

Political Reform and Educational Outcomes: Impact of the Secret Ballot in Chile*

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Abstract

This paper analyzes the impact of loss in political power of ruling elites on educational outcomes. We use the introduction of the secret suffrage in 1958 in Chile as a quasi-experiment and information from 5 population censuses. Our hypothesis is that land-owners' loss of suffrage control of their workers would have generated incentives for improving prospects for rural families, in particular access to public goods, such as education. Our findings are consistent with this idea and we find that the introduction of the secret ballot increased literacy rates of the provinces ex-ante supposed to be more affected by this change – those with higher proportion of tenants in the agricultural labor force. This result is robust to some alternative explanations, such as the structural change in the economy and the availability of public resources associated with positive terms of trade shocks. Our preliminary results are not conclusive about the mechanism and additional work needs to be done on collecting more and better information about public schools, teachers' availability, and coverage.

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1. Introduction

One of the most debated and interesting issues in economic development is the large difference in income per capita across nations, and even across regions within a country. There are diverse hypotheses for these differences, some of them associated with the direct impact of geography and institutions and others related with macroeconomic policies, such as trade openness and financial integration.

The seminal papers by Acemoglu, Johnson and Robinson (2001) and Sokoloff and Engerman (2000) have stimulated a broad research agenda for understanding the impact of institutions on economic development. In this context, it has been argued that initial inequality – due for example to factor endowments - would be harmful for economic growth. This is because inequalities in the political and economic power generate “extractive” institutions that do not incentivize capital accumulation and technological innovation. Moreover, institutions tend to be persistent and, for this reason, initial inequalities – like those originated from colonial times - affect current economic performance.

Engerman and Sokoloff (2012) have explored how several institutions were evolving in the new world and suggest that differences in factor endowments among the colonies explain how different institutions, such as education, suffrage, taxation, immigration policies, among others, were established and changing overtime. One

interesting research question is how institutions evolve and what are the mechanisms through which institutions affect economic growth. In particular, how changes in political power may have an effect on institutions and policies.

Related to this literature, Baland and Robinson (2008) have shown that the introduction in 1958 of secret suffrage in Chile had as a consequence a fall in the proportion of right-wing votes in rural areas, weakening the political power of land owners. In the same context, Baland and Robinson (2012) analyze some of the economic consequences of this change, finding that it had relevant changes in labor composition and it caused a reduction in land prices¹. This is compatible with the idea that, once landlords lost their ability to politically control the *inquilinos* (tenants), the advantages of keeping them and their families within the farm were substantially reduced.

However, little is known of whether this reform had an impact on institutions and policies. If, as expected from redistribution of political power, some institutional changes were implemented, then they would have favored those with initially less political power. In particular, we look at educational outcomes. Education is relevant in this context at least for two reasons. First, keeping workers within farms implied also that their children were workers in the *Hacienda*. There is wide evidence that

¹ According to Baland and Robinson (2012), the share of tenants in agricultural labor force declined from 12.4% (1955) to 7.6% (1965).

school attendance was historically very low in rural areas. Second, most of the government authorities had no incentive to offer high-quality public goods because they were not challenged by competitors, apart from politicians of the same coalition.

This paper looks at the impact of a loss in political power on educational outcomes, using the introduction of the secret suffrage in 1958 as a quasi-experimental setting. Our hypothesis is that land-owners' loss of political power would have generated incentives for improving prospects of rural families, in particular access to education.

In this case, and similar to Baland and Robinson (2008) and (2012), we exploit differences in provinces exposure to the suffrage law. We expect that, after the Law and due to it, provinces with a higher proportion of tenants increased educational attainment in comparison with other less exposed provinces. The question is interesting because, even though Baland and Robinson (2008, 2012) show that right-wing parties lost votes, there is no evidence that these induced changes played in favor of excluded households. In fact, losing political power does not necessarily imply a loss of seats in Congress or relevant democratization. Moreover, as Correa (2005) has shown, the right lost votes and representation in Parliament and Government, but kept a great deal of power during the XX century.

We contribute to the literature in two main dimensions. First, we show novel evidence of how changes in political power can have important effects on excluded segments of the population. Second, we try to illustrate the mechanisms and consequences of these changes. In particular, we look at how this change was associated with higher public schools and teacher's availability, and other education related variables. Also, by exploiting this exogenous variation in education, this can be a first step in looking at the impact of education on Chilean long-run economic growth.

Our research relates to various strands of the literature. First, it relates to the literature analyzing the link between voting rules and the extent of clientelism (see Baland and Robinson, 2012 for a review of articles). Second, our paper is also related to the literature analyzing how changes in voting rules can have an impact on policy outcomes. These changes range from extending the voting franchise to previously excluded groups (Husted and Kenny, 1997; Lott and Kenny, 1999; Miller, 2008), mandatory voting (Hoffman, León and Lombardi, 2017; Bechtel, Hangartner and Schmid, 2016; Fowler, 2013), and electronic voting (Fujiwara, 2015).

