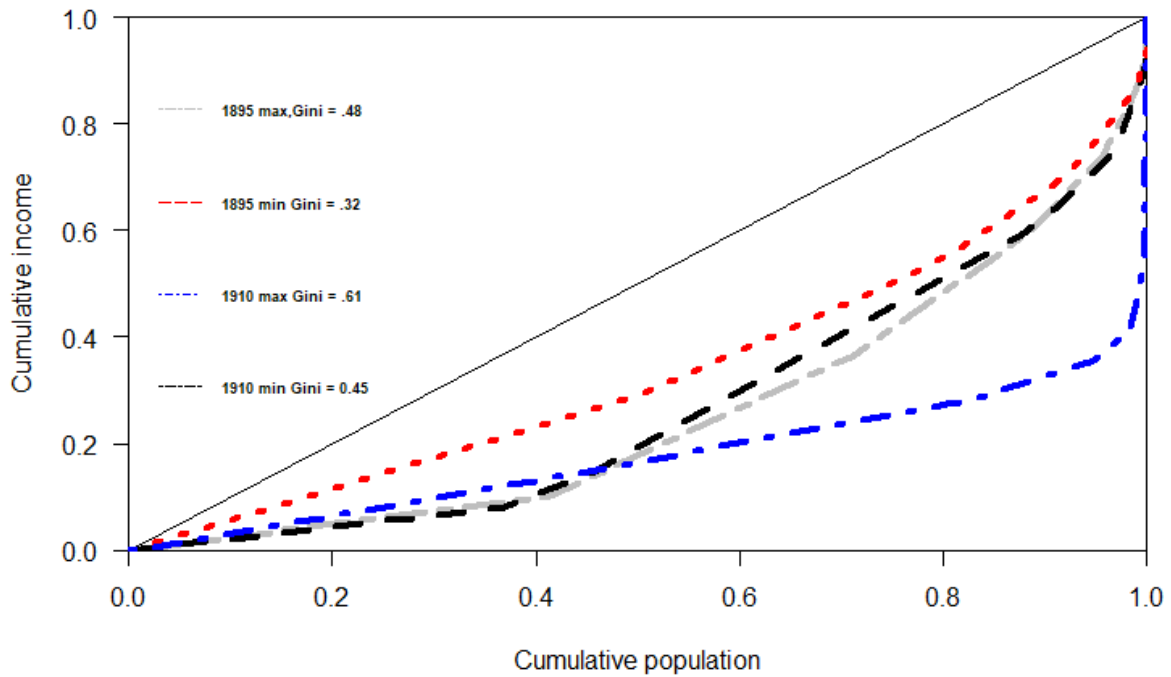
While rents were high, working conditions for the agrarian population were harsh and wages were low. The German agronomist Karl Kaerger (1902), in a research mission from the German Kaiser, surveyed the possibility to substitute imports from the United States agriculture for Latin American ones in case of war. Kaerger arrived to Mexico to observe agricultural production and labour conditions. In his report, Kaerger describes the low wages paid to Mexican peasants and how these labour conditions, low labour costs and possible high profits in agricultural exports, were favourable for German investments. Wages were so low that *The Mexican Economist* (*El Economista Mexicano*, May 7, 1904) a weekly newspaper dedicated to economics and finance at the time, reported that the rural population, in a bad harvest year, were unable to afford clothing.

Díaz's government saw itself in the positivist tradition of Auguste Comte. His cabinet members were even called the "scientists" due to their idea of ruling employing scientific management and unregulated market economy policies. Often this policy was not as pure as they presumed. In an open economy, rapidly integrating to the global markets some distributive effects are expected. The Stolper-Samuelson theorem (Stolper & Samuelson, 1941) and the Heckscher-Ohlin model (Heckscher, 1931) would predict that the intensive factor of production in a country like Mexico, unskilled labour, would be utilised with more intensity and would gain from trade.

Meanwhile, the less intensive factors, skilled labour and capital would lose. That is not what occurred in Mexico. Government protection of industries prevented this type of distributional forces. Besides, the Porfirian regime had as a core principle the freezing of the existing distribution of resources and political power. For that reason, the government actively resisted the creation of an organised working class. Any attempt to demand higher wages or improve the labour conditions was ignored, any attempt of a strike in a factory was met with force.

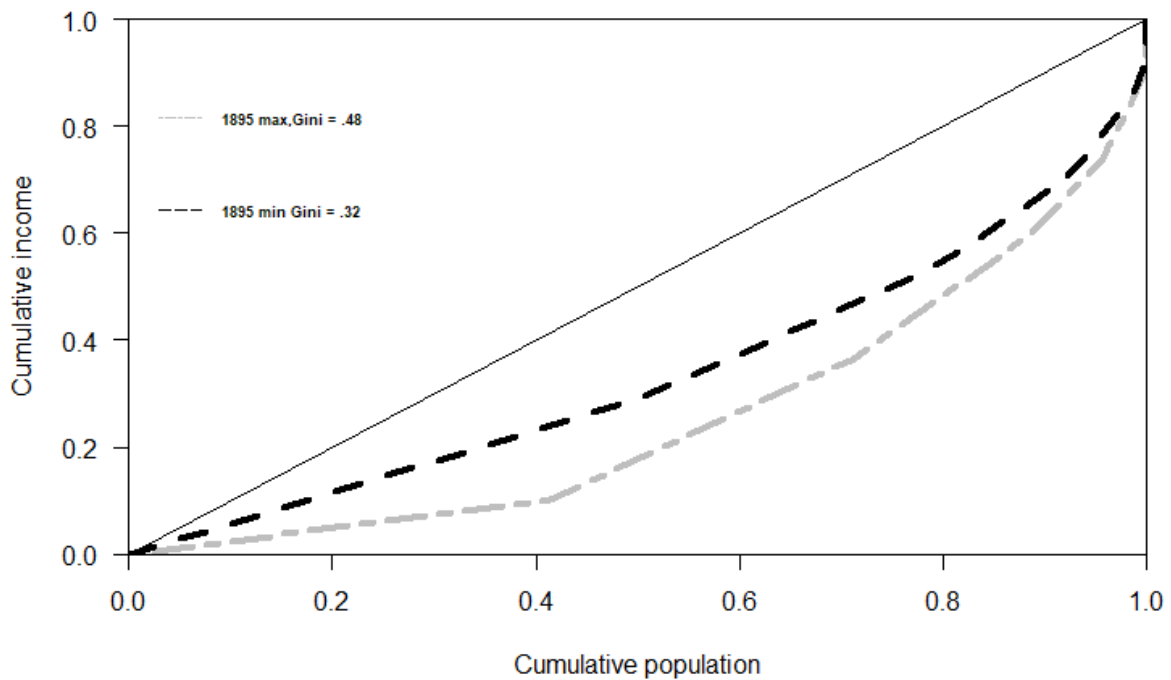
The Lorenz curves for 1895 and 1910, Figures 2 to 4, reveal the nature of some of these changes, the winners and losers of the liberal modernisation project of the Díaz's government. From 1895 to 1910, we observe how the distribution skews towards the upper side of the income distribution. Even if the overall population appears to have experienced some income growth, it is disproportional in favour of a few groups, like the top government bureaucracy, the industrialist's merchant-financiers and the large landowners.

Figure 2: Mexico's Lorenz curves 1895 & 1910 min max levels



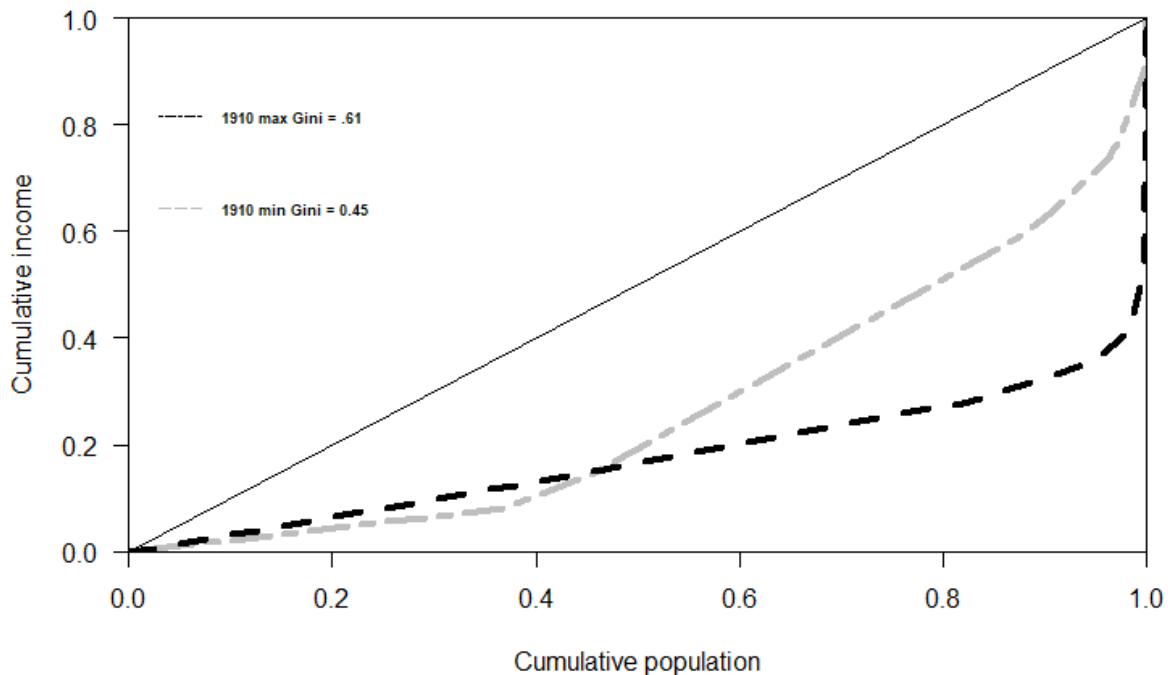
Source: Author's own calculation.

Figure 3: Mexico's Lorenz curves 1895 min max levels.



Source: Author's own calculation.

Figure 4: Mexico's Lorenz curves 1910 min max levels.



