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Essays in Development Economics

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Economics

by

Diana Flores-Peregrina

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ABSTRACT OF THE DISSERTATION

Essays in Development Economics

by

Diana Flores-Peregrina

Doctor of Philosophy in Economics

University of California, Los Angeles, 2024

Professor Martha Jane Bailey, Chair

This dissertation evaluates the effectiveness of public policies that aim to improve development. In the first chapter, I examine the impact of Progresa program on urban areas and children's health measures in Mexico. Using a differences-in-differences design by a locality's first year of enrollment and the children's age at first exposure to treatment, I estimate the effects of receiving one additional year of treatment during early adolescence. My findings corroborate the RCT's positive impacts on children's height but also underscore some unintended effects of the program on adolescent's health, such as an increase in the prevalence of overweight and obesity, particularly among girls.

The second chapter studies the effects of Progresa's cash transfer (CT) intervention on rural children's health outcomes in Mexico. I decompose these effects by conditionality, exploiting a discontinuity in the minimum eligible age for receiving the education CT component. Conditional on family structure and birth order, I estimate the average treatment effect on the treated (ATT) of receiving a higher CT during early childhood. My results show an increase of 0.13 SD in standardized height-by-age (z-scores) for children who received earlier the education CT –though not statistically significant. While my estimates are imprecise, their magnitude is consistent with previous literature evaluating the effects of Progresa on children's height.

The third chapter documents that municipalities in central Mexico closer in the past to an agricultural estate (hacienda) are associated with higher literacy and lower poverty throughout the 20th century than municipalities similar in other respects but farther away from a hacienda. The results are robust to various specifications, neighbor-matching analyses, and a placebo-type test. The complementarities between late-colonial haciendas in central Mexico and mining and trade appear to have set municipalities close to a hacienda on a distinct development path. The evidence points to local scale economies in hacienda locations that coordinated new investments away from agriculture and toward the latest industrial and commercial sectors. My findings highlight the role of landed estates as centers linking rural economic activity to the main colonial economic activities.

The dissertation of Diana Flores-Peregrina is approved.

Natalie Danielle Bau

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Rodrigo Ribeiro Antunes Pinto

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2024

To my family for supporting even my craziest dreams,

and to my friends, the family I chose for my life.

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Chapter 1

Health Outcomes and Cash Transfers: Evidence from Progresa in Urban Mexico

1. Introduction

In the late 1990s, Mexico launched Progresa, a conditional cash transfer (CCT) program widely known for its experimental design and rigorous evaluations. The randomized control trial (RCT) assigned 506 rural localities[1] into treatment and control groups, where eligible families in the treated group received all benefits earlier than eligible control families (Levy, 2006). Using this variation, researchers have found evidence of the positive impacts of Progresa on children's health outcomes, such as height, weight, and health status.[2] Afterwards, Progresa was scaled up nationally, assuming its effects could be extrapolated elsewhere. However, given the program was designed to compensate for the opportunity cost of child labor by increasing school attendance in rural areas, these findings might not be the best

[1]Mexico is composed of 32 states, which are divided into municipalities, and these into localities.
[2]See Parker and Todd (2017) for a literature review of Progresa's findings throughout the years.

guide for understanding Progresa's impacts in urban Mexico.

This paper provides novel causal estimates of Progresa's impacts on children's health anthropometric measures after its expansion to urban localities. I exploit the program roll-out in urban localities between 2000 and 2006 derived from a major political change in Mexico. Similar to Duflo (2001)'s work in Indonesia, I use a difference-in-differences design by a locality's first year of treatment and the children's age at first exposure to the intervention. I estimate the effects of receiving one additional year of Progresa during early adolescence on height, weight, and body mass index (BMI).

The data in this paper comes from two primary sources. First, I use administrative records on Progresa beneficiaries' enrollment by locality between 1999 and 2012. Second, I use the National Health and Nutrition Survey (ENSA 2000; ENSANUT 2006) to construct a repeated cross-section database by cohort of birth and locality of residence, which I link to Progresa's enrollment data. My sample includes individuals born between 1983 and 1989 who were eligible to receive the education cash transfer between 2000 and 2006.[3] Following previous studies on the effectiveness of nutrition interventions, and given the biological differences observed in the children's growth trajectories, I set 14 years old as the maximum age for an individual to be effectively exposed to Progresa. This way, my treatment corresponds to the years an individual was exposed to the intervention before age fourteen.

Using before and after treatment data, my DiD research design models the change in children's health trajectory –as they age– that can be causally attributed to the intervention. To do this, I focus the analysis on urban localities not treated by 2000 (before only 10% of urban localities were treated), and I estimate Progresa's intent-to-treat (ITT) effects for children living in the intervened localities. Then, using the take-up rate of the program observed in 2006, I calculate the local average treatment effect (LATE) among households in the lowest socioeconomic status (SES) tercile and compare my results to the treatment

[3]Unfortunately, the ENSA 2000 only has data on health biomarkers for children over ten years old, which restricts the implementation of a differences-in-differences strategy for younger cohorts.

effects found using the RCT sample.

My identification strategy relies on two main assumptions. First, the parallel trend (PT) evolution on average children's health outcomes between localities' treatment adoption groups for staggered settings. Unfortunately, before 2000, Mexico had no other disaggregated data on children's health metrics. Instead, I test this assumption using three different proxies for children's health outcomes: locality fertility rates (1990-2012) and infant and neonatal mortality rates (1998-2012). I implement an event study analysis (Callaway and Sant'Anna, 2021), where I do not find any pre-trends on fertility rates. Moreover, consistent with Barham (2011), I find neither significant effects of Progresa on infant mortality in urban areas nor neonatal mortality rates. A second assumption refers to no anticipatory effects. Given my period of interest, my design exploits the program roll-out derived from a major political change in Mexico, which is unlikely to have been anticipated. Still, if the treatment time is correlated with a locality's characteristics, my estimates would be biased if these characteristics also affect my main outcomes. Using multiple administrative data sources, I show that a locality's roll-out year is unrelated to geographic, demographic, and socioeconomic variables (this is not true for rural areas).[4]

I find that receiving Progresa before age 14 significantly increases urban children's height. My results show that boys gained 0.38 centimeters (cm) per year of treatment than their counterparts who did not receive the intervention by age fourteen. This corresponds to a 1.3% increase in their height after receiving five years of treatment, reaching up to a 2.1% increase for boys with low SES. In the case of girls, consistent with their growth period concluding earlier, I find positive but imprecise effects on height (0.16 cm per year of treatment). A rough translation of these intention-to-treat effects into local effects on the treated implies that receiving Progresa for one year during early adolescence (11 to 14 years old) increased boys' height between 1.9 to 2.3 cm and 1 cm for girls.

[4]From government documents, it is unclear the selection criteria for new entering localities –other than emphasizing marginality and adjacency to localities already enrolled (Progresa, 2000).

Further, I find positive and significant effects on weight for both sexes, an effect consistently larger for children in the lowest SES tercile. Urban children receiving Progresa before age fourteen gain around 0.6 kilograms (kg) more weight per year of treatment. These ITT effects represent an average local effect on the treated between 3.3 kg more weight per one more year of exposure to treatment. Nonetheless, the latter increases do not necessarily imply a positive impact of Progresa on children's health, as more weight could be correlated with higher rates of overweight and obesity. For example, recent literature has emphasized a higher risk of a simultaneous manifestation of undernutrition and overweight and obesity –also known as the double burden of malnutrition– among the urban poorest in low and middle-income countries (Popkin, Corvalan and Grummer-Strawn, 2020).

To deepen these dynamics, I perform the analysis using BMI ($^{kg}/_{m^2}$), and its standardized weight categories (i.e., underweight, overweight, obese). Two main results arise from this analysis. First, as expected, I find positive and significant effects of the intervention on children's BMI, though smaller and more imprecise for boys.[5] Second, while some weight gains are explained by a slight decrease in underweight prevalence (not statistically significant), the share of wasted children is relatively small in my sample. Instead, my findings point out a rising concern on the other side of the distribution. On average, the probability of being overweight and obese increases between 0.3 and 2.6 percentage points per year of exposure to treatment. These increments are consistently larger for both sexes in the lowest SES tercile, a 2.9 and 3.7 percentage points increase for boys and girls, respectively. These translate to a LATE of over ten percentage points increase in overweight and obesity prevalence per one more year of treatment.