Our findings indicate that the introduction of secret ballot increased literacy rates of the provinces ex-ante supposed to be more affected by this change – those with higher proportion of *inquilinos* in the agricultural labor force. This result is robust to some alternative explanation such as structural change and availability of resources

coming from positive terms of trade shocks. Our preliminary results are not conclusive about the mechanism, but more work needs to be done on collecting more and better information about public schools, teachers' availability, and coverage.

The paper is structured as follows. In the second section, we describe the data and we show the main stylized facts on historical educational outcomes in Chile. The third section presents the differences in differences methodology. The fourth section shows the econometric results. The fifth section presents a preliminary assessment on the potential mechanisms. The sixth section concludes.

2. Data

We use information at province level of literacy rates and other education variables coming from censuses and Annual Statistical provided by the National Institute of Statistics. The data for national census comprise years before and after the introduction of secret suffrage, i.e., 1940, 1952, 1960, 1970 and 1982. We complement these data with information about the share of tenants in each province from Baland and Robinson (2008).

The historical data shows a positive evolution of schooling indicators in Chile. Figure 1, 2, 3 present the evolution of enrollment coverage, years of schooling and literacy rate from 1900 to 1990. These indicators, except for tertiary education, show

an increase of average educational attainment in Chile. In terms of literacy rates, in 1990 this was about 40%, reaching more than 80% in 1950 and more than 90% in 1990.

As highlighted by Engerman and Sokoloff (2012) looking at the historical evolution of schooling in the Americas, "Chile had one of the best records of Latin America societies in promoting primary education and attaining high rates of literacy". According to them, primary schooling expansion received higher priority in the middle of XIX century, especially between 1845 and 1860 where the share of national budgets' allocation increased from 11% to 31%. However, this increase was not equally distributed across regions. Engerman and Sokoloff (2012) indicate that literacy was higher in large cities or in provinces receiving benefits of revenues coming from the export of nitrates.

In this paper, we focus on the evolution of educational outcomes across provinces according to the proportion of tenants before the suffrage law. As it can be seen from Figure 4, there are significant differences in this variable across provinces. The minimum is lower than 1% and the maximum is over 18%.

The disparities and the evolution overtime are presented in Figure 5, splitting the sample in high and low share of tenants using the median and the 75th percentile

(median is 10.7%, and third quartile is 14.3%), respectively². The provinces with low proportion of *inquilinos* in the agricultural labor force start with higher literacy rates, but there are relevant changes overtime. First, the previous evolution to the change in the suffrage law for both groups of provinces looks similar, indicating that differences in pre-trends would not be a serious concern. Second, after the suffrage law, it can be appreciated that the more exposed provinces have tended to close the gap with the other group. In 1982, both groups of provinces had similar literacy rates. The question that we address formally in the next section is whether this convergence may be attributable to changes in the suffrage law.

3. Empirical Model

To address the question about how suffrage law affected educational outcomes, we estimate a differences-in-differences model as follows:

$$Y_{pt} = \alpha_p + \alpha_t + \delta Inq_p DPost_t + \varepsilon_{pt}$$

Where Y is education achievement, measured as literacy, and p denotes province and t corresponds to census years. Inq is the exposure to the change in the Suffrage Law in 1958 and it is calculated as the proportion of *inquilinos* in the agricultural labor force, DPost is a dummy variable for the year after the change in the suffrage law. The expected value of δ is positive, indicating that after the reform there is

² In both figures, the group median is shown.

relative increase in literacy rate for provinces where the proportion of *inquilinos* was larger. The set of provinces and year fixed effects - α_p y α_t , respectively, control for any time-invariant characteristics of the provinces and for common shocks over time.

We measured *Ing* in year 1955 – previous to the reform - as a continuous variables. We also estimate using a dummy for each census year. First, doing that, we can evaluate the timing of changes in literacy rates. This is very relevant because it would be strange to observe changes in literacy rates immediately. Second, the time dummy variables for the pre-reform period can help to elucidate one the concerns with this methodology, which is that there may be other reasons why literacy was increasing before the reform in provinces with higher proportion of *inquilinos* in the labor force. This may be attributable to general government policies aimed to increases schooling in laggard or rural localities.

4. Results

The basic regressions are presented in Table 1 and indicate that literacy rates increases relatively more for the exposed provinces after the introduction of secret ballot. In the first column, we only introduce the interaction for year post law and the proportion of tenants. The parameter is positive and statistically significant. However

the impact is quite small. For a province in the third quartile of the *inquilinos* variable compared with one in the third, the differential effect is 0.51 percentage points³.

In the other two columns we look at the impact over time by introducing year dummy variables interacted with the exposure variable. It can be inferred, first, that since the interactions between census years and the exposure variable before the reform are not significant, previous trends would be similar. Second, the impact on literacy rates, as expected, increases over time. It is mostly significant in 1970 and 1982. Indeed, the interaction between *inquilinos* share and the year 1982 is higher than the same interaction for the year 1970. We reject the null hypotheses that both coefficients are equal (p-value of 0.086 in column 2 and p-value of 0.08 in column 3).