Source: Author's own calculation.

We know from historiographic sources that the large concentration of economic power and the exploitation behind it created conditions favourable for the peasants and proletariat to revolt. At the end of the Porfiriato, revolts ended in a massacre, like the Rio Blanco revolt of 1907 (Gómez-Galvarriato, 2002). Additionally, the close relationship between the concentration of wealth and income and political power became a barrier for local elites, particularly in the North of the country. The political economy of the Díaz's regime, with its success in creating growth that benefited a small clique of cronies, created the conditions suitable for its demise.

The Mexican Revolution overthrew Díaz's regime, but it did not have a unified ideological agenda or goals (Gómez-Galvarriato, 2002). The labour movement hard earned the changes in labour relations that took place from 1911 and onwards. In 1911 the first general strike was successfully conducted in the textile industry in the states of Veracruz and Puebla, leading to a collective contract and the unionisation of the textile industry (Bortz, 2002). The gains for the popular classes did not arrive from the revolutionary political agenda that to some extent represented the interest of some of the neglected economic elite and *petite* bourgeoisie. It was an accident, a by-product of the revolutionary process itself.

The bloodiest years of the revolution took place after the assassination of president Madero in the beginning of 1913. The period started with the overthrow of Madero's usurper, Victoriano Huerta and then faction infighting commenced among revolutionary groups. This part of the Mexican Revolution closely behaves like a civil war, governments lasted for short periods and therefore were weak. This weakness made local and national governments make enormous concessions to workers at a scale not hitherto dreamt of. For example, as documented by Bortz (2002), some state governors like Luis F. Domínguez from Tabasco and Candido Aguilar from Veracruz decreed minimum wage increases, regulated the maximum working hours per day, abolished debts and prohibited physical punishment at factories. This development most likely had an impact on income inequality.

Considering its importance, the second decade of the twentieth century is a period surprisingly neglected in the Mexican economic historiography; this because of the lack of reliable sources of data. The population census of 1920 does not allow us to construct a social table to proxy for the income distribution and other sources are not available, for example, statistical yearbooks or economic censuses. Nonetheless, it is reasonable to assume that inequality decreased.

Mexican economic elites lacked ideological cohesion during the Revolution, therefore were unable to protect their interests as before. On the other hand, the popular classes began to conquer economic and political rights. This shift in political power can be illustrated by the Venustiano Carranza's series of decrees from the beginning of 1915 which restored lost land to peasants, extended the new labour law to all the country and increased the minimum wage.

At the height of the faction infighting of the Mexican Revolution, peasants and workers became a vital source of men for the revolutionary armies. In 1915 Carranza's Constitutionalist Army (Ejército Constitucionalista) engaged in a ferocious war with Francisco Villa's Northern Division (La División del Norte) and at a lesser extent with Emiliano Zapata's army, the latter, although less of a military threat, provided the ideology for the revolution. Thus, Carranza's concessions to the working classes that fielded his army were a necessity. The 1917 Constitution's recognised labour and social rights, yet it was resisted by the economic elite and Carranza himself, therefore it was a conquest of the popular classes that now had a seat at the political table (Bortz, 2002). The claim that the Mexican Revolution decreased inequality can be supported by the number of successful strikes since 1920.

<b>Year</b>	<b>Strikes</b>	<b>Workers</b>	<b>Favour workers</b>	<b>Favour owners</b>	<b>Negotiated</b>	<b>Not known</b>
1920	173	88,536	30.00%	30.00%	40.00%	0.00%
1921	310	100,380	13.23%	13.23%	61.29%	12.26%
1922	197	71,382	45.69%	45.69%	8.63%	0.00%
1923	146	61,382	28.77%	28.77%	42.47%	0.00%
1924	136	23,988	50.74%	23.53%	25.74%	0.00%
1925	51	9,861	50.98%	15.69%	33.33%	0.00%
1926	23	2,977	34.78%	34.78%	13.04%	17.39%
1927	16	1,003	25.00%	25.00%	50.00%	0.00%
1928	7	498	71.43%	14.29%	14.29%	0.00%
1929	14	3,473	42.86%	35.71%	14.29%	7.14%
1930	15	3,718	80.00%	13.33%	6.67%	0.00%
1931	11	227	72.73%	0.00%	0.00%	27.27%
1932	56	3,574	10.71%	26.79%	53.57%	8.93%
1933	13	1,084	61.54%	15.38%	0.00%	23.08%
1934	202	14,685	47.52%	52.48%	0.00%	0.00%
1935	642	145,212	45.48%	16.36%	31.31%	6.85%
1936	674	113,885	75.82%	12.46%	5.04%	6.68%

*Source: Mexico's Statistical Yearbook 1935.*

From the year 1920 up to 1936 strikes intensified and most of the time favoured the workers or required a negotiated solution in which both workers and owners had to make concessions. This state of affairs was unthinkable before the revolution and led to significant improvements in the working conditions and wage increments. It has long been recognised in the inequality literature that rising minimum wages have a strong influence in inequality levels (Autor, Manning and Smith, 2016).

Also, the construction of the 1930 social table provides us with an estimate for inequality levels after the Mexican Revolution ended. Inequality in this year is at its lowest point in more than a century with an average Gini index of 0.381 and a possible minimum of 0.311. The Mexican revolution arguably ended in 1921, after most revolutionary leaders were dead and a faction claimed victory, however, soon after this conflict ended a minor religious war erupted, ending in 1929.

We know from the social tables that inequality was at its highest point in 1910 and we know that the mechanisms that produced that high concentration of income were land grabbing and

the creation of rents. We also know that inequality in 1930 was at its lowest point. What mechanisms account for this evolution?

One mechanism must be the revolutionary violence, Scheidel (2017) argues that war and destruction are a source of levelling, and even explicitly mentions the Mexican Revolution and its agrarian reform as an example (Scheidel, 2017 p. 347). However historiographic evidence suggests that the destruction of capital was not generalised (Womack, 1978; Haber, 1989). Revolutionary armies captured factories and haciendas and exploited them to obtain resources to sustain their military operations. Haber (1989) describes how the economic elite was left untouched after the revolution and shows how industrial output recovered after the fighting stopped. Owners even managed to retain political power, for example, influencing the draft of the 1917 Constitution (Bortz, 2002). Katz (1974, 1998) describes how after the revolution some of the confiscated lands were returned to their previous hacendado owners.

These facts imply that the destruction of capital channel of Scheidel was not the driver of the levelling process. Nonetheless, violence did play a role in the levelling, as it provided the popular classes with some bargaining power to wrest concessions out of the elites. The Mexican Revolution impacted inequality in more subtle ways, like labour rights, social rights, education and health services, the introduction of income taxation and large-scale land reform, and through the institutional reforms of the 1917 Constitution.

The income tax was first introduced in 1924, even if it was a very low rate it slightly compressed the income distribution. The same can be argued about the inheritance tax introduced in 1926. Labour rights can be illustrated with the number of strikes that resulted in favour of the workers. For example, according to Gómez-Galvarriato (2002), from 1920 to 1929 real wages increased 131 per cent, with some regional variations due to the differences in the strength of the labour movement. Perhaps the more significant source of redistribution came from the land reform, which created new owners that could derive income from the land. Even if the economy was about to experience a modern take-off, during the decade of the 1920s the agricultural sector still contributed the highest share to national income.

From 1895 to 1930 it is clearly distinguishable how the political economy created winners and losers. The political decisions to either create rents or redistribute land and increase wages impacted the income distribution. It was not a Kuznetsian evolution of the economy that created inequality as a process of economic development; it was a series of political choices.

In the 1930 to 1940 decade, the story is slightly different; we observe an increase of inequality in a period in which social rights and public services expanded; also, social policy had a strong influence on well-being. This increase shares some common mechanisms with the previous evolution, but for this period it is closely related to the Kuznets hypothesis as industrialisation took off with the Second World War.

The Gini index obtained for 1940 from the social table was 0.471, a level above the 1895 average level and close to the possible maximum registered in 1895. During the decade between 1930 and 1940 social policy and land redistribution augmented, particularly during the Lazaro Cárdenas' government 1934-1940. Cárdenas' policies accelerated the land reform redistribution and promoted extensive national campaigns to train professors and medics and then deploy them around the country.

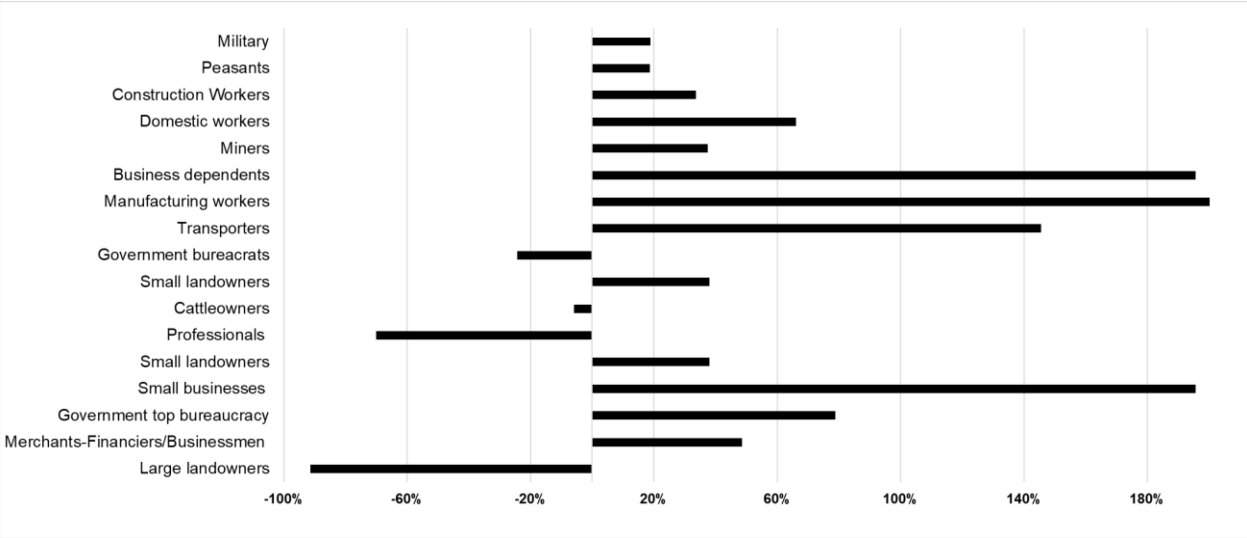
During the same period, as the recovery from the Great Depression took place and the hostilities of the Second World War started, the Mexican industrial sector experienced fast growth rates. Large infrastructure projects stimulated demand for industrial goods and Cárdenas strongly favoured investments in social housing for workers (Davis, 1994). In one hand we have the equalising forces of social policy and land redistribution and in the other the Kuznetsian increase in inequality due to rapid economic development.