The main contribution of this paper is to provide –to the best of my knowledge– the first causal estimates of Progresa's impact on health anthropometric measures of *urban* children. Shifting from the RCT's 18 months of exposure to treatment, I estimate the effects of receiv-

[5]This is likely explained by the fact that boys' weight gain is accompanied by an increase in their height, as opposed for girls who already stopped growing.

ing one more additional year of treatment over six years during early adolescence. Compared to the RCT effects on children's health, I find larger effects of Progresa on boys' height (twice as large) but very similar in magnitude for girls (Gertler, 2004; Fernald, Gertler and Neufeld, 2009, 2008). Two factors can explain this. First, for very disadvantaged populations, previous studies have shown that health and nutrition interventions during adolescence might still significantly affect children's height (Georgiadis and Penny, 2017; Leroy et al., 2014). Second, given urban areas have fewer food access issues, urban beneficiary households can spend more money on food consumption (MPC=0.80), which translates into a higher total amount of calories consumed (Angelucci and Attanasio, 2009). However, this increase in food consumption seems to have also brought some unintended health effects.

Similarly to Fernald, Gertler and Hou (2008), I find a positive and detrimental effect of Progresa on body mass index, but at younger ages. My findings show a significant increase in the prevalence of overweight and obesity, particularly worrisome among girls. Given the increasing availability of cheap ultra-processed food and beverages in urban areas (Popkin, Corvalan and Grummer-Strawn, 2020), it is likely that Progresa's money was used to buy non-healthy food, especially as beneficiary households did not have any restrictions on how to spend the money. This lack of conditionality from cash transfer programs has been discussed to increase BMI and obesity risk (Levasseur, 2019; Forde et al., 2012), posing new challenges to the design of CCT programs. Further research is needed to understand the dynamics between households' incentives to spend their CT on healthy food and the urban poor's disproportionate barriers to healthy food in low and middle-income countries (Vilar-Compte et al., 2021).

The paper proceeds as follows. Section 2. provides some background on Progresa. Section 3. explains the data and presents descriptive statistics of the sample. Section 4. details the identification strategy, and section 5. shows the results. Finally, section 6. compares my findings to those from the RCT and presents some concluding remarks, along with the paper's limitations and future research agenda.

2. Background

In 1997, following a major economic crisis, the Mexican government launched an innovative strategy to alleviate poverty: Progresa (Schooling, Health and Nutrition Program). It began as a pilot randomized control trial (RCT) in rural Mexico. The RCT selected 506 rural localities from seven states to participate in the program. Localities were randomly assigned into treatment and control groups, where eligible households in the treated group received the benefits 18 months earlier than eligible households in the control group (early 1998 to late 1999). After the RCT concluded, Progresa was expanded to eligible families in highly impoverished rural and semi-urban municipalities in Mexico (Parker and Todd, 2017; Skoufias, 2005).

Later, in 2000, Progresa rapidly escalated to the rest of the country –including urban cities. This expansion followed a significant change in Mexico's political environment when the incumbent party lost the presidential elections for the first time in over seventy years. The program continued functioning and growing through the years, and by 2016, it covered almost one-fourth of the Mexican population. Still, the intensive urban household enrollment peaked between 2001 and 2005, as new localities were incorporated each year (Figure 1.1). During this period, the program roll-out became less geographically targeted (by marginality classification), and its implementation differed considerably from the former rural-established program.

Initially, eligible families were notified about Progresa after a socioeconomic screening was conducted for all households. After this initial screening, eligible families received a home visit to verify their socioeconomic status. If accepted into Progresa, they remained beneficiaries for the next three years as long as they comply with their co-responsibilities.

However, this census became unfeasible in urban localities. Instead, interested families in urban localities needed to attend the register office and respond to the screening questionnaire to corroborate their eligibility. This entrance barrier resulted in self-selection and low take-up rates of the program, as not everyone was aware of their existence (Parker, Todd and Wolpin, 2005).

Progresa is widely known for its cash transfer (CT) conditional on school attendance. However, its multifactor design enclosed multiple benefits (Levy, 2006). These included a food CT per person, nutritional supplements, and healthcare access for all household members, conditional on the *beneficiary coresponsibilities*. As part of the conditionality, all beneficiary members were required to attend their periodic healthcare check-ups (based on their age), and one member per household –usually the mother– needed to participate in the health and nutrition workshops offered at their public clinics (every 2 or 3 months). In addition, beneficiary families with children between 3rd and 12th grade of school received the conditional education CT.[6] While the food cash aid was fixed for all beneficiary households, the education grant's amount varied by children's school grade and sex, aiming to compensate for the opportunity cost of staying in school, with a maximum limit per family. The amounts were modified every year, and all monetary transfers were given directly to the female head of the household.

3. Data

My data comes from two main sources at the locality level. First, I use administrative records on Progresa beneficiaries' enrollment between 1999 and 2012. These include the total number of families enrolled in the program by residence locality at the end of each fiscal year. A locality –the smallest geographic unit in Mexico– served as the target level

[6]Initially Progresa only covered up to the 9th grade. In 2001, they extended it up to the 12th grade, and in 2012, they incorporated the 1st and 2nd grades for the schooling benefits.

to scale up Progresa.[7] I identify the year when a locality enters the intervention using the first time I observe at least one beneficiary family in the data. Following the definition of urban settlements, my sample of interest includes localities with more than 5,000 inhabitants during my study period. Then, I match this with other available sources on geographic, demographic, and socioeconomic characteristics to create a locality panel data between 1995 and 2010 ($N = 1{,}166$).[8]

Figure 1.1 shows the aggregate number of new households enrolled in Progresa and the total number of localities newly incorporated between 1999 and 2011. It also includes the new household enrollment in urban areas (dotted line), and the number of new urban localities incorporated yearly. As previously mentioned, the largest expansion in rural areas peaked in 1999 and 2010. However, the largest expansion for urban areas occurred between 2001 and 2004. Over half of the newly enrolled households in the program in this period belonged to urban areas. The only exception is 2003, the year of midterm elections when new enrollment was temporarily suspended.

Second, I use the National Health (ENSA, for its acronym in Spanish) and the National Health and Nutrition Survey (ENSANUT) to construct a repeated cross-section data set representative of Mexican children from rural and urban localities. As the predecessor of ENSANUT, the ENSA 2000 is the first cross-sectional survey in Mexico to include biological health metrics such as height and weight. Following international guidelines, trained and standardized nurses measured these biomarkers directly on-site. Weight was measured in kilograms (kg) using a calibrated solar scale and height in centimeters (cm) using a flexometer. While the ENSANUT measures biomarkers for children over one year old, the ENSA 2000 only includes them for adults and children over ten years old (INSP, 2003).

[7]Mexico is composed of 32 autonomous states, divided into municipalities, and these into localities. Localities have changed throughout the years, but Mexican public records allow me to identify movements and changes in the territorial division using their 9-digit id (INEGI, 2022).

[8]These include cartographic data and Population Censuses from the National Institute of Statistics and Geography (INEGI); marginality indexes from the Population National Counsel (CONAPO); Health Resources data from the Ministry of Health (SS).

In addition,[9] the ENSANUT includes data on the socioeconomic and demographic characteristics of households' members, such as indigenous language, literacy, schooling, marital status, employment, self-reported income, and government subsidies. It also incorporates information on houses' economic characteristics, for example, ownership, construction materials (i.e., floor, walls, roof), number of rooms, household assets, sanitary conditions (e.g., drinking water, sewage), and access and utilization of healthcare services. With these, I construct a household's socioeconomic status (SES) index –for each year– using principal component analysis (PCA). When comparing the index with Progresa's take-up rate in 2006, all beneficiary households lie in the first SES tercile. Thus, I define those children from households in the lowest SES tercile for each wave, who are more likely to represent Progresa's eligible population. For comparison across years, I transform this index to percentiles.