We check the robustness of our results to changes in the productive structure of the Chilean economy and also to changes in terms of trade. As we show in Figure 6, during this period there was a reduction in the relative importance of agriculture and mining in GDP, and the manufacturing industry was gaining participation in the economy. This can have important implications for human capital accumulation and it could have differential effects on provinces. To look at this potential impact, we introduce an interaction term between sectorial growth and a dummy for provinces with the share of *inquilinos* higher than the median.

³ This computed as $0.208 \times [0.143 - 0.067]$

The introduction of changes in terms of trade is motivated by the idea that positive windfalls from increases in commodity prices could be used to finance education investments, especially in more laggard locations. Engerman and Sokoloff (2012) indicate that positive terms of trade shocks can be one of the explanations for the positive evolution of schooling in Chile compared with other countries in Latin America. During this period, there are several episodes of large and persistent changes in terms of trade (Figure 7). Thus, we introduce interaction terms between terms of trade and the *inquilinos* dummy. Specifically, for looking the lagged impact of terms of trade (TOT) shocks, we calculate the 10 and 20 years average difference with the average TOT in the period 1920-1982. This is done to capture deviations from long-run trend.

The results are presented in Tables 2 and 3, for the specifications in columns 1 and 3 of Table 1, respectively. It can be appreciated in Table 2 that inclusion of sector growth and terms of trade do not affect the significance of our main interest variable. Even controlling for the differential impact of structural change and external shocks, we find that provinces with higher presence of *inquilinos* increase literacy rates relative to provinces with lower importance of these agricultural workers. In the last two specifications, including all the control variables, the results indicate that agriculture growth is associated with lower literacy rates in provinces with above the median *inquilinos* rate. In contrast, manufacturing and mining growth are associated

with higher literacy rates in those provinces. Finally, we find that either previous 10 or 20 years of TOT evolution, the impact is negative for provinces with high rate of inquilinos. This indicates that bonanza periods do not favor disproportionately these provinces. As Engerman and Sokoloff (2012) suggest, this could have affected to mining provinces or main cities.

In Table 3, we show the specification where the ex-post effect is identified for each year. Again, even the significance is slightly reduced, the evidence holds to show that provinces with higher rates of inquilinos increased literacy rates overtime relative to other provinces. As in our basic regressions, the positive effect tend to increase over time and is larger in 1982. In fact, the null hypothesis of equal coefficient is rejected at standard levels of significance (p-value about 0.67 in columns 4 and 5).

5. Mechanisms

In this section, even though the data available is more limited, we try to illustrate the mechanism. Following the secret ballot, right congressmen linked to Haciendas lost political control over workers, then they would need to respond with more attractive policies to capture these votes. In our case, we argue that this would have induced more resources to public goods, in particular to education. Then, we test whether or not there was an increase in public schools, teachers, and other related variables such as coverage and attendance.

In Table 4, we look at the impact of the law on primary and secondary public schools per the corresponding number of potential students, and professor per potential students. We do not find a significant increase in these measures of public school provision. In Tables 5 and 6, we show the results for variables related with primary and secondary coverage and attendance for women and men. Our findings indicate that there was an increase in primary attendance and primary coverage (both for men and women), but the effect is not significant. However, the limited coverage of years impedes a better estimation of these effects.

6. Conclusions

A relatively recent empirical research agenda has shown that institutions are important for economic development. In this context, it has been argued institutions tend to be persistent and, for this reason, initial inequalities – like those originated from colonial times - affect current economic performance. However, institutions change over time and may have relevant economic effects.

In this we have investigated the impact of the introduction of the secret suffrage in 1958 in Chile as a quasi-experimental setting. The associated loss in political power of ruling elites is expected to affect the provision of public goods, such as educational. Using information from 5 population censuses, we have analyzed the hypothesis that land-owners' loss of suffrage control of their workers would have

generated incentives for improving prospects for rural families, in particular access to education.

Our findings are consistent with this idea and we show that the introduction of the secret ballot increased literacy rates of the provinces ex-ante supposed to be more affected by this change – those with higher proportion of tenants in the agricultural labor force. This result is robust to some alternative explanations such as structural change and availability of resources coming from positive terms of trade shocks. In contrast, our preliminary results are not conclusive about the mechanisms. We think that more work needs to be done on collecting more and better information about public schools, teachers' availability, and coverage.