Cárdenas' government maintained some tensions with Mexican industrialists. During his government, their influence on policy was reduced, and the popular classes increased their political participation. Alan Knight (1991) sees the acceleration of the land redistribution under Cárdenas as favourable to the well-being of the peasants and as a source of change in the political equilibrium.

However, even if Cárdenas' government managed to successfully negotiate with all political sectors, including the newly enfranchised peasantry and produce a better distribution of the gains of growth, it does not mean that it totally broke the cronyism that allowed for the political creation of rents. Haber, Roza and Maurer (2003) call this phenomenon "vertical political integration" and it can be seen as an element of the monopolistic nature of many industries since the end of the nineteenth century to the first decades of the twentieth-first.

Perhaps for this reason, the long-term evolution of the Mexican income distribution is relatively constant through time. If we look at inequality today and inequality in 1895 it is not dramatically different. Only two periods, the Mexican Revolution 1910 to 1921 and the process of consolidation of the Mexican state in the 1920s and 1930s can be characterised as moments of a secular decline in inequality.

*Figure 5: Winners and losers: real gains by selected occupational groups 1930-1940*

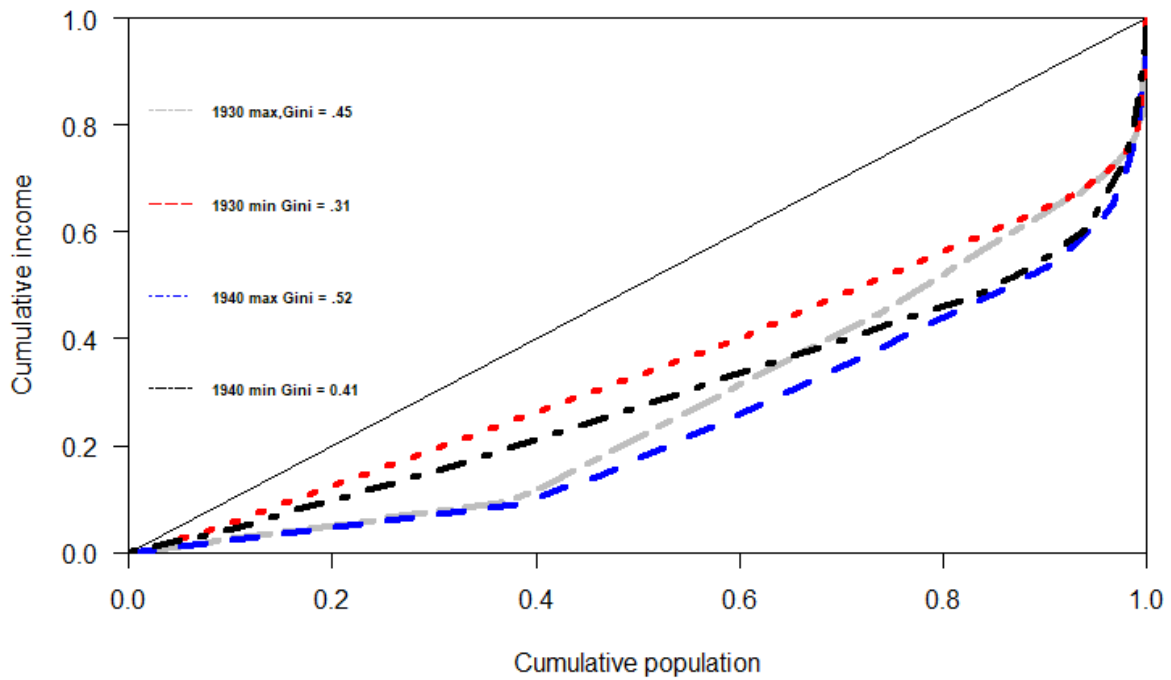


*Source: Author's own calculation.*

Figure 5 repeats the same exercise that Figure 1. It is evident the different nature of the increase in inequality that we observe between 1930 and 1940. Large landowners were significantly less important after the agrarian reform, a number of them moving to other sectors, the main driver of the increment was the rise of small businesses that accompanied the acceleration of the industrialisation process induced by the Second World War and the swelling divide between the traditional and modern segments of the economy. Although peasants and ejidatarios had significant gains, those gains were dwarfed by the income gains of the occupations more directly associated with the rapid industrialisation like manufacturing workers.

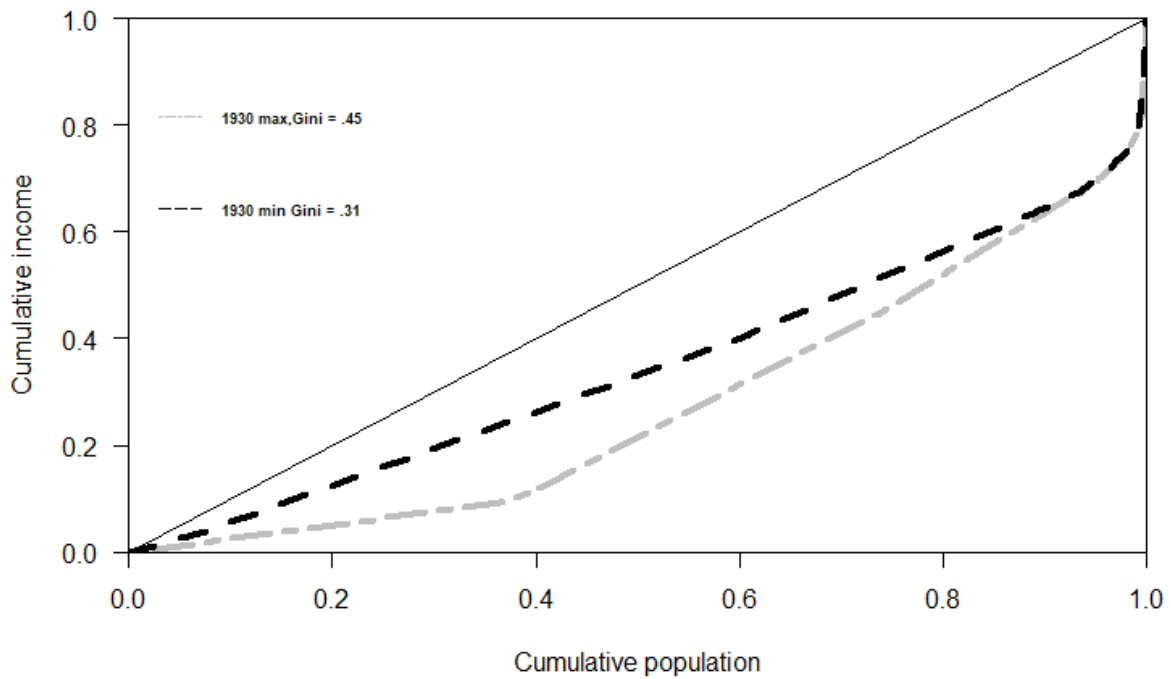


Figure 6: Mexico's Lorenz curves 1930 & 1940 min max levels.



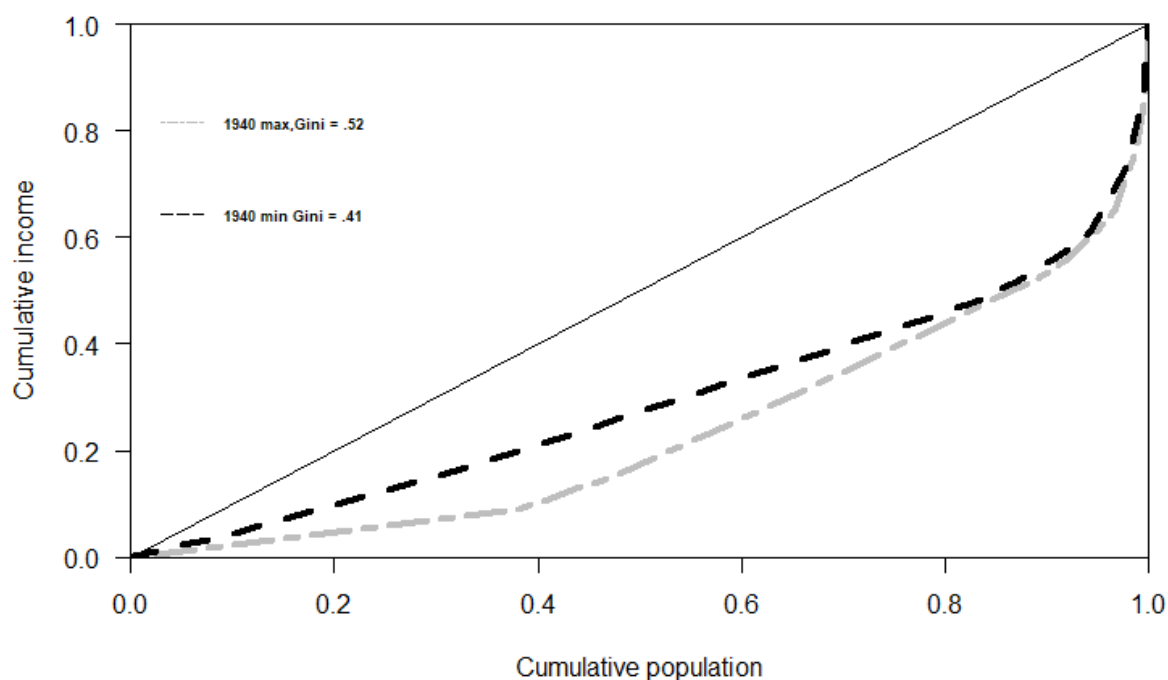
Source: Author's own calculation.