By matching both datasets, I construct a repeated cross-section database for individuals by birth cohort and locality of residence. This includes cohorts of birth between 1983 and 1989 who would have been eligible to receive Progresa's education grant (11 to 17 years old) if their locality had been treated in 2000 (with available health data in the first wave). My sample includes 11,710 children residing in 427 urban localities. In the next section, I propose and test an identification strategy that allows me to estimate the intent-to-treat (ITT) effect of receiving Progresa during early adolescence.

4. Identification Strategy

My identification strategy exploits the temporal variation in Progresa's roll-out at the locality level and age at first exposure to the program. For each locality ℓ, I observe the year they receive the program for the first time. I focus the analysis on urban localities receiving Progresa between 2001 and 2005, which I define as the treatment adoption group G_ℓ. Note that this excludes 17 localities treated later, which are also very different from those treated

[9] From now on, I will use ENSANUT to refer to both the ENSA (2000) and ENSANUT surveys.

during my period of interest (see Table 1.2).

However, not all children exposed to the intervention will be potentially affected. Progresa can only affect children's health biomarkers if it occurs during biological growth. For the same treatment adoption group G_ℓ, the individual's exposure to treatment will vary by birth cohort. For each cohort of birth j, I calculate the age at first exposure to Progresa based on their locality's treatment adoption group as: $\tilde{a}_0 = G_\ell - j$. Following Parker and Vogl (2023), I set fourteen as the maximum age of effective exposure to Progresa.[10] I define my treatment as a continuous variable that accounts for the total years of treatment received before (or equal) 14 years old in 2006. Based on this definition, children must be younger than 14 years old in 2000. Furthermore, given I only observe health outcomes of children over ten years old at baseline, my analysis focuses on children born between 1987 and 1989, who were 11 to 13 years old in 2000 and 17 to 19 years old in 2006.

Similar to Duflo (2001) analysis in Indonesia, I employ a differences-in-differences (DiD) design with repeated cross-sectional data. In addition to the standard DiD estimation, I include a vector of birth cohorts by time-fixed effects that control for the stage in their growth trajectory. I estimate my model using the following equation:

$$Y_{ij\ell st} \; = \; \beta \, YearsTreated_{j\ell t} \, + \, \alpha_t \times \phi_j \, + \, \theta_{g(\ell)} + \mathbb{X}'_{i\ell}\Gamma \, + \, \eta_s \, + \, \varepsilon_{ij\ell st} \tag{1.1}$$

where, $Y_{ij\ell st}$ is the health outcome for individual i from cohort of birth j in locality ℓ in state s at year t; $YearsTreated_{j\ell t}$ is the total years of treatment received before 14 years old in 2006; $\theta_{g(\ell)}$ corresponds to treatment adoption group fixed effects; α_t are time fixed effects; ϕ_j are cohort of birth fixed effects (1987-1989) $\mathbb{X}_{i\ell}$ is a vector of individual and locality covariates; η_s are state fixed effects; and $\varepsilon_{i\ell sct}$ is an error term. I cluster my standard errors by locality. Given that I cannot observe who was eligible to receive the program before it

[10]This threshold is also illustrated in Figure A.2, where growth stabilizes around fourteen years old for girls and around fifteen years for boys.

began, my analysis reflects an intent-to-treat (ITT) approach rather than a treatment effect on the treated.

My identification strategy requires two main assumptions. First, it relies on the abrupt transition of urban localities into receiving Progresa. As mentioned before, given that the most impoverished municipalities received the intervention earlier, the second phase of Progresa's scale-up was less economically and geographically targeted. While the municipality marginality index was the main criteria for incorporating new localities, there are no records of a clear threshold used to decide the incorporation of new urban localities. By definition, urban localities have a lower marginality index than rural areas. Still, if initial poverty determines a locality's year of enrollment, my estimates will be biased. I test this by regressing a locality's transition year with a pre-treatment demographic, socioeconomic, and geographic characteristics vector. Table 1.2 shows the descriptive statistics *pre*–intervention by treatment adoption group, along with the OLS coefficients. Despite the differences in levels, I do not find evidence suggesting a correlation between the time of treatment and important economic determinants (columns 7 and 8). Another reason for this could be the closeness between urban centers, as proximity within treated localities was also an incorporation criteria to avoid migration between localities.

The second assumption refers to the parallel trends (PT) premise. My strategy assumes if treatment had not occurred, the average outcomes for all adoption groups g_ℓ would have evolved in parallel.[11] Ideally, I would test for pre-trends between treatment and control groups in my main outcomes. However, before 2000, Mexico had no other disaggregated data on children's health biomarkers. Instead, I use three outcomes as proxies for children's health, which the literature has evidenced in their correlation with health biomarkers. Following Callaway and Sant'Anna (2021), I implement an event-study analysis by year when a locality first receives the program using annual fertility rates and infant and neonatal mortality

[11] For all $t \neq t'$ and $g \neq g'$: $\mathbb{E}\left[Y_{\ell,t}(0) - Y_{\ell,t'}(0) \mid G_\ell = g\right] = \mathbb{E}\left[Y_{\ell,t}(0) - Y_{\ell,t'}(0) \mid G_\ell = g'\right]$

rates for urban localities (Figure 1.3). Consistent with previous work by Barham (2011), I find no significant effects of Progresa on infant mortality in urban areas, also true for neonatal mortality rates. Regarding fertility rates, I observe a significant decrease after the intervention. However, given my sample was at least ten years old at the time of the intervention, this does not affect my analysis.

5. Results

My results show the intent-to-treat effects of receiving one more year of Progresa before age fourteen. I find that Progresa significantly increases height and weight among children in urban areas. My estimates are robust to including individual and locality controls (see Appendix 1.2). Table 1.3 shows the estimates from my preferred specification controlling for socioeconomic index, marginality index, the share of children between 6-17 years old, and the number of physicians per one thousand population. Treated boys gain 0.42 centimeters (cm) in height per year of exposure to Progresa, which corresponds to a 1.5% increase in height over an average period of 5 years. On the other hand, the ITT effect on girls' height is positive but not statistically significant (0.2 cm). This is consistent with their growth period concluding earlier than boys, approximately one year after their menarche or first menstruation (between 11 and 12 years old).

In addition, I find positive and significant effects on weight for both sexes. Urban children receiving Progresa before age fourteen gain between 0.63 and 0.79 kilograms (kg) more weight per year of treatment. This corresponds to an average 7.5% increase in weight for an exposure of 5 years to the intervention among boys and a 9.2% rise in weight for girls. Based on these, I only find significant ITT effects on girls' BMI. Girls gain 0.37 units of BMI ($^{kg}/_{m^2}$), which translates to a 1.8% increase per year of treatment. Though still positive for boys, the coefficient on BMI is more imprecise, as boys' weight gain is also accompanied by an increase in their height (0.6% increase per year of treatment). Nonetheless, these increments in weight and BMI are only beneficial for wasted and underweight children. Otherwise, more weight could be correlated with higher rates of overweight and obesity.

Following on these, table 1.4 shows the intent-to-treat effects on the probability of being underweight, overweight, and obese –each with respect to the normal weight BMI category. The first two columns show my estimates on underweight prevalence for boys and girls, respectively. I do not find any statistically significant effects on these, likely driven by a low prevalence of underweight for this population –on average 4.4%. On the other side, I find positive and statistically significant effects on overweight and obesity, where around one-third of my sample is either overweight or obese. On average, receiving one more year of Progresa increases girls' overweight and obesity probability by 2.8 and 1.7 percentage points, respectively. In the case of boys, both estimates are more imprecise; a one percentage point increase in obesity prevalence by one more year of receiving treatment.

In addition, I repeat the analysis without any restrictions on the effective age to receive treatment (14 years old), including all birth cohorts eligible to receive Progresa for at least one year between 2000 and 2006 (i.e., children born between 1983 and 1989). Consistent with the fact that boys continue their growth until 18 years old, I find larger ITT effects of receiving one more year of Progresa's intervention on both boys' height and weight (Table A.6). However, these increments are not accompanied by an increased prevalence of overweight and obesity, as before. On the other hand, though positive, I do not find any statistically significant effect on girls' anthropometric measures. Yet, their probability of being overweight increases to 3.7 percentage points, and up to 2.2 percentage points for obesity prevalence (not statistically significant), by one more year of receiving Progresa (Table A.7).