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Figure 1
 Enrollment Coverage: 1900-1990
 (percentage)

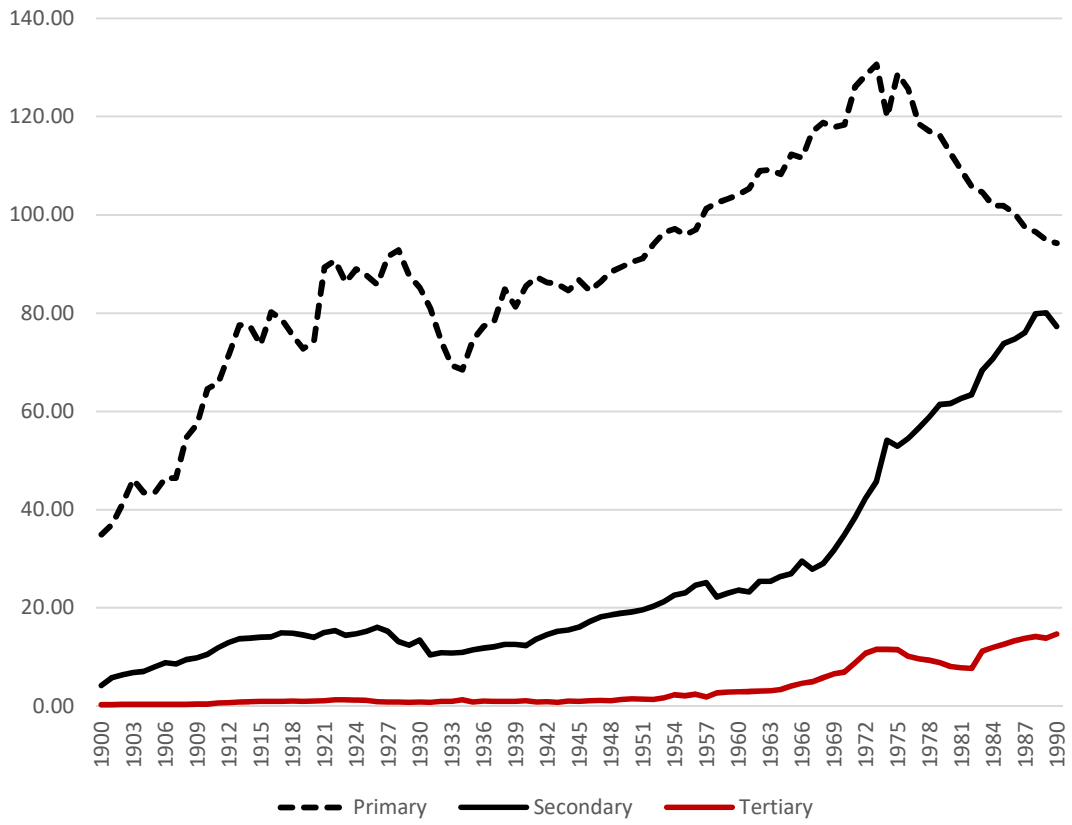


Figure 2
Years of Schooling: 1900-1990

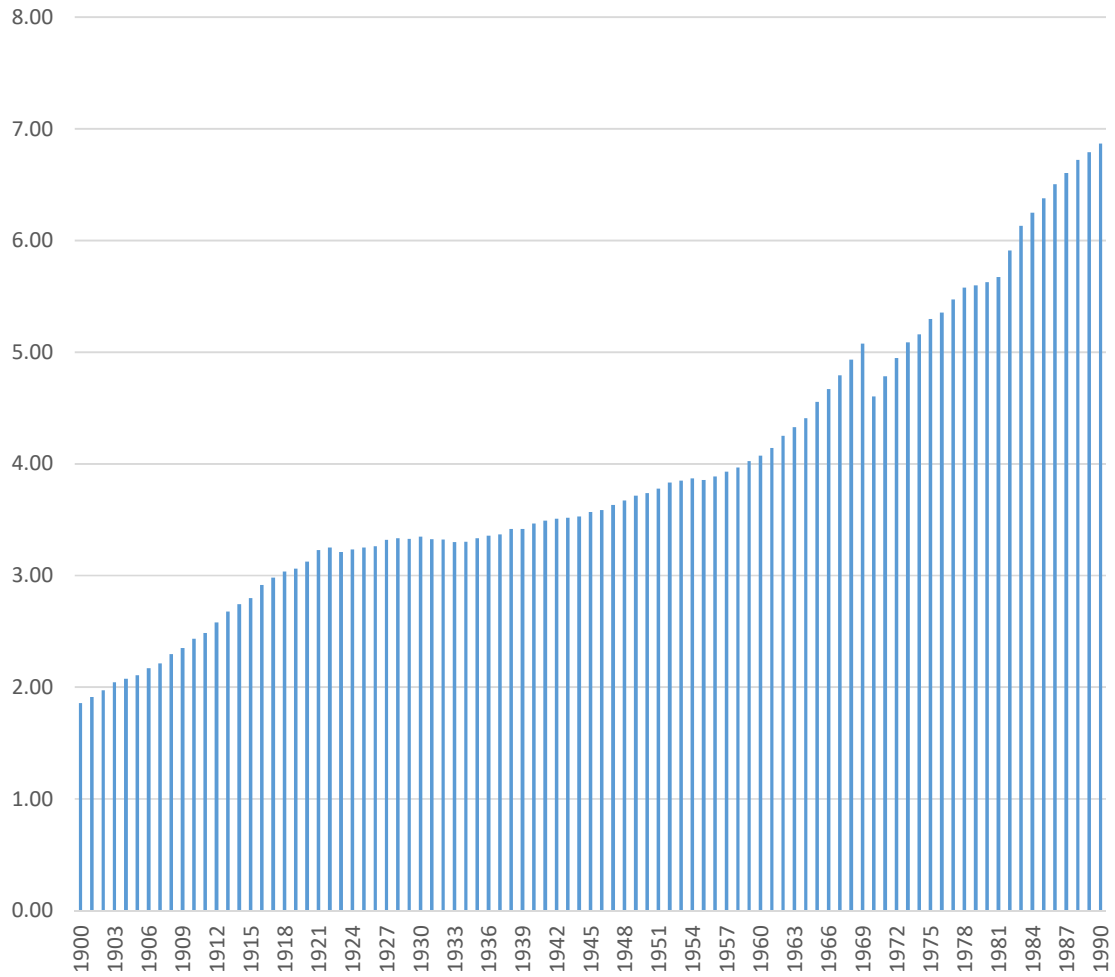


Figure 3
Literacy Rates: 1900-1990
(population ages 15 and above)