Figure 7: Mexico's Lorenz curves 1930 min max levels.



Source: Author's own calculation.

Figure 8: Mexico's Lorenz curves 1940 min max levels.



Source: Author's own calculation.

<b>Table 7: Incomes and ratios between occupational groups, Mexican pesos</b>				
	<b>1895</b>	<b>1910</b>	<b>1930</b>	<b>1940</b>
<b>workers wage*</b>	382.50	460.00	861.43	1678.82
<b>peasants wage</b>	171.76	272.48	496.40	708.10
<b>businessmen income</b>	14,208.71	27,119.15	25,653.40	44,236.84
<b>Large landowners income</b>	105,403.50	249,183.22	51,560.04	16,816.67
<b>Ratio workers/peasants</b>	2.23	1.69	1.74	2.37
<b>Ratio businessmen/workers</b>	37.15	58.95	29.78	26.35
<b>Ratio businessmen/peasants</b>	82.72	99.53	51.68	62.47
<b>Ratio Large Landowners/workers</b>	275.56	541.70	59.85	10.02
<b>Ratio Large Landowners/peasants</b>	613.67	914.50	103.87	23.75
<b>Ratio Large Landowners/businessmen</b>	7.42	9.19	2.01	0.38

\*For 1930 and 1940 the workers wage is the average of industrial occupations.

Source: Author's own calculations

From 1930 and 1940 Lorenz curves Figures 6, 7 and 8 and Table 7, we can distinguish how inequality was not only driven by the top income gains, but from differences between skilled workers around the middle of the distribution and unskilled workers at the bottom of it. The 1930 distribution is significantly compressed as it can be seen in the decline of the ratio of landowners' income to other benchmark classes. In 1940 the fast industrialisation of the economy favoured skilled urban workers over the still numerous rural population, as can be seen in the recovery of the ratio of workers' income to peasants' income. At the same time, we observe how land stops being the primary source of income, the large landowners' ratio to workers dramatically diminishes, and the businessman ratio to other classes becomes the larger one. All these evidence points to a Kuznetsian process taking place in that decade.

Nevertheless, the fact that land stopped being the primary source of income does not necessarily mean the old elites disappeared. As Wasserman (1987) points out, the old elite employed several strategies to survive; for example, dividing their lands to avoid the land reform, selling them to foreign investors, diversifying their investments and marrying members of the new regime. In this sense, the capacity of the old economic elite to survive and retain some degree of economic influence is reminiscent of the recent findings of Ager, Platt Boustan and Eriksson (2019) in the *postbellum* United States and the economic recovery of former slave-owning families. These mechanisms could be part of the explanation behind the rise in inequality between 1930 and 1940.

Another important aspect to keep in mind is the female participation in the economy. Female participation before the Mexican Revolution was concentrated in occupations such as domestic work and servitude with very low wages.

After the revolution this changed, during the 1930s and the government of Lázaro Cárdenas women were able to participate on a broader set of occupations and enjoy some of the benefits of education. However, gender inequality most likely persisted. An illustration of this comes from the writings of the Mexican diplomat, novelist and poet Rosario Castellanos in her novel *Balún Canán*, where she describes the class conflict between the rural population and especially indigenous women trying to materialise the gains from the Cárdenas' reforms against the resistance from the economic elites. At the end, even if the Cárdenas' government implemented reforms, redistributed land, enfranchised people and promoted social services, the huge disparities among the haves and the have-nots eventually resumed.

### 4.3 History is the rock upon which economic theories survive or are broken

History is the true test for economic theories, in light of our results, what can be said about the dominant theories of the evolution of inequality in the Mexican context?

First, the Kuznets hypothesis, we indeed observe to some degree the characteristic increase in inequality as industrialisation accelerates; however, it cannot explain by itself the evolution we see. Over the whole period of 1895 to 1940 we can only claim the existence of something like the Kuznetsian process from 1930 to 1940. The increases from 1895 to 1910 and the decrease we observed from 1910 to 1930 do not match with this traditional explanation.

Mexico was a predominantly agrarian society with most of its population living in rural areas and working on the traditional sectors of the economy, like small-scale agriculture up until the 1960s. The Kuznets hypothesis works best for countries facing rapid urbanisation (Lindert & Williamson, 2016), but at the time, that was not the case for Mexico. For the Mexican scenario, the distribution of the land appears to be the main factor behind distributional changes; this is something commonly neglected in inequality studies and particularly relevant in historical contexts as demonstrated by Lindert and Williamson (2016) for incomes in the United States and by Bengtsson, Missiaia, Olsson and Svensson (2018) for wealth in Sweden.

Second, the institutionalist point of view is very relevant in this case. However, it is not in the same way as thought by Engerman and Sokoloff (1997, 2012) or Acemoglu, Robinson and Johnson (2001, 2002). Extractive institutions did play a prominent role, the vertical political integration allowed for cronyism and rent-seeking behaviour, however, it was not a product of inherited institutions, but a consequence of the political economy circumstances of the time. To survive the Mexican governments of the period had to make allies with those who could provide them resources and then after the revolution by a corporatist arrangement.

The ECLAC structuralist school, represented in the works of Cardoso and Falleto (1967) and Pinto (1973), is concerned with the problem of structural heterogeneity, that is, the existence of several stages of development at the same time in the same country, which is closer to the Latin-American reality than the more orthodox institutionalist approach. Haber's (2002) commitment problem is also useful for understanding how institutions had an impact on the distribution of income as governments tied themselves to private interests to sustain their power.

Third, the Williamson (2010, 2015) and Dobado (2010) hypothesis that argues in favour of the nineteenth century commodity boom as the source of inequality in Latin America does not match the Mexican circumstances. The Mexican industrialists did try to take advantage of the first wave of globalisation. They tried to export both commodities and manufactures but were not very successful. They were not competitive and they lacked a strong inner market to sell their production, requiring significant amounts of protection. The government ended up carving monopolies and oligopolies for them. The first globalisation cannot be the primary driver of inequality between 1895 and 1910; clearly politically created rents that skewed the distribution of income are a more apparent culprit.

Fourth, Piketty's  $r > g$  and the changes due to taxation and the welfare state related policies partially apply in the Mexican context of 1895 to 1940. The rate of return of capital for the period, did exceed the rate of economic growth. The owners of capital, the large landowners' and industrialists' incomes greatly surpassed the popular classes as can be seen in Table 7. We also know from the literature that after the Mexican Revolution several conquests were made by the popular classes, labour rights, healthcare services and education; income and inheritance taxes were created, so after the 1930s redistribution intensified. Thus, the Pikketian mechanism fits some of the developments and cannot be easily discarded, the rate of return matches, but taxes had a marginal impact.

Finally, the destruction mechanism claimed by Scheidel (2017) becomes relevant. As we have argued before, the Mexican Revolution did not destroy large amounts of capital, it left the economic elite largely untouched; hence, destruction of capital cannot be the source of levelling between 1910 and 1930. However, similarly to the institutionalist view, the revolution was indeed a source of levelling but in a subtle manner. It was the recognition of the peasantry and proletariat as legitimate political actors that wrestled concessions from the elites. Moreover, it was the recognition of social rights and the need to pacify the country that turned out to be the great leveler.

Therefore, the Scheidel (2017) argument of revolution as a source of levelling might need to be thought in a more complex manner, the type of revolution matters for the levelling process. Taking into consideration Barrington Moore's (1966) three types of revolutions: agrarian revolutions, bourgeoisie revolutions and aristocratic revolutions, one can see that the Scheidel mechanism is present in the agrarian type of revolution, for example in China and Russia. Nonetheless, the Mexican Revolution shares characteristics with the agrarian and the

bourgeoisie types. Therefore, we can observe opposing mechanisms at play, an agrarian reform and a set of social rights that promote equality and the survival of segments of the economic elite and the defense of bourgeoisie interests pulling in the opposite direction.

Following these findings, the land ownership dynamics become even more relevant, as pointed by Lindert and Williamson (2016), in countries with sharp differences between rural and urban sectors, inequality is shaped by often opposing forces. The rural population becoming more equal relative to themselves in terms of income, but more unequal relative to urban populations where industrial jobs and human capital-intensive jobs can obtain more income. Between 1930 and 1940 we observe different forces oppose each other, the occupations centred in rural areas stagnated and fell behind, on the other hand, urban occupations, associated with the industrialisation and urbanisation process, like small business and industrial workers, were able to earn higher wages and salaries.

What we can see then is that no single theory about inequality is a perfect fit, the evolution of inequality in Mexico between 1895 and 1940 is a multifactorial process. If we take a long-term perspective and observe not only the period of our study, but the evolution up to the present time, the necessity for a more contextual explanation is even more evident, but this discussion is better suited for our concluding remarks.

# 5 Conclusions and Further Discussion

## 5.1 Inequality as a Political Choice

Thinking about the the 1895-1940 period, it becomes difficult not to consider the Mexican Revolution as more Bonapartist, in the Marxist use of the term (Marx, 2015 [1852]), than radical, as the faction that prevailed at the end of the conflict represented the interests of the bourgeoisie and the surviving Porfirian economic elite. Therefore, this faction only made concessions to the proletariat and rural classes out of political necessity. Gilly (1971) characterises the Mexican Revolution as an economic elite fighting with its rival factions for political power and access to rents, peasants that wanted to restore the status quo to the pre-capitalist economy and stop exploitation and workers that wanted a post-capitalist arrangement with social, economic and political rights. Since the economic elite that eventually won did not have an ideological cohesion, instead adopted a pragmatic approach to power during the conflict; all the conquests of workers and peasants that ended in the Mexican Constitution of 1917 were a compromise. Nonetheless, although this was a dramatic improvement that freed capital and labour to be employed in more efficient ways (Womack, 2012), it did not entirely extinguish the political economy of the Mexican *ancien régime*, it merely included fractions of new groups in it.