Further, my estimates evidence a non-linear relationship between socioeconomic status and risk of overweight and obesity. While having a higher SES index is correlated with higher weight and BMI, the effects are smaller for individuals in the farthest part of the SES distribution. This is consistent with recent literature emphasizing how the urban poorest face a higher risk of undernutrition and overweight –also known as the double burden of malnutrition (Popkin, Corvalan and Grummer-Strawn, 2020). To deepen on this, I perform a new analysis by socioeconomic status interacting my treatment with a dummy variable for *Low SES* using the following equation:

$$\begin{aligned} Y_{ij\ell st} \; &= \beta_{_L} \, YearsTreated_{j\ell t} \times Low_{it} \; + \; \beta_{_H} \, YearsTreated_{j\ell t} \times High_{it} \\ &\quad + \, \alpha_t \times \phi_j \, + \, \theta_{_{g(\ell)}} + \, \mathbb{X}'_{i\ell}\Gamma \, + \, \eta_s \, + \, \varepsilon_{ij\ell st} \end{aligned} \tag{1.2}$$

where, $Low_{it} = 1$ if individual i at year t corresponds to the lowest tercile of the SES index distribution, and $High_{it} = 1$ if individual i at year t is above the first tercile of the SES index distribution. As before, my main estimates, $\hat{\beta}_{_L}$ and $\hat{\beta}_{_H}$, correspond to the intent-to-treat effect of receiving one more year of treatment –for each income group, respectively.

Figure 1.4 shows these estimates by sex, comparing them with my results from model 1.1 (dotted line). First, all estimates for low SES children are statistically different from zero (except for underweight prevalence), while only the coefficient on BMI for high SES girls remains statistically significant. This suggests that most of the effect found before is driven by children in the lowest socioeconomic tercile, which is to be expected as only low-income households were eligible to receive Progresa.

On average, per one more year of exposure to Progresa, poor urban boys gain 0.69 cm, and poor urban girls gain 0.35 cm in height. Similarly, poor urban children receiving Progresa gain around 1.2 kilograms (kg) more weight per year of treatment, which also translates to a significant increase in BMI (0.3 and 0.5 units for boys and girls, respectively). However, these BMI increments have different interpretations between boys and girls. On one side, some of the increase in BMI is helping to reduce underweight prevalence among low SES girls (though not statistically significant). On the other side, poor-treated girls increase their overweight prevalence by 4.5 percentage points for each year of receiving Progresa treatment and have 2.3 percentage points more probability of being obese. In the case of poor-treated boys, only their prevalence of overweight and obesity increases by 2.7 and 2.0 percentage points, respectively.

Note all these intent-to-treat effects are significantly larger if we calculate the local average treatment effect (LATE) using the observed take-up rate of the program in 2006 among low SES children (26.5%). For example, the LATE for poor urban boys corresponds to a 2.6 cm increase in height for each year of treatment received before fourteen years old and 1.3 cm among poor urban girls. Alternatively, I can estimate the LATE with a Two-Step Least Squares (2SLS) approach, using Progresa's take-up rate observed in 2006 as an instrument (Imbens and Angrist, 1994). Table 1.5 summarizes these local average treatment effects on each outcome by sex, using both methodologies. The LATE estimates are qualitatively similar, though the 2SLS are more conservative.

6. Conclusions

Compared to the RCT effects on children's health, I find larger effects of Progresa on boys' height (twice as large) but very similar in magnitude for girls (Gertler, 2004; Fernald, Gertler and Neufeld, 2009, 2008). While this could be derived from receiving the intervention at different growth periods and the biological differences by sexes, these do not explain the increase in overweight and obesity risk among urban poor children. From these seemingly opposite effects, we need to understand first the differences among urban beneficiaries –before evaluating the net impact of Progresa on urban children's health.

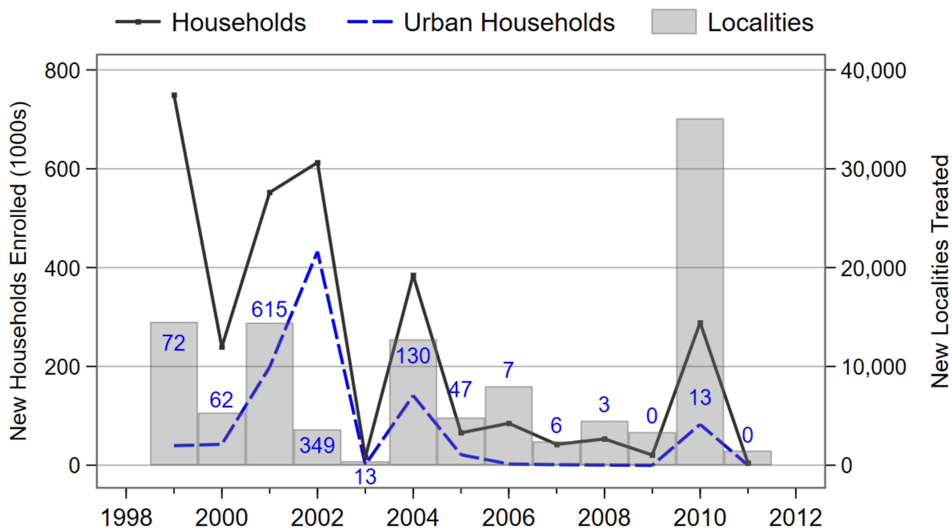
As mentioned, Progresa was initially designed for rural communities, where the cash transfer amount compensated for the opportunity cost of child labor. However, even among low-income populations, urban areas have higher schooling rates than rural localities. In this sense, the trade-off between receiving Progresa's CCT and keeping children in school (instead of sending them to work) will likely be lower for urban beneficiary families. This has been evidenced in previous studies analyzing the effects of Progresa on school enrollment using an urban sample. Behrman et al. (2012) find that –for an average treatment of 18 months– secondary school enrollment (12 to 14 years old) increases between 2.7 and 3 percentage points for girls and between 1 and 1.3 percentage points for boys. In comparison, for the same age bracket using the RCT sample, the effects of receiving the intervention 18 months earlier are significantly larger, with an average increase of 9 and 6 percentage points in school enrollment among girls and boys, respectively (Schultz, 2004).

This lower trade-off can also be interpreted as a higher marginal benefit per dollar of transfer received among urban households. Despite urban areas having fewer food access issues, urban beneficiary households spend 80% of their cash transfer on food consumption (Angelucci and Attanasio, 2009), which translates to an increase in the total amount of calories consumed between 12 and 17.5% after 18 months of treatment. In comparison, for this same treatment exposure, treated households in the RCT increase their average total calorie consumption by 7 percent (Gertler, Martinez and Rubio-Codina, 2012; Hoddinott and Skoufias, 2004). This increase in food consumption might explain the larger effects of Progresa on urban children's height. However, it also brought some unintended health effects, as beneficiary households had no restrictions on how to spend the money.

This detrimental effect of Progresa was previously observed by Fernald, Gertler and Hou (2008) among adults' BMI from the RCT sample and has been studied among the adult population from other cash transfer programs (Levasseur, 2019; Forde et al., 2012). However, my findings underscore that urban beneficiaries experience these risks at earlier ages. In this sense, despite the so-called urban advantage, the urban poorest face disproportionate barriers to accessing healthy food, such as higher transportation costs to buy food, limited access to fresh produce, and lack of production for self-consumption (Vilar-Compte et al., 2021; Dutra et al., 2018). These, combined with an increase in the availability of cheap, ultra-processed food and beverages in urban areas, put urban adolescents at a higher risk of overweight and obesity. This poses new challenges for the optimal design of conditional cash transfer programs in low and middle-income countries, as further research is needed to understand the households' incentives to spend their cash transfer on healthy food.