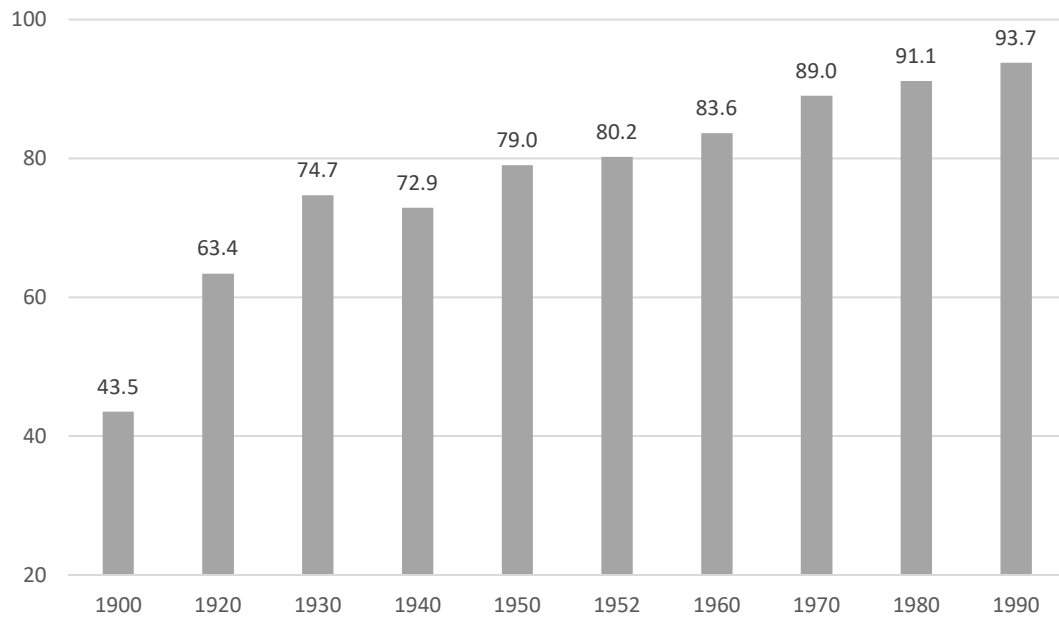


Figure 4

Distribution of Exposure Variable

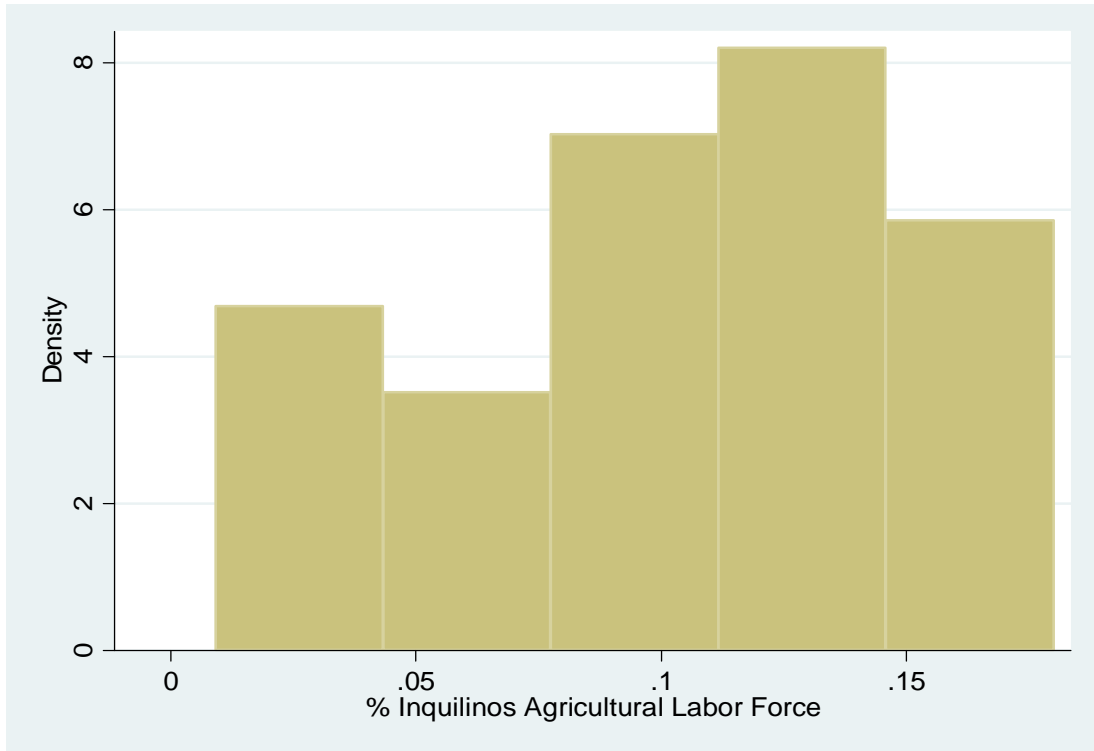


Figure 5

Literacy Rates Evolution between Groups

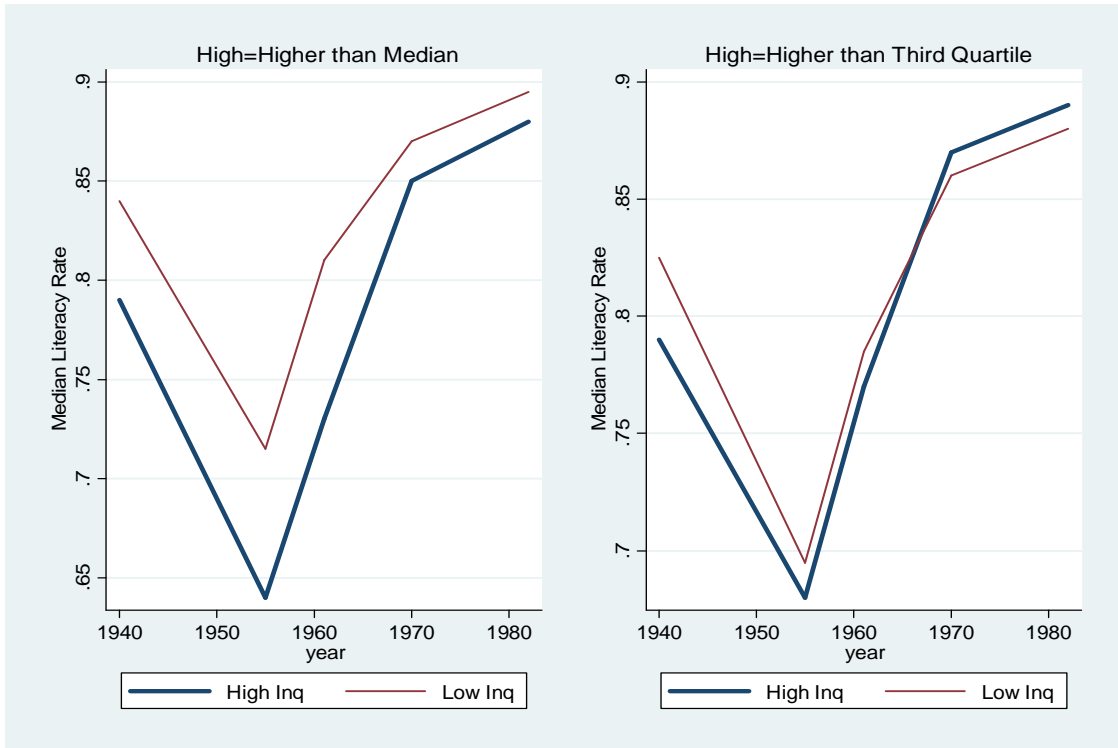


Figure 6

GDP Participation of Selected Sectors, 1940-1982

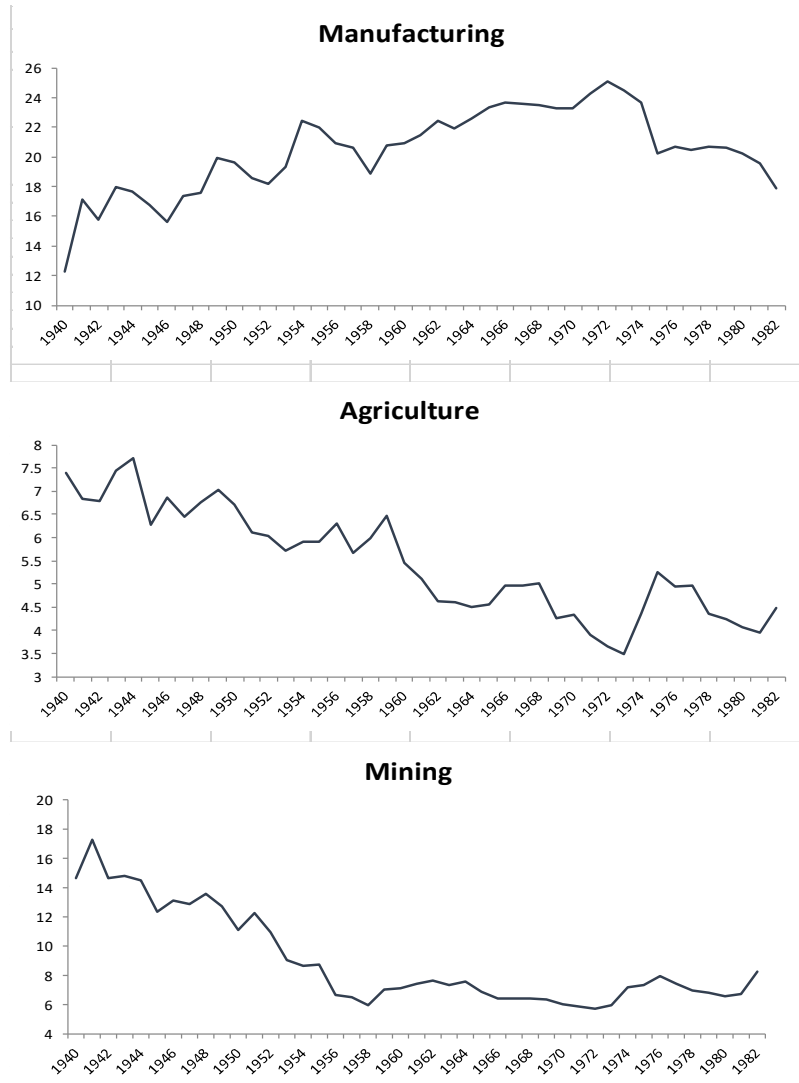


Figure 7