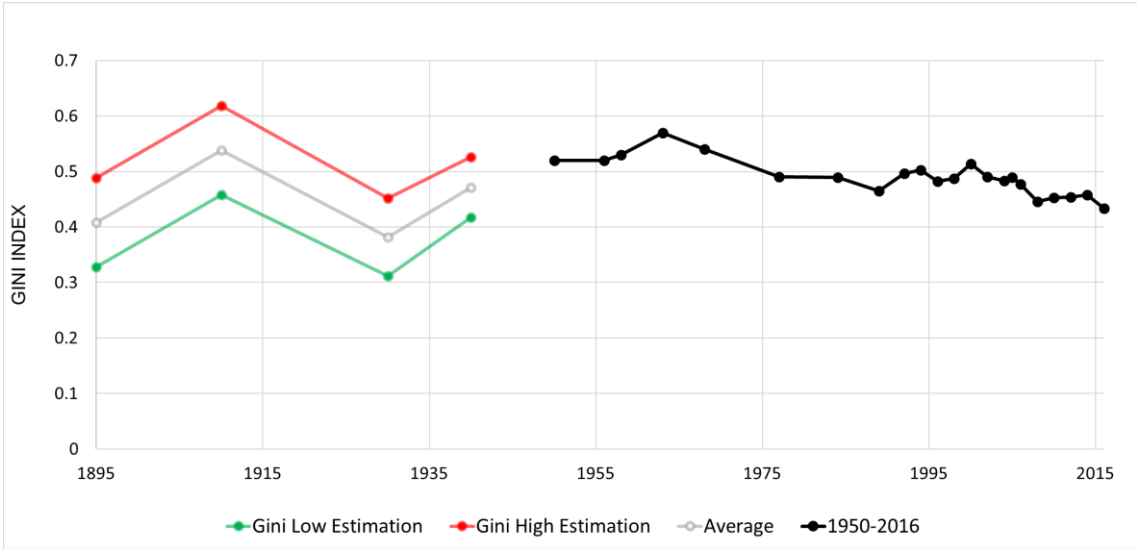
In a simile to the French Revolution, the Mexican one also had its Thermidorian Reaction. It temporarily changed the inequality dynamic as the country required peace. Governments, either by the understanding of that peace as a requirement for economic development or because of merely sympathy for the popular classes, mustered the political will to enact policies that reduced inequality. The Mexican Revolution eventually faced its Thermidor by leaving the vertical political integration alive. This cronyism would be one of the mechanisms that prevented inequality to further decrease over the twentieth century and turned into a source of many of the economic problems the country has faced up to this day.

For example, Tocqueville (2006[1856]) in his book *The Old Regime and Revolution*, and Marx (2015[1852]) in his *Eighteenth Brumaire of Louis Bonaparte* concluded, when examining the

French Revolution, bourgeoisie or Bonapartist revolutions change the economic and political elites, but not the political structures. The Mexican Revolution in the fragile equilibrium it wanted to preserve between all social classes, ended embracing a corporativist structure that although more inclusive than before, still maintained some of the old structure of power.

As Bleynat, Challú and Segal (2017) point out, inequality in Mexico does not seem to follow the Kuznets process, the changes in inequality are more intertwined with the political sphere and the policies implemented by the ruling classes than to economic development alone. Milanovic and Bustillo (2008) argue that in Latin America the Kuznets hypothesis does not hold. Inequality appears to be rather persistent over time regardless of the development level. When looking at the long-term evolution for the Mexican case in Figure 9, that statement is confirmed. In Mexico, income inequality has remained high for more than a century, even after intense periods of economic growth. The Kuznets hypothesis states that inequality should rise after the initial states of economic development and then decrease after a certain level has been attained. Nonetheless, development and inequality in the Mexican case have followed each other hand in hand for as long as we can measure. In the most optimistic reading of the data, we could claim the existence of tenuous Kuznets wave (Milanovic, 2016) but on the worst, inequality has almost remained the same.

*Figure 9: The evolution of inequality in Mexico: 1895-2016*



*Source: For 1895, 1910, 1930 and 1940 author’s own calculations. For 1950-2004 Székely (2005). For 2008-2016 Coneval.*



This persistence challenges prevailing theories of how inequality behaves. In the past, referring to our 1895 and 1910 estimates, the property of land is the main factor behind inequality changes, owning land meant having a production to sustain oneself and a surplus to sell to the market. Owning land meant controlling natural resources that were key for new industries, it meant having collateral resources to access the tight financial market of the time. Not owning land meant being dispossessed and with little choice but to sell your work to the landed elite or migrate to the cities seeking employment in the nascent industrial sector. Few people had freedom due to lack of entitlements and this is especially true for women and the indigenous population as their work were concentrated among the occupational categories with lower wages.

Historically, the Kuznets hypothesis and the new institutionalist view were held as the primary explanations behind inequality; nonetheless, over the years historical evidence for developed and developing countries alike do not support the Kuznets hypothesis validity anymore and the institutional view is debatable according to each country's history. Developing countries have heterogeneous economies arriving late to the industrial revolution, failing to integrate rapidly to the global economy and with different geographies, colonial histories and most importantly their own historical contexts; hence developing countries require a tailor-made analysis that often general theories omit for simplicity.

At the end of the nineteenth century, Mexico was not a pure capitalist economy; even to this day, the country faces dualism with powerful and dynamic technologically advanced modern economic sectors and weak and stagnated traditional ones still employing nineteenth century techniques. Developing countries, particularly Latin American countries, can be thought as different countries living inside the same geographic boundaries. For that reason, detailed contextual analyses are required to understand how inequality changes.

If the concept of structural heterogeneity is valid, and there are reasons to think it might be, then inequality in developing countries needs to be thought in a way that addresses this specific set of circumstances. If as Pinto (1973) argues, Latin American countries have within sector differences in technologies and institutions in which development does not occur at the same pace, then inequality ought to follow different patterns. If large sectors of the economy are consistently not capitalist yet inhabit or even overlap with more modern and capitalist ones, it is straightforward to see why standard theories fail to explain the evolution of inequality.

From our findings, it comes to be clear that land ownership played a critical role in the dynamics of the distribution of income. In the contemporary and historical context, this role seems to be often underestimated or even entirely ignored. One hundred years ago or even today developing countries still have large rural populations, subsistence agriculture and are reliant on light industries and commodity exports. Therefore, the ownership of land and the share of population in the rural sector in such countries can play a significant role in explaining inequality today. If inequality reduction is in the global political agenda for social justice motives and economic development, this often-ignored mechanism needs to be taken more seriously in present debates about structural change and its distributional consequences. The Mexican experience of 1895 to 1940 serves as an excellent example of what type of policies can compress the income distribution and what political economy challenges could arise from it.

In the present work we set to answer the following questions:

- a) What was the level of inequality from the late Porfiriato to post-revolutionary Mexico, 1895-1940?
- b) Can Inequality be explained by structural change forces alone? Alternatively, could it be the result of the political-economy process?
- c) Did the Mexican Revolution produce a change in the levels of inequality? Moreover, through which channels did they change?
- d) Did the agrarian reform lead to higher incomes among the agrarian population and thus had an impact in the inequality levels?
- e) Did the introduction of labour and social rights lead to higher wages and thus had influence in the inequality levels?

Thus, we successfully answered them. Regarding question a) and b) we found that the Gini index for the four benchmark years were: 0.40806 in 1895, 0.5386 in 1910, 0.3814 in 1930 and 0.4713 in 1940. Increasing and then decreasing to rise again. In the long-term view, Figure 9, we can see that the levels that our social tables capture are not much different from current levels. Therefore, we find that the structural change, the Kuznets hypothesis by itself is not enough to explain the evolution of inequality. Only between 1930 and 1940 we can distinguish with clarity the Kuznetsian forces at play. With confidence, we can claim that the political economy process played a crucial role.

For questions c), d) and e) we find that indeed the Mexican Revolution played a pivotal role in the decrease of inequality that followed the start of the conflict up until 1930. The Mexican Revolution produced a series of institutional changes through the Mexican Constitution of 1917 that compressed the income distribution. The introduction of labour rights, social rights and the welfare policies that were implemented were a direct result of the political power gained by the popular classes. As a product of the Mexican Revolution, the agrarian reform had an impact on rising income among the peasantry and the new class of ejidatarios, though at the moment the new industrial sectors were increasingly important and the traditional sectors were losing ground. The social tables of 1930 and 1940 and Figures 5 to 8 distinctly show their gains. Finally, the introduction of social and labour rights also reduced inequality, Table 6 illustrates how workers with labour rights could organise strikes and conquer benefits.

In answering those questions, this thesis makes distinctive contributions. First, it provides the first empirical account of Mexican inequality levels before 1950. The measurements from the 1895 to 1940 period are the first income inequality estimations produced for that time. Second, it offers a discussion about the adequacy of the most prominent theories of inequality and its suitability to the Mexican case. In doing so, it makes a case for the importance the ownership of land has in explaining inequality dynamics in historical contexts and for developing countries with large agrarian populations. Third, the findings deliver valuable lessons for fighting inequality today, not only in Mexico but in other developing countries, the main one being that inequality is often politically constructed, the result of the policy decisions and the interplay between those who hold political and economic power. The traditional view of inequality as a secondary effect of the development process is not always true. If inequality is the result of the existent political economy, it can be reduced through political action.

## 5.2 Persistent Inequality?

As a further point of discussion and a possible extension of the present work is the remarkable persistence of inequality over the long run in the Mexican economy. Historical inequality studies have suggested different patterns or behaviours, for example, the Kuznets waves or cycles and the standard Kuznets hypothesis. Kuznets waves have been documented for several countries dating back to even centuries for countries like Spain (Alvarez del Nogal & Prados de la Escosura, 2013), Chile (Rodriguez Weber, 2014), England and the United States

(Milanovic, 2016). Over time, this evidence shows large swings often linked to changes in land ownership and structural changes in the economy. However, cases like Mexico, reported here, are not common. Mexico displays very small variations over the long run, if we discount the hard swings produced by the Mexican Revolution and compare the trend with the post 1950 development, inequality is stable and when it is reduced, the contraction is slow and small, even in the presence of strong and time consistent land redistribution and fast industrialisation.