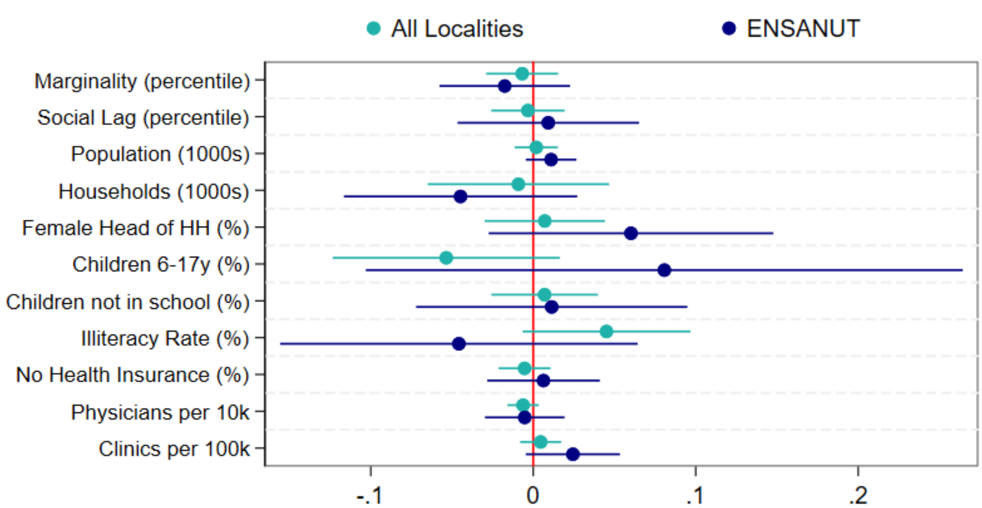
7. Figures

Figure 1.1: Progresa New Enrollment by Locality and Households, 1999-2011



Notes: Bars represent all new localities treated each year (right axis), where the number in each bar corresponds to the new urban localities treated. Source: Progresa Administrative Records.

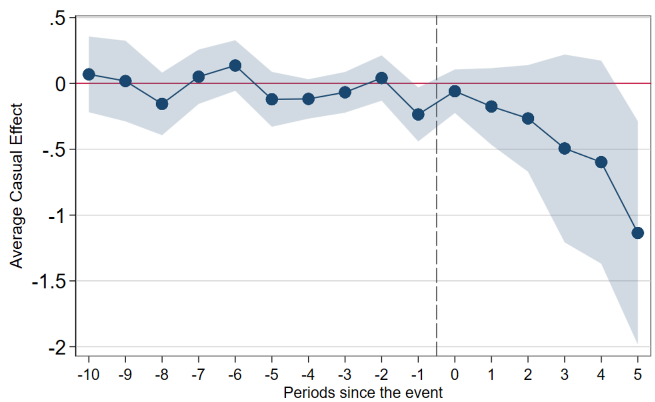
Figure 1.2: Predicting a Locality's Year of First Treatment (2001-2012)



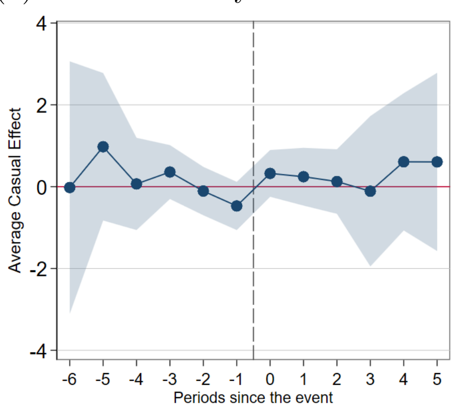
Notes: $Year_{\ell m} = \alpha + \mathbb{X}_{\ell}'\beta + \eta_m + \varepsilon_{\ell m}$ for locality ℓ in municipality m. OLS coefficients with 95% confidence intervals (intercept omitted). Standard errors clustered by locality, with population weights. Sample restricted to urban localities treated after 2000. Sources: CONAPO, INEGI, Progresa Administrative Records, Ministry of Health, ENSANUT.

Figure 1.3: Event-Study Analysis for Pre-Trends in Health Outcomes

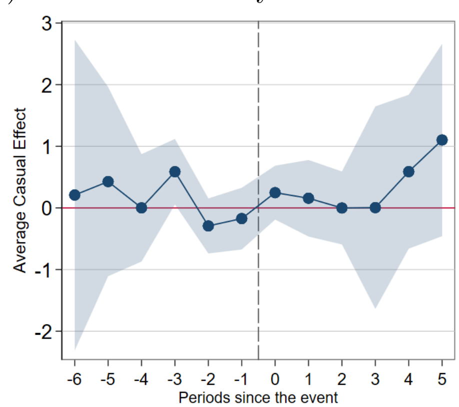
(a) Fertility Rate: 1990-2006



(b) Infant Mortality Rate: 1998-2006

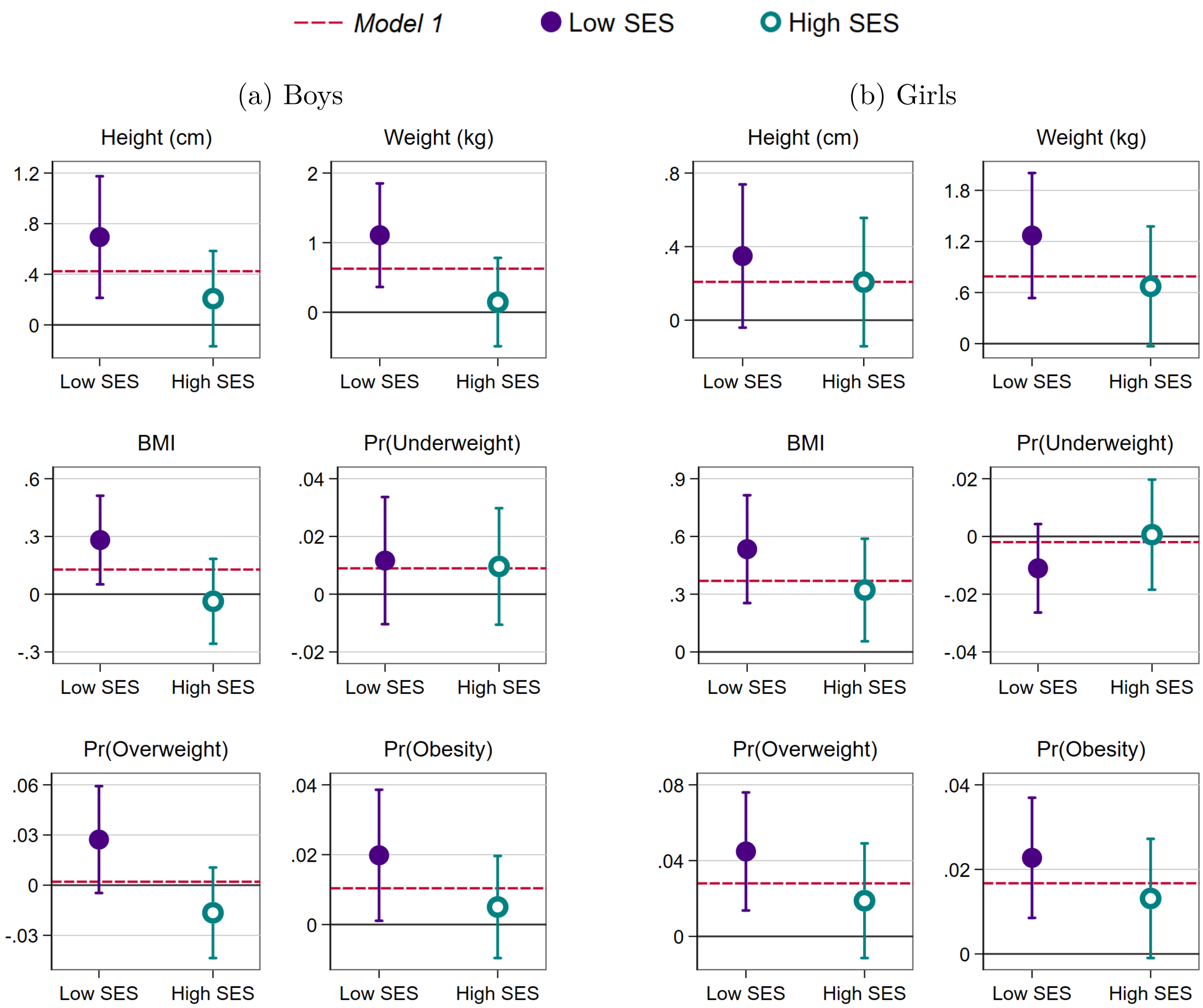


(c) Neonatal Mortality Rate: 1998-2006



Notes: Callaway and Sant'Anna (2021) estimator with 95% confidence intervals (CI). Infant Mortality Rate equals the number of deaths in children under one year old per 1,000 births. The neonatal Mortality Rate equals the number of deaths in children under one month old per 1,000 births. Fertility Rate equals total births per 1,000 inhabitants. All rates are annual by urban locality of residence and weighted by population. H_0: $\beta^{PRE} = 0$, $p-$value: (a) 0.500, (b) 0.883, (c) 0.837. Sources: Natality records, Mortality records, Population Censuses (1990, 1995, 2000, 2005, 2010).