Terms of Trade Evolution: 1920-1982

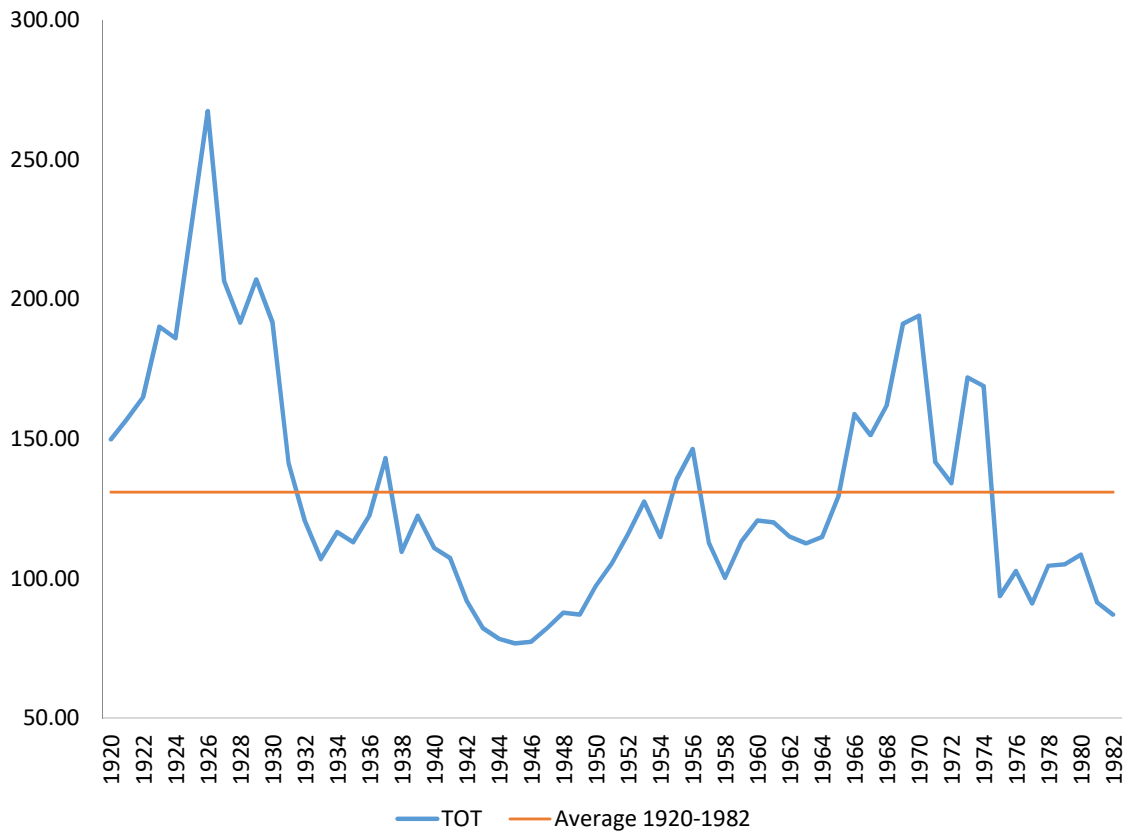


Table 1

Literacy Rates

	(1) Literacy	(2) Literacy	(3) Literacy
After*Inquilinos Share 55	0.208 (2.68)*	- -	- -
1955*Inquilinos Share 55	-	-0.225 (0.84)	-
1961*Inquilinos Share 55	-	-0.158 (0.80)	-0.046 (0.62)
1970*Inquilinos Share 55	-	0.172 (1.38)	0.284 (2.26)*
1982*Inquilinos Share 55	-	0.271 (2.92)**	0.384 (2.64)*
Constant	0.820 (136.55)**	0.825 (104.24)**	0.820 (135.10)**
Observations	125	125	125
R-squared	0.94	0.95	0.95

t statistics in parentheses. Standard errors clustered at province level. * significant at 5%; ** significant at 1%. Province and year fixed effects included.