Against the existence of persistent levels of income inequality, it could be argued that although the Gini index displays similar values through time, the country indeed has changed and today is richer than the period of study for this work. Labour exploitation is not at the same levels as in the end of the nineteenth century or the beginning of the twentieth century. Nonetheless, a counterargument could be made by pointing out that Mexico remains a highly unequal country and the sources of inequality are at the core, still connected to access to public services, lack of the facto labour rights, severe regional differences and the political process that allows the state to be captured by private interests.

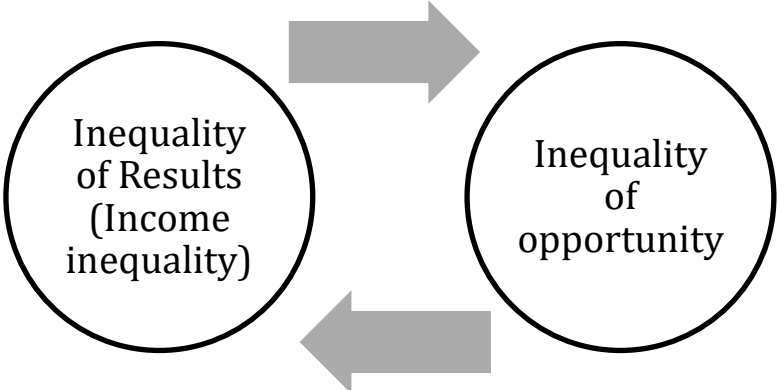
As pointed in our observation of inequality as a political phenomenon, if we draw upon the most optimistic view, maybe taking a long term perspective, we can consider changes produced by the revolution as a Kuznets wave. Nonetheless, unlike other Kuznets waves that can be observed over centuries, in Mexico inequality reverses fast to the previous levels. This fast reversal points to the contingent character of the evolution of inequality in the described political context and the radical changes that occurred in a short period of time.

If we strictly focus on the long-term evolution of this trend, and we zoom out from the revolutionary changes we chose to focus on this work, then we still need to explain why a quasi-constant inequality level is possible? Redistribution or the lack of it cannot fully explain this evolution.

From this reality two possible extensions are required. First, it is necessary to look further back in time to the middle of the nineteenth century or even further back to its beginning. Maybe in a larger time horizon the apparent persistence becomes an illusion. If on the other hand the persistence is real, the second possible extension can come from the study of the so-called structural heterogeneity of the economy, the very different development paths that exist inside the productive sectors and the effect it has on the distribution of resources.

If persistent income inequality is a real phenomenon, how can this structural heterogeneity affect inequality? A hypothetical mechanism could be this: workers on the low productivity sectors, the stagnated traditional ones, find themselves in very different labour relations that imply not only lower wages and lack of social services, but they also probably have less opportunities for social mobility due to a higher degree of inequality of opportunities rooted, for example, in their ethnicity, regional origin, gender, education, health and even the languages they can speak.

*Figure 10: The vicious cycle of inequality*



*Source: Author's own elaboration.*

In this way, the dualism or worst the structural heterogeneity as a characteristic of the economic structure of a country, impacts inequality both ways, in the income distribution (inequality of results) and through inequality of opportunity. Since these two types of inequality are dynamically linked in a vicious cycle, inequality of results becomes inequality of opportunity in the future, as a result inequality can be persistent over time. Therefore, the persistent inequality could be explained by the structural heterogeneity, because it creates different types of labour relations and through them income inequalities that perdure over time and constraint social mobility.

This hypothetical mechanism could be a fructiferous research agenda both for economic history and economics with important public policy implications for the developing and developed world. Tracing back inequality of opportunity and its links to the income distribution can reveal not only unknow aspects of historical inequality, it can also give us a better understanding of how to fight inequality in the present and in the future.

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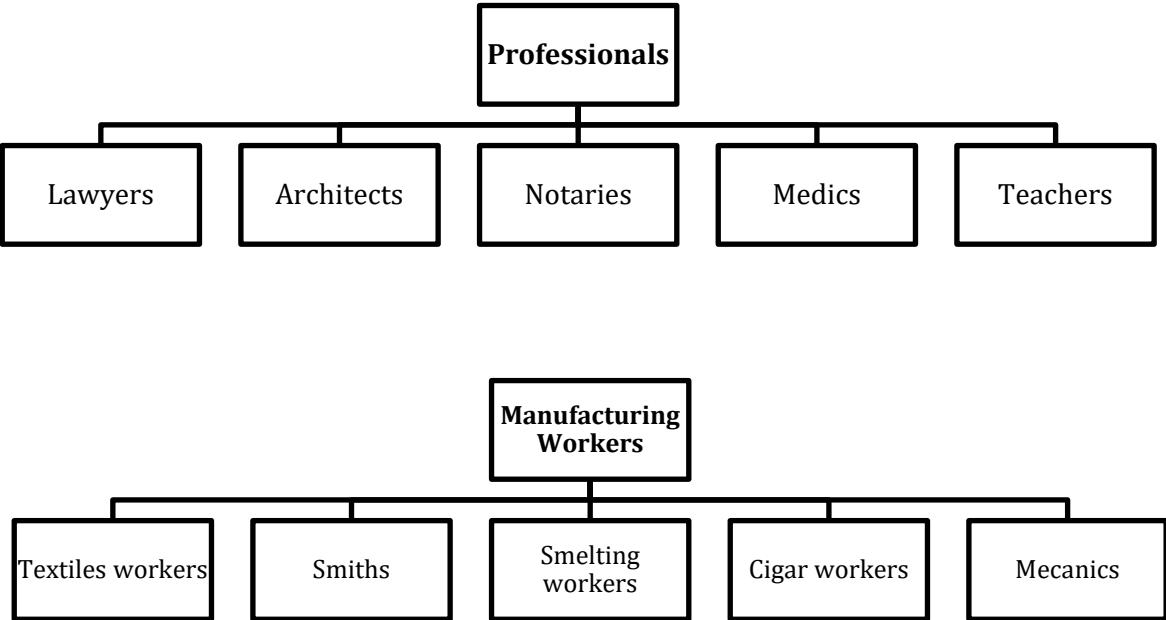
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# Appendix A: Social Tables Construction and Alternative Measurements.

## How occupational categories were constructed for 1895 and 1910?

Examples of how categories were aggregated for the 1895 and 1910 social tables:

Figure 11: Examples of aggregated occupational categories.



Source: Author’s own elaboration

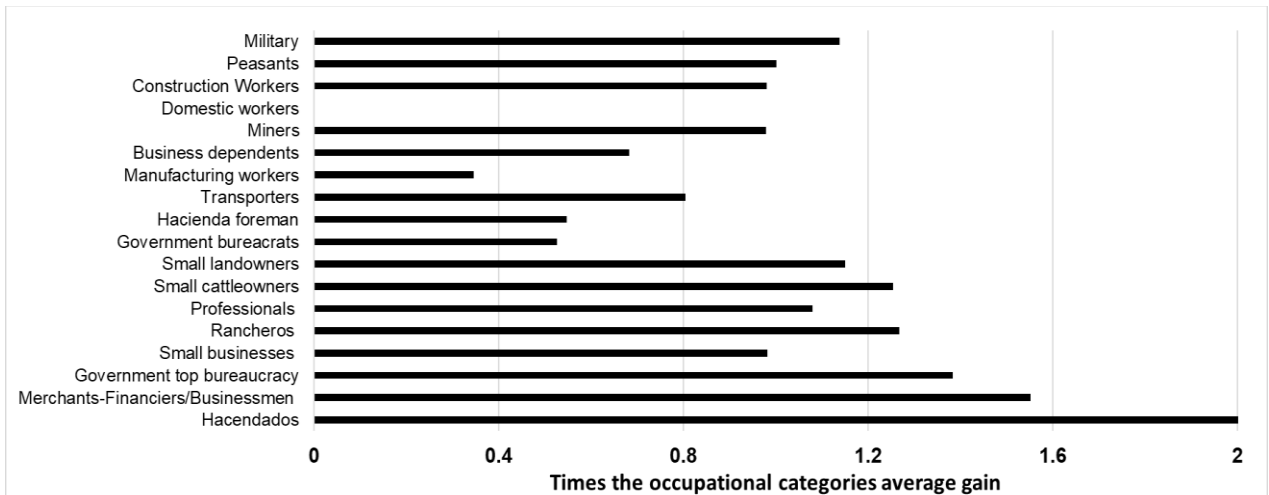
To address the fact that for some occupational categories wage information was not available to the same level of detail, we aggregated categories from occupations belonging to the same aggregate sectors.

For the 1930 and 1940 categories two occupational categories were created. First, "ejidatarios", employing as the source the ejidatal and agrarian censuses. Second, the category "people without occupation" was aggregated from the "unemployed" and the "people without productive occupation" in the population census.