Figure 1.4: Intent-to-Treat Effects of Progresa by Sex and Socioeconomic Status



Notes: $\widehat{\beta}_s$ coefficient by SES group with 95% confidence intervals (equation 1.2). Dotted line shows the coefficient from equation 1.1. Sample restricted to children born between 1987-1989 from urban localities treated between 2001-2005. All regressions include sample weights and standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

8. Tables

Table 1.1: Mean Descriptive Statistics on Urban Households by Socioeconomic Status

	ENSANUT 2000			ENSANUT 2006		
	(1) All	(2) Low SES	(3) High SES	(4) All	(5) Low SES	(6) High SES
Take-up of Progresa (%)	0.0	0.0	0.0	9.8	26.5	0.0
Household size	3.98	4.76	3.67	4.28	4.33	4.28
Health Insurance (prop.)	0.58	0.43	0.65	0.61	0.56	0.64
With children (prop.)	0.68	0.90	0.60	0.69	0.70	0.69
Number of children	1.49	2.43	1.14	1.56	1.73	1.48
With adults over 70y (prop.)	0.13	0.03	0.15	0.15	0.20	0.13
Head of Household						
Age	45.7	36.4	48.0	48.3	49.5	47.7
Female (prop.)	0.04	0.04	0.04	0.22	0.29	0.19
Married (prop.)	0.76	0.88	0.72	0.76	0.69	0.79
Schooling (years)	7.76	6.68	8.21	7.30	5.28	8.58
House characteristics						
Rooms per person	0.61	0.36	0.71	0.58	0.51	0.62
Firm roof (prop.)	0.76	0.54	0.86	0.80	0.51	0.97
Firm floor (prop.)	0.96	0.88	0.99	0.96	0.89	1.00
Firm walls (prop.)	0.97	0.93	0.99	0.93	0.84	0.99
With electricity (prop.)	0.99	0.98	1.00	0.99	0.98	1.00
With sewage (prop.)	0.94	0.85	0.99	0.96	0.89	1.00
With water acces (prop.)	0.97	0.92	0.99	0.98	0.94	1.00
Households (N)	27,981	7,243	17,148	29,349	10,758	16,948

Notes: Sample weighted means. Low SES corresponds to the first index tercile; high SES includes the second and third index terciles. Sources: ENSANUT.

Table 1.2: Baseline Characteristics for Urban Localities by Treatment Adoption Group

	Means in 2000 by Year of First Treatment					
	(1) 2001	(2) 2002	(3) 2003	(4) 2004	(5) 2005	(6) After
Marginality (percentile)	59.3	42.5	32.7	37.1	37.4	18.3
Social Lag (percentile)	58.1	43.8	34.8	40.3	42.8	19.7
Population (1000s)	14.3	75.2	9.7	159.1	45.8	409.5
Households (1000s)	3.3	18.2	2.2	36.4	10.7	104.9
Female Head of HH (%)	18.5	18.1	15.9	16.1	14.9	20.8
Children 6-17y (%)	27.8	26.6	26.2	26.2	25.5	21.0
Children not in school (%)	17.3	14.9	14.9	15.4	13.1	15.7
Illiteracy Rate (%)	10.6	7.8	6.6	6.8	5.6	5.7
No Health Insurance (%)	65.4	55.6	52.1	57.0	61.8	54.0
Physicians per 10k	8.8	6.6	3.9	5.7	5.8	9.3
Clinics per 100k	12.2	8.0	12.2	8.2	8.4	2.4
Localities ($N = 1,166$)	615	349	13	130	47	17

Notes: Sample restricted to urban localities treated after 2000. Sources: CONAPO, INEGI, Progresa Administrative Records, Ministry of Health.

Table 1.3: Intent-to-Treat Effects on Anthropometric Measures

	Height (cm)		Weight (kg)		BMI	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Years Treated	0.424**	0.208	0.626**	0.789**	0.128	0.369***
	(0.179)	(0.164)	(0.272)	(0.317)	(0.093)	(0.120)
SES Index	0.042	0.030	0.083**	0.121***	0.026*	0.043***
	(0.027)	(0.022)	(0.039)	(0.036)	(0.015)	(0.014)
(SES Index)^2	0.0001	-0.0001	-0.0005	-0.0011***	-0.0002	-0.0004***
	(0.0003)	(0.0002)	(0.0004)	(0.0004)	(0.0002)	(0.0002)
Locality Controls	yes	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes
Mean DV	144.1	145.3	41.7	42.8	19.8	20.0
Observations	2,702	2,960	2,726	2,929	2,697	2,907
R^2	0.765	0.492	0.554	0.361	0.216	0.213

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights and standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table 1.4: Intent-to-Treat Effects on BMI Categories

	Underweight		Overweight		Obesity	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Years Treated	0.0089	-0.0020	0.0021	0.0280**	0.0104*	0.0167***
	(0.0086)	(0.0078)	(0.0124)	(0.0142)	(0.0063)	(0.0057)
SES Index	-0.0021	-0.0009	0.0029*	0.0031**	0.0016*	0.0020**
	(0.0016)	(0.0009)	(0.0015)	(0.0015)	(0.0009)	(0.0008)
$(\text{SES Index})^2$	0.00003	0.00001	-0.00003	-0.00003*	-0.00001	-0.00002*
	(0.00002)	(0.00001)	(0.00002)	(0.00002)	(0.00001)	(0.00001)
Locality Controls	yes	yes	yes	yes	yes	yes
State FE	yes	yes	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes
Mean DV	0.042	0.046	0.278	0.257	0.078	0.052
Observations	1,792	2,022	2,339	2,647	1,872	2,026
R^2	0.053	0.030	0.034	0.040	0.038	0.048

Notes: Comparison group is normal weight. Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights and standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p<0.01$, ** $p<0.05$, * $p<0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table 1.5: Local Average Treatment Effects by Additional Year of Treatment

	OLS		2SLS	
Outcome	(1) Boys	(2) Girls	(3) Boys	(4) Girls
Height (cm)	2.013***	1.012*	1.939**	0.810
	(0.709)	(0.574)	(0.855)	(0.755)
Weight (kg)	3.212***	3.683***	2.853**	3.162**
	(1.097)	(1.083)	(1.316)	(1.485)
BMI ($^{kg}/_{m^2}$)	0.816**	1.549***	0.560	1.557***
	(0.339)	(0.413)	(0.446)	(0.564)
Pr(Underweight)	0.0337	-0.0320	0.0377	-0.0075
	(0.0325)	(0.0226)	(0.0415)	(0.0369)
Pr(Overweight)	0.0791*	0.1300***	0.0001	0.1168*
	(0.0471)	(0.0460)	(0.0588)	(0.0661)
Pr(Obesity)	0.0575**	0.0659***	0.0452	0.0718***
	(0.0277)	(0.0210)	(0.0303)	(0.0274)

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. *** $p<0.01$, ** $p<0.05$, * $p<0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Chapter 2

Childhood Interventions and Social Mobility: The Case of Progresa Program in Mexico

1. Introduction

During the past two decades, cash transfer (CT) programs have become a common policy to reduce poverty and promote social capital investment (Bastagli et al., 2016; Baird et al., 2013). This paper provides new evidence on the effects in children's health outcomes of a CT intervention. I document how the conditionality in per capita households' transfers shapes the effects, and how these vary by age of initial exposure to the program. I use the case of *Progresa* program in Mexico to decompose the effects of the education component during early childhood.