Table 2

Literacy Rates, with control variables

	(1)	(2)	(3)	(4)	(5)
After*Inquilinos Share 55	0.196 (2.46)*	0.171 (2.09)*	0.184 (2.22)*	0.349 (2.92)**	0.349 (2.92)**
Agr. Growth * DInq 55	0.002 (0.47)	-0.000 (0.05)	-0.010 (0.71)	-0.062 (2.49)*	-0.083 (2.60)*
Manuf. Growth * DInq 55		-0.002 (0.89)	0.001 (1.02)	0.017 (2.77)*	0.056 (2.68)*
Mining Growth *DInq 55			0.009 (1.17)	0.043 (2.96)**	0.091 (2.88)**
DTot10*DInq55				-0.005 (2.62)*	
DTot20*DInq55					-0.018 (2.62)*
Constant	0.817 (89.37)**	0.830 (43.36)**	0.820 (57.07)**	0.802 (50.47)**	0.569 (5.84)**
Observations	125	125	125	125	125
R-squared	0.94	0.94	0.94	0.95	0.95

t statistics in parentheses. Standard errors clustered at province level. * significant at 5%; ** significant at 1%. Province and year fixed effects included.

Table 3
Literacy Rates, Year Effect with control variables

	(1)	(2)	(3)	(4)	(5)
1960*Inquilinos Share 55	-0.054 (0.66)	-0.053 (0.61)	-0.075 (0.70)	0.050 (0.45)	0.050 (0.45)
1970*Inquilinos Share 55	0.331 (2.16)*	0.330 (2.13)*	0.348 (1.98)	0.476 (2.51)*	0.476 (2.51)*
1982*Inquilinos Share 55	0.456 (2.21)*	0.463 (1.92)	0.464 (1.90)	0.521 (2.10)*	0.521 (2.10)*
Agr. Growth * DInq 55	-0.008 (0.85)	-0.008 (0.75)	-0.006 (0.49)	-0.044 (2.08)*	-0.058 (2.20)*
Manuf. Growth * DInq 55		0.000 (0.05)	-0.001 (0.48)	0.010 (2.21)*	0.038 (2.21)*
Mining Growth *DInq 55			-0.002 (0.21)	0.023 (1.92)	0.056 (2.22)*
DTot10*DInq55				-0.003 (2.20)*	
DTot20*DInq55					-0.013 (2.20)*
Constant	0.830 (69.15)**	0.829 (35.21)**	0.832 (54.56)**	0.822 (52.91)**	0.657 (8.24)**
Observations	125	125	125	125	125
R-squared	0.95	0.95	0.95	0.95	0.95

t statistics in parentheses. Standard errors clustered at province level. * significant at 5%;
** significant at 1%. Province and year fixed effects included.

Table 4
Public Schools and Teachers

	Primary Schools	Secondary schools	Primary Teachers
After*Inquilinos Share 55	-0.721 (0.36)	-1.878 (0.30)	-1.972 (0.21)
Constant	4.037 (37.23)**	10.225 (35.55)**	11.744 (24.14)**
Observations	100	100	75
R-squared	0.94	0.94	0.92

t statistics in parentheses. Standard errors clustered at province level. * significant at 5%; ** significant at 1%. Province and year fixed effects included.

Table 5

Coverage

	Primary	Primary men	Primary women	Secondary	Secondary men	Secondary women
After*Inquilinos Share 55	0.095 (0.38)	0.152 (0.56)	0.038 (0.15)	-0.135 (0.70)	-0.108 (0.90)	-0.045 (0.46)
Constant	0.426 (37.75)**	0.424 (36.59)**	0.426 (37.40)**	0.049 (13.24)**	0.050 (15.39)**	0.046 (9.97)**
Observations	100	100	100	100	100	100
R-squared	0.96	0.95	0.95	0.93	0.89	0.91

t statistics in parentheses. Standard errors clustered at province level. * significant at 5%; ** significant at 1%. Province and year fixed effects included.

Table 6
Attendance

	Primary	Primary men	Primary women	Secondary	Secondary men	Secondary women
After*Inquilinos Share 55	0.191 (0.66)	0.173 (0.56)	0.209 (0.75)	-0.123 (0.87)	-0.188 (1.05)	-0.056 (0.47)
Constant	0.359 (43.89)**	0.354 (41.84)**	0.363 (41.85)**	0.048 (14.92)**	0.050 (17.37)**	0.047 (12.14)**
Observations	100	100	100	100	100	100
R-squared	0.89	0.88	0.90	0.91	0.88	0.91

t statistics in parentheses. Standard errors clustered at province level. * significant at 5%; ** significant at 1%. Province and year fixed effects included.