## Winners and losers?

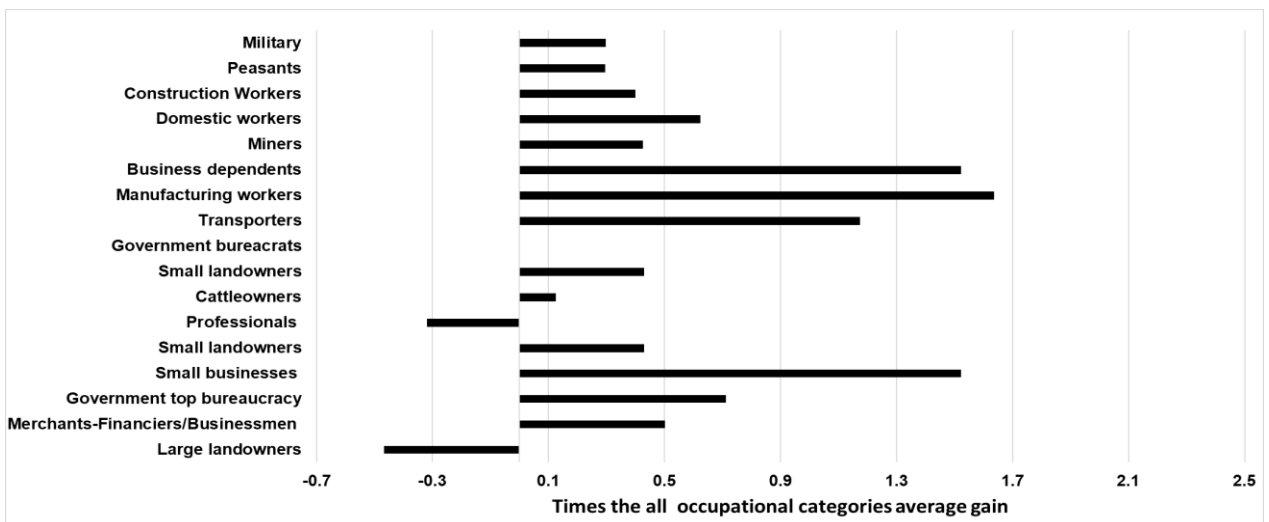
Another way to observe the winners and losers between 1895-1910 and 1930-1940, is to construct alternative relative growth bars for Figure 1 and Figure 5.

*Figure 12: Relative winners and losers by occupational categories 1895-1910.*



*Source: Author's own calculation*

*Figure 13: Relative winners and losers by selected occupational categories 1930-1940.*



*Source: Author's own calculation*

Figures 1A and 2A show that the income gains by occupational categories are normalised by the average gains of all occupational categories according to the social tables. Both show the gains and loses as proportions, for example, between 1895 and 1910 the hacendado class shows

gains 2 times higher than the average gain. In the 1930-1940 period, the small business category shows a gain of 1.7 times the average gain. This is an alternative way to rank and observe who won and who lost from the distributional changes at those times.

## Appendix B: Alternative 1930 Social Table

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican pesos of 1930)</b>
1	Large landowners	0.03%	51,560.04
2	Very high government bureaucracy	0.00%	27,000.00
3	Businessmen	0.16%	25,653.40
4	Cattle owners	0.71%	97,34.82
5	High government bureaucracy	0.00%	9,450.00
6	Professionals (lawyers, teachers)	0.04%	5,000.00
7	Government bureaucracy	0.02%	3,510.00
8	Small landowners	0.51%	2,822.66
9	Medics	0.14%	2,806.00
10	Electric machines makers	0.01%	2,237.04
10.1	Min	0.00%	559.91
10.2	Max	0.00%	2514.06
11	Forestry	0.13%	1,782.42
12	Management employees	0.12%	1,535.17
13	Printing and lithography workers	0.04%	1,429.67
13.1	Min	0.00%	132.58
13.2	Max	0.04%	1622.02
14	Government workers	0.60%	1,350.00
15	Metal manufacturing workers	0.01%	1,303.21
15.1	Min	0.01%	86.72
15.2	Max	0.00%	1474.71
16	Electricity workers	0.14%	1,228.42
16.1	Min	0.00%	586.16
16.2	Max	0.014%	2030.31
17	Science, Artistic and Literature professionals	0.28%	1,200.00
18	Chemical industry workers	0.01%	1,165.64
18.1	Min	0.00%	888.65
18.2	Max	0.00%	1227.38
19	Oil industry workers	0.05%	1,165.64
20	Paper industry workers	0.02%	1,150.58
21	Edification workers	0.58%	1,098.91
21.1	Min	0.00%	347.25
21.2	Max	0.00%	1250.42
22	Metallurgy industry workers	0.06%	1,069.47
22.1	Min	0.00%	273.3
22.2	Max	0.00%	1266.45
23	Mining workers	0.43%	1,039.78
24	Glass industry workers	0.00%	1,028.98
24.1	Min	0.00%	743.16
24.2	Max	0.00%	1436.97

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican pesos of 1930)</b>
25	Cigar industry workers	0.02%	1,020.46
26	Cigarettes industry workers	0.01%	1,020.46
26.1	Min	0.00%	114.34
26.2	Max	0.02%	1369.92
27	Photography and cinematography employees	0.02%	1,011.29
28	Oil industry workers (exploration)	0.02%	967
29	Pharmaceutical industry workers	0.00%	966.75
29.1	Min	0.00%	293.51
29.2	Max	0.00%	1113.40
30	Crystal industry workers	0.00%	962.26
30.1	Min	0.00%	226.44
30.2	Max	0.01%	1122.76
31	Wood industry workers	0.02%	901.22
31.1	Min	0.00%	180.02
31.2	Max	0.00%	1418.40
32	Rubber manufacturing workers	0.00%	898.05
33	Coffe toasters	0.02%	887.5
33.1	Min	0.00%	388
33.2	Max	0.00%	1071.69
34	Bank employees	0.00%	871.7
35	Salt mining workers	0.03%	860.43
36	Sand mining workers	0.01%	860.43
37	Beer and Wine industry workers	0.10%	856.16
37.1	Min	0.00%	134.21
37.2	Max	0.00%	1458.14
38	Bread bakers	0.38%	851.67
38.1	Min	0.00%	111.62
38.2	Max	0.00%	1060.70
39	Nonspecified industry workers	0.03%	840
40	Land transport carriers	0.92%	825
41	Cooking oil and regental butter industry workers	0.02%	806.23
41.1	Min	0.00%	109.88
41.2	Max	0.00%	1004.00
42	Customs employee	0.00%	800
43	Matchsticks makers	0.00%	785.58
43.1	Min	0.00%	300.01
43.2	Max	0.01%	810.41
44	Soap industry workers	0.04%	776.54
44.1	Min	0.00%	97.83
44.2	Max	0.005%	1102.33

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican pesos of 1930)</b>
45	Ice and ice-cream industry workers	0.03%	756.72
45.1	Min	0.00%	308.66
45.2	Max	0.00%	1539.50
46	Glue industry workers	0.00%	727.38
47	Military	0.74%	700
48	Smiths and smelters	0.29%	664
49	Tiler makers	0.02%	664
50	Shredders of cotton and other fibers	0.03%	647.31
50.1	Min	0.00%	23.53
50.2	Max	0.08%	815.02
51	Air transport carriers	0.00%	645
52	Hair combs and buttons makers	0.00%	621.63
53	Upholsterers	0.00%	620.91
53.1	Min	0.00%	555.26
53.2	Max	0.00%	992.86
54	Canned food industry workers	0.00%	619.31
54.1	Min	0.00%	157.88
54.2	Max	0.00%	674.13
55	Entertainment industry workers	0.01%	617
55.1	Min	0.00%	369.52
55.2	Max	0.00%	704.13
56	Dry cleaning workers	0.12%	602.94
57	Boudoir workers	0.17%	602.94
57.1	Min	0.00%	239.93
57.2	Max	0.00%	744.27
58	Policemen and firefighters	0.10%	600
59	Flours, starches, pastes and starches workers	0.03%	597.88
59.1	Min	0.00%	165.42
59.2	Max	0.00%	1275.67
60	Yarns, fabrics and prints workers	0.53%	579.84
60.1	Min	0.00%	207.91
60.2	Max	0.00%	847.52
61	Tanners and taxidermists	0.10%	577.02
61.1	Min	0.00%	136.40
61.2	Max	0.01%	968.13
62	Hosiery, stockings, shirts workers	0.01%	574.14
62.1	Min	0.00%	314.42
62.2	Max	0.03%	670.81
63	Dairy industry workers	0.02%	565.91
63.1	Min	0.00%	534.48
63.2	Max	0.00%	744



	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican pesos of 1930)</b>
64	Shoemakers	0.42%	546.05
64.1	Min	0.00%	104.75
64.2	Max	0.03%	902.36
65	Manufacture of cardboard and cardboard artifacts workers	0.00%	544.64
65.1	Min	0.00%	336.54
65.2	Max	0.00%	607.68
66	Manufacturing of construction materials workers	0.08%	542.87
66.1	Min	0.00%	123.16
66.2	Max	0.00%	756.56
67	Trimmings and galleries workers	0.00%	531.09
67.1	Min	0.00%	474.93
67.2	Max	0.00%	646.02
68	Paints, varnishes and inks workers	0.00%	527.72
68.1	Min	0.00%	364.37
68.2	Max	0.00%	600.90
69	Servants	1.80%	527
70	Clothing, hats and clothing for women makers	0.44%	507.54
71	Postmen, telegraphists and telephone operators	0.02%	500
72	Sweets, chocolate and syrups workers	0.01%	499.36
72.1	Min	0.00%	91.25
72.2	Max	0.01%	675.10
73	Peasants	17.20%	496.4
74	Carpenters	0.40%	496.23
74.1	Min	0.00%	93.20
74.2	Max	0.01%	766.20
75	Yarns, fabrics and twists of hard fibers workers	0.14%	486.88
75.1	Min	0.00%	49.92
75.2	Max	0.01%	715.46
76	Sellers	1.61%	467.2
77	Butchers	0.08%	465.18
77.1	Min	0.00%	295.30
77.2	Max	0.00%	618.20
78	Sea transport carriers	0.04%	465
79	Jewelry makers	0.02%	464.94
79.1	Min	0.00%	26.10
79.2	Max	0.00%	622.11
80	Furniture makers	0.02%	452.96
80.1	Min	0.00%	125
80.2	Max	0.00%	703.83