While Progresa is widely known for the wide positive effects[1] of its cash transfer con-

[1] Angelucci (2015); Angelucci et al. (2010); Angelucci and De Giorgi (2009); Attanasio, Cattan and Meghir (2022); Behrman, Parker and Todd (2011); Behrman, Sengupta and Todd (2005); Bobonis, González-Brenes and Castro (2013); Bobonis and Finan (2009); Gertler, Martinez and Rubio-Codina (2012); Parker and Todd (2017); Schultz (2004); Skoufias and Di Maro (2008), among others.

ditional on school attendance, its multifactor design enclosed different benefits and conditionalities that varied by age of the children (Levy, 2006). All beneficiary families receive healthcare services and a fixed nutrition CT, around \$15 per household every two months, conditional on regular check ups and attendance to health and nutrition workshops. In addition, families with children attending school between the 3rd and 12th grade could receive a significantly higher education transfer conditional on their school attendance, between \$35-153 per household. I take Progresa's minimum eligible age for the education CT as an exogenous variation to estimate the effect for children who where not eligible to receive this transfer, but still receive it –without any conditionality– from their oldest siblings.

Using longitudinal data, I am able to identify the time when beneficiary children first enrolled in the program, and how these benefits and conditionality varied across time. My data comes from the Mexican Family Life Survey (MxFLS), a representative survey (national, urban and regional) with socioeconomic and demographic information between 2002 and 2012. I construct novel data set that follows children and their families for every survey wave, and match their individual and household characteristics across time. A household is treated if they report being enrolled in Progresa and receiving some monetary aid in the past three months. My sample of interest includes children from treated households born between 1995 and 2009 who where not eligible to receive the education cash transfer before 2002 (i.e. attending 2nd grade of school or below) from rural localities.[2]. I focus on standardized height by months of age (WHO, 2006) as my main outcome of interest, which allows me to compare between cohorts and sex, even before they reached adulthood.[3]

Every children received treatment since early childhood, nonetheless the intensity of treatment and the age at first exposure vary as a function of family composition. For

[2]Progresa's first eligibility screening was different in rural and urban areas. While rural families were almost automatically enrolled, urban families faced entrance barriers that resulted on a self-selection bias during the first stages of the program.

[3]Height is highly determined during the first five years of life (Almond and Currie, 2011; Rogol, Roemmich and Clark, 2002), and it can be affected by external environmental factors.

each cohort of birth, I define the minimum year for treatment eligibility, as the year when they would enter the 3rd grade of school and become eligible to receive the education cash transfer (around age 8). An individual will only receive the education cash transfer (plus other benefits) before time if they have at least one older sibling in school between 3rd to 12th grade. Given this transfer does not have any conditionality for them, I define this group as the *early-full* or *unconditionally* treated. Their counterparts, the *early-partial* or *conditionally* treated, only receive the health and nutrition benefits; and, they have to wait –until reaching the age eligibility– to receive the education CT, which will be conditional on their school attendance. Conditional on the order of birth and family composition, I identify the average treatment effect on the treated (ATT) of the unconditional education cash transfer by comparing the outcomes between these groups.

My primary findings focus on height as the outcome variable, with $Full$ treatment measures the average treatment effect of the treated (ATT) for receiving Progresa's education cash transfer up to three years earlier. Although the average increase in children's standardized height (z-scores) due to receiving the $Full$ treatment earlier is 0.09 standard deviations (SD), these effects are not statistically significant. Expectedly, higher socioeconomic status and parents' height positively and significantly influence children's height, with girls being, on average, 2 cm shorter than boys due to differences in biological growth. Protective effects of socioeconomic status, parental height, and father's schooling on children's standardized height are observed. Despite the estimates' imprecision, their magnitudes align with previous literature evaluating Progresa's effects on children's height, ranging between 0.03 to 0.2 SD. However, the main limitation lies in the small sample size of 172 individuals, limiting the power to estimate an ATT effectively.

This paper provides new evidence on the effect of conditional and unconditional cash transfers on children's health using a novel identification strategy that exploits variation in the conditionality of benefits of Progresa –a widely studied intervention in Mexico. To do so, I build on previous literature on impact evaluation (Khandker, Koolwal and Samad, 2009; Rawlings and Rubio, 2005), and I propose a discontinuity in the minimum eligible age for receiving the education transfer component. This is important for two reasons. First, as Attanasio, Meghir and Schady (2010) point out, previous studies analyzing Progresa's effects by component fail to account for the endogeneity in the incentive's design of the program when using the cumulative CT received over time enrolled as a measure for level of exposure (Fernald, Gertler and Neufeld, 2008, 2009; Manley, Fernald and Gertler, 2015). Given transfers increase by grade after elementary school, and grade repetition is not penalized and very common, the cumulative CT over time is likely endogenous to unobserved cognitive abilities. I overcome this problem by exploiting the variation in age of first-born that grants –younger siblings– an 'early' and 'unconditional' access to the education cash transfer. Conditional on family characteristics, I identify the ATT of a larger level of treatment among children who would have been equally treated in absence of the age restriction. In addition, this has important policy implications, as identifying which components have the largest effects on children's health outcomes can provide a better understanding of the behavioral requirements of similar programs aimed to reduce the intergenerational transmission of poverty (Todd and Wolpin, 2006; Gertler, 2004; Baird et al., 2013).

Without question, Progresa has shown to improve children's development in the short and long-run (Attanasio, Meghir and Schady, 2010; Gertler, 2004; Skoufias, 2005; Araujo and Macours, 2021; Parker and Todd, 2017; Levasseur, 2019; Manley, Gitter and Slavchevska, 2013, among others). Nonetheless, most studies focus on the RCT experiment data, raising two main caveats in the literature. First, by design, control communities received the program 18 months after enrollment. This fixed variation in exposure to treatment, between control and treatment groups, limits the identification of Progresa's effects over a larger and more sensitive period, such as the first 3 years of life (Black et al., 2017). One of the main advantages of my identification strategy is that it also allows to differentiate the effects by time of first exposure to the program. While this idea has been tested in different contexts before (Attanasio et al., 2020; Doyle, 2020; Baker, Gruber and Milligan, 2019; Aizer et al., 2016; Almond and Currie, 2011), to my knowledge, this is the first study comparing Progresa's effects by age when a child first received the intervention. Another concern refers to the unanswered question on whether Progresa's RCT impacts can be extrapolated to a broader population, specifically after its national expansion. Though my sample size is small, my results are representative of all rural population in Mexico, and corroborate previous findings on children's health outcomes. This methodology –with a richer database– could be very useful when evaluating the effects of Progresa after its expansion to urban localities.

The paper proceeds as follows. Section 2. provides some background on *Progresa* and describes its design, implementation and previous results; section 3. explains the data used in the analysis and presents descriptive statistics of the sample; section 4. details the identification strategies used to estimate the impact of *Progresa* on height and cognitive status; section 5. presents the results; and, section 6. concludes with a discussion of the results, along with its limitations and future research agenda on the topic.

2. What is *Progresa*?

In 1997, following a major economic crisis, the Mexican government launched an innovative strategy to alleviate poverty: *Progresa* (Schooling, Health and Nutrition Program). Aimed to combat intergenerational transmission of poverty, *Progresa* is a conditional cash transfer (CCT) program with focus on human capital investment of low-income families in Mexico. It began as a pilot randomized-control trial (RCT) in small rural communities in Mexico[4]; and later, in 2000, it was expanded to eligible families in highly impoverished rural munic-

[4]The experimental evaluation began in 1997 selecting 506 rural communities (or localities) from seven states in Mexico to participate in the program. Localities were randomly assigned into treatment and control groups, where eligible households from treated communities received the benefits in early 1998 and eligible households in control communities became beneficiaries in late 1999.

ipalities in Mexico (Parker and Todd, 2017; Skoufias, 2005). In 2002, under a new federal administration, *Progresa* program was renamed *Oportunidades* and it was expanded to all rural and urban municipalities in Mexico (see Figure A.1). *Progresa* continued functioning and growing through the years, by 2010 its budget represented about 0.5% of GDP, and by 2016 it covered almost one fourth of Mexican population.[5]

Progresa was designed as a multifactor intervention that included education, health and nutrition benefits –both, monetary and in-kind transfers. All beneficiary households received a food cash aid, in-kind nutritional supplements, and basic healthcare services for all members. In addition, beneficiary households with children attending between the 3rd and 12th grade of school[6] received an education cash transfer, conditional on children's school attendance (at least 80%). All *Progresa*'s benefits were conditional on compliance with some co-responsibilities: attendance to healthcare check-up appointments (for all members) and participation in the health and nutrition workshops offered at their public clinics (one person per household). While the food cash aid was fixed for all beneficiary households, the education grant's amount varied by children's school grade and sex, with a maximum limit per family. The amounts were modified every year, with higher amounts for adolescent girls aiming to compensate for the opportunity cost of staying in school. All monetary transfers were given directly to the female head of the household.

Before 2002, all households in participant localities were censused on their socioeconomic conditions to identify their eligibility to the program. After this first screening, eligible families received a home visit to verify their socioeconomic status; and if accepted into Progresa, they remained beneficiaries for the next 3 years, as long as, they comply with their co-responsibilities. However, after the program expanded to urban areas, the first screening survey became unfeasible. Instead, eligible families needed to apply during a specific period

[5]In 2013, the program was renamed to PROSPERA *Programa de Inclusión Social*, coinciding again with a turnaround on the federal administration.

[6]Initially Progresa only covered up to the 9th grade. In 2002, they extended up to the 12th grade, and in 2012 they incorporated the 1st and 2nd grade for the schooling benefits.

in the year at Progresa's register office, where they would answer the questionnaire on socioeconomic conditions to confirm their eligibility. These additional entrance barriers, combined with a lack of awareness on the program, resulted on a self-selection bias among beneficiary families in urban settlements.[7]

3. Data

I use data from the Mexican Family Life Survey (MxFLS). The MxFLS is a longitudinal survey, representative of at the national, urban and regional levels in Mexico. It began in 2002 by creating a representative and unique panel data in Mexico, and, currently it has two more waves:[8] 2005-2006 (MxFLS-2), and 2009-2012 (MxFLS-3). The first wave or baseline (MxFLS-1) recollected information on 35,000 individuals in 8,400 households among 150 different localities in Mexico (Rubalcava and Teruel, 2006). For the later waves, the original sample was re-interviewed, including those who migrated outside Mexico and new households formed by the second generation. Both, the MxFLS-2 and the MxFLS-3, had a recontacting rate close to 90% of the original sample (Rubalcava and Teruel, 2008, 2013).

The main advantages of using this survey is its longitudinal nature and its multi-thematic approach, containing diverse information on the socioeconomic and demographic characteristics of Mexican families at the individual, household and community level. These include data on income, education, food expenditure and labor market, among others. In addition, the MxFLS also collects information of the individual's health measures, e.g. weight, height, blood pressure and hemoglobin. One of the main strengths of these data is that biomarkers are not self-reported but measured directly, thereby reducing measurement error. Moreover, the MxFLS started at the same time as *Progresa*'s expansion to all municipalities, and its

[7] As the program continued, extensive informative campaigns about Progresa were launched around the country, which increased the scope of the program in urban areas and reduced the self-selection bias.

[8] An attempt to collect the MxFLS-4 initiated in 2018. However, it was never completed as the COVID-19 pandemic disrupted the data collection.

timeline covers around 18 years, which allows me to estimate adulthood outcomes in children enrolled in Progresa since birth.

My treatment variable is defined at the household level, where a household is treated at wave t if they report being enrolled in Progresa and have received any non-negative monetary aid in the past three months. To avoid selection bias, my analysis focuses on treated households in all three waves of the MxFLS, which I can observe given the longitudinal nature of the MxFLS. Moreover, given Progresa's roll-out was different between rural and urban localities, I restrict the analysis to rural localities that had received the program by 2002 –conditional on not migrating to urban settlements across waves.

My sample of interest only includes treated children from rural localities born between 1995 and 2009 (cohort, k) who where not eligible to receive the education cash transfer before 2002 (i.e. attending 2$^{\text{nd}}$ grade of school or below). While all these children received treatment since early childhood, the level of treatment varied by the family composition. I construct a panel of children by matching their individual and household characteristics in each wave. Then, using the relationship with the head of the household, I create a nuclear family id across years that identifies family j for every child. This allows me to identify between siblings and classify them by family composition: size (number of children), order of birth and age gap between siblings.

For each cohort k, I define the minimum year for treatment eligibility, $\widetilde{t}_k$, as the year when cohort k would enter the 3$^{\text{rd}}$ grade of school and become eligible to receive the education cash transfer component (around 8 years old). For any $t < \widetilde{t}_k$, an individual i, j, k will receive the education cash transfer –in addition to the other benefits– if they have at least one older sibling attending school between 3$^{\text{rd}}$ and 12$^{\text{th}}$ grade. Given this transfer does not have any conditionality for them, I define this group as the *full* or *unconditionally* treated. Their counterparts, the *partial* or *conditionally* treated, only receive the health and nutrition benefits at t; and, they have to wait until $\widetilde{t}_k$ to receive the education cash transfer which will be conditional on their school attendance. In other words, even though everyone receive treatment since early childhood, the level of treatment and the time first exposure vary by family composition. Figure 2.1 shows an example of these treatment groups for cohorts between 1994 and 1997, where the *full* group receives the education cash transfer earlier than $\widetilde{t}_k \in (2002, 2005]$.

In addition, given the time lapse between waves in the MxFLS, I restrict the analysis only to cohorts born between 1994 and 1997 who were not eligible to receive the education cash transfer for themselves, until the second wave of the MxFLS (circa 2005). Finally, to reduce bias between groups, I restrict the analysis only to families with up to 5 children and a birth gap between siblings under 6 years.[9] Table 2.1 shows the family characteristics by cohort of birth at baseline (MxFLS-1, 2002). Given my sample of interest, family characteristics are able to predict around 94% of the variation by treatment group (Table A.1). In the next section, I propose and test an identification strategy that allows me to estimate the treatment effect of the transfer using this variation between groups.

4. Identification Strategy

Based on Progresa's design and the time and set of expansion, for children born between 1995 and 1997, their family composition determine the type of treatment receive in early childhood. For same cohort k, a child from the *full* group will receive a higher and unconditionally amount of cash transfer earlier than their counterparts from the *partial* group. To illustrate this, consider the following example in Figure 2.2. Suppose there are only two types of rural families receiving the program: $j \in \{A, B\}$. Both families are identical, except on the age of their first born; and, each has a child born in 1997. In absence of the age restriction, both individuals from cohort $k = 1997$ would have been equally treated at

[9] On average, beneficiary families from the RCT experiment have 3 children; with 50% of the women having the third birth within a 7 years period, and 25% more within 10 years (Todd and Wolpin, 2006).

the same time. However, family A receives the education cash transfer three years before B. Hence, I can identify the treatment effect of the education cash transfer for cohort $k = 1997$ by comparing the outcomes between i_A and i_B after the first wave.

Therefore, aggregating individuals by cohort k, I can estimate the treatment effect for the education cash transfer during early childhood from the following equation:

$$\begin{aligned} Y_{ijkt} \; = \; & \beta Full_i \; + \; \theta_1 Size_{jt} \; + \; \theta_2 Gap_{it} \; + \; \theta_3 Order_{it} \; + \; \theta_{4s} \mathbb{1}\{Order_{it} = s\} \times Gap_{it} \\ & + \; \mathbb{W}'_{jt}\Gamma \; + \; \mathbb{X}'_{ij}\Delta \; + \; \phi_k \; + \; \tau_t \; + \; \varepsilon_{ijkt} \end{aligned} \tag{2.1}$$

where, Y_{ijkt} is the outcome for individual i of family j from cohort k in wave t; $Full_i$ is an indicator variable that takes the value of 1 if individual i received the education cash transfer in 2002 –before being eligible; $Size_j$ is the number of children in family j; Gap_i is the age gap between individual i and her next-closest sibling; $Order_i$ is the order of birth for individual i; $\mathbb{W}_{jt}$ includes family controls varying across time (e.g. number of eligible siblings for education CT, number of sisters in secondary school, household size, and a household socioeconomic index); $\mathbb{X}_{ij}$ is a vector of individual and parental controls (female, mother and father's schooling