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican pesos of 1930)</b>
81	Service sector employees (hotels, restaurants)	0.02%	450
82	Other industries	-0.00%	436.05
82.1	Min	0.00%	81.01
82.2	Max	0.00%	754.48
83	Saddlers	0.04%	434.4
83.1	Min	0.00%	79.91
83.2	Max	0.00%	767.06
84	Vehicle manufacturing workers	0.02%	425.71
84.1	Min	0.00%	73.16
84.2	Max	0.00%	987.17
85	Domestic workers	31.56%	421.6
86	Hunters and fishers	0.04%	420
87	Tonic makers	0.02%	413.92
87.1	Min	0.00%	54.34
87.2	Max	0.00%	486.9
88	Occupations not sufficiently specified	1.25%	407
89	Clothing and hats for men (excluding palm hats) makers	0.13%	406.34
89.1	Min	0.00%	141.92
89.2	Max	0.00%	549.93
90	Brooches, brushes, brooms, sieves makers	0.00%	391.75
90.1	Min	0.00%	385.07
90.2	Max	0.00%	398.63
91	Attendants	0.10%	387
92	Oils and greases for industrial use makers	0.00%	382.76
92.1	Min	0.00%	253.34
92.2	Max	0.00%	527.95
93	Manufacture and repair of scientific and precision apparatus workers	0.00%	317.14
94	Dough, tamales, tortillas and atole makers	0.07%	313.93
94.1	Min	0.00%	126.98
94.2	Max	0.01%	656.57
95	Ejidatarios (peasants with communal property rights)	3.24%	308.57
96	Explosives, gunpowder, pyrotechnics or rocketry makers	0.02%	304.66
96.1	Min	0.00%	113.25
96.2	Max	0.00%	448.52
97	Potters	0.09%	255.04
97.1	Min	0.00%	22.47
97.2	Max	0.00%	819.89

	<b>Occupational Group</b>	<b>Population Share</b>	<b>Income 1930 (Mexican pesos of 1930)</b>
98	Manufacture and repair of musical instruments	0.00%	143.89
98.1	Min	0.00%	140.83
98.2	Max	0.00%	150
99	Manufacture of art objects.	0.00%	125.21
99.1	Min	0.00%	80.35
99.2	Max	0.00%	160.75
100	Sugar, alcohol and brown sugar or brown sugar	0.33%	122.03
100.1	Min	0.00%	27.90
100.2	Max	0.00%	342.33
101	People without occupation	36.35%	108.33

After introducing the regional variations within each category to approximate the maximum level of within group inequality we get a Gini Index that moves between a minimum level of 0.3097 and a maximum level of 0.5053. Both numbers within a reasonable margin from our preferred estimates. This exercise can be seen as a robustness check on our 1930 estimates, also increasing our confidence in the rest of the results.

<b>Table 9: Comparison 1930 (Table 3) vs 1930 (Table 8)</b>		
	<b>1930 (Table 3)</b>	<b>1930 within inequality (Table 8)</b>
<b>Min</b>	0.3112	<b>0.3097</b>
<b>Max</b>	0.4516	<b>0.5053</b>
<b>Average*</b>	0.3814	<b>0.4075</b>

*Source: Author's own calculation*

# Appendix C: Code and Data

All data is available upon request and will be released after publication. The Inequality measures and the Lorenz curves of this work were calculated employing the R Studio software package with the ineq library, the code for the data workflow is the following:

## **#Load libraries.**

```
library(pacman)
p_load(forcats, ggthemes, scales, tidyverse)
library(ineq)
```

## **#Load the datasets for each year.**

```
x1895 <- ST1895full$income1895
x1895WWO <- ST1895WWO$income1895
x1910 <- ST1910full$income1910
x1910WWO <- ST1910WWO$income1910
x1930 <- ST1930full$income1930
x1930WWO <- ST1930WWO$income1930in1990usd
x1940 <- ST1940full$income1940
x1940WWO <- ST1940WWO$income1940
```

## **#Create population weights.**

```
w1895 <- ST1895full$nshare1895
w1895WWO <- ST1895WWO$nshare1895
w1910 <- ST1910full$nshare1910
w1910WWO <- ST1910WWO$nshare1910
w1930 <- ST1930full$nshare1930
w1930WWO <- ST1930WWO$nshare1930
w1940 <- ST1940full$nshare1940
```

```
w1940WWO <- ST1940WWO$share1940
```

### **#Gini Index estimation.**

```
weighted.gini(x1895,w1895)
```

```
weighted.gini(x1895WWO,w1895WWO)
```

```
weighted.gini(x1910,w1910)
```

```
weighted.gini(x1910WWO,w1910WWO)
```

```
weighted.gini(x1930,w1930)
```

```
weighted.gini(x1930WWO,w1930WWO)
```

```
weighted.gini(x1940,w1940)
```

```
weighted.gini(x1940WWO,w1940WWO)
```

### **#Figure 2 code**

```
Lc.max <- Lc.mehran(x1895,w1895)
```

```
Lc.max2 <- Lc.mehran(x1910,w1910)
```

```
Lc.max3 <- Lc.mehran(x1895WWO,w1895WWO)
```

```
Lc.max4 <- Lc.mehran(x1910WWO,w1910WWO)
```

```
plot(Lc.max,col = 8, lty = "twodash", lwd = 4, pch = 1:25,
```

```
  main = "",
```

```
  xlab = "Cumulative population", ylab = "Cumulative income")
```

```
lines(Lc.max2, col = 1, lty = "dashed", lwd = 4, pch = 1:25)
```

```
legend("topleft", bg= "transparent", inset = c(.01, .0001), legend=c("1895 max,Gini = .48",  
"1895 min Gini = .32", "1910 max Gini = .61", "1910 min Gini = 0.45"),
```

```
  col=c("gray", "red", "blue", "black"), lty=6:4, cex=.58,text.font=2,box.lty=0, box.lwd=2)
```

```
mtext("", side = 1, line = 4, outer = FALSE, at = NA,
```

```
  adj = 0, padj = NA, cex = 0.75, col = "black", font = NA)
```

```
lines(Lc.max3, col = 2, lty = "dotted", lwd = 4, pch = 1.25)
```

```
lines(Lc.max4, col = 4, lty = "dotdash", lwd = 4, pch = 1.25)
```

### **#Figure 3 code.**

```
Lc.max <- Lc.mehran(x1895,w1895)
Lc.max3 <- Lc.mehran(x1895WWO,w1895WWO)
plot(Lc.max,col = 8, lty = "twodash", lwd = 4, pch = 1:25,
     main = "",
     xlab = "Cumulative population", ylab = "Cumulative income")
lines(Lc.max3, col =1, lty = "dashed", lwd = 4, pch = 1:25)
legend("topleft",bg= "transparent",inset=.01, legend=c("1895 max,Gini = .48", "1895 min
Gini = .32"),
     col=c("gray","black"), lty=6:4, cex=.58,text.font=2,box.lty=0, box.lwd=2)
mtext("", side = 1, line = 4, outer = FALSE, at = NA,
     adj = 0, padj = NA, cex =0.75, col = "black", font = NA)
```

### **#Figure 4 code.**

```
Lc.max2 <- Lc.mehran(x1910,w1910)
Lc.max4 <- Lc.mehran(x1910WWO,w1910WWO)
plot(Lc.max2,col = 8, lty = "twodash", lwd = 4, pch = 1:25,
     main = "",
     xlab = "Cumulative population", ylab = "Cumulative income")
lines(Lc.max4, col =1, lty = "dashed", lwd = 4, pch = 1:25)
legend("topleft",bg= "transparent",inset=.01, legend=c("1910 max Gini = .61", "1910 min
Gini = 0.45"),
     col=c("black", "gray"), lty=6:4, cex=.58,text.font=2,box.lty=0, box.lwd=2)
mtext("", side = 1, line = 4, outer = FALSE, at = NA,
     adj = 0, padj = NA, cex =0.75, col = "black", font = NA)
```

### #Figure 6 code.

```
Lc.max <- Lc.mehran(x1930,w1930)
Lc.max2 <- Lc.mehran(x1940,w1940)
Lc.max3 <- Lc.mehran(x1930WWO,w1930WWO)
Lc.max4 <- Lc.mehran(x1940WWO,w1940WWO)
plot(Lc.max,col = 8, lty = "twodash", lwd = 4, pch = 1:25,
     main = "",
     xlab = "Cumulative population", ylab = "Cumulative income")
lines(Lc.max2, col =4, lty = "dashed", lwd = 4, pch = 1:25)
legend("topleft",bg= "transparent",inset=.0001, legend=c("1930 max,Gini = .45", "1930 min
Gini = .31", "1940 max Gini = .52", "1940 min Gini = 0.41"),
     col=c("gray", "red", "blue", "black"), lty=6:4, cex=.58,text.font=2,box.lty=0, box.lwd=2)
mtext("", side = 1, line = 4, outer = FALSE, at = NA,
     adj = 0, padj = NA, cex =0.75, col = "black", font = NA)
lines(Lc.max3, col = 2, lty = "dotted", lwd = 4, pch = 1.25)
lines(Lc.max4, col = 1, lty = "dotdash", lwd = 4, pch = 1.25)
```

### #Figure 7 code.

```
Lc.max <- Lc.mehran(x1930,w1930)
Lc.max3 <- Lc.mehran(x1930WWO,w1930WWO)
plot(Lc.max,col = 8, lty = "twodash", lwd = 4, pch = 1:25,
     main = "",
     xlab = "Cumulative population", ylab = "Cumulative income")
lines(Lc.max3, col =1, lty = "dashed", lwd = 4, pch = 1:25)
legend("topleft",inset=.01, legend=c("1930 max,Gini = .45", "1930 min Gini = .31"),
     col=c("gray","black"), lty=6:4, cex=.58,text.font=2,box.lty=0, box.lwd=2)
mtext("", side = 1, line = 4, outer = FALSE, at = NA,
     adj = 0, padj = NA, cex =0.75, col = "black", font = NA)
```

**#Figure 8 code.**

```
Lc.max <- Lc.mehran(x1940,w1940)
Lc.max3 <- Lc.mehran(x1940WWO,w1940WWO)
plot(Lc.max,col = 8, lty = "twodash", lwd = 4, pch = 1:25,
     main = "",
     xlab = "Cumulative population", ylab = "Cumulative income")
lines(Lc.max3, col =1, lty = "dashed", lwd = 4, pch = 1:25)
legend("topleft",inset=.01, legend=c("1940 max,Gini = .52", "1940 min Gini = .41"),
     col=c("gray","black"), lty=6:4, cex=.58,text.font=2,box.lty=0, box.lwd=2)
mtext("", side = 1, line = 4, outer = FALSE, at = NA,
     adj = 0, padj = NA, cex =0.75, col = "black", font = NA)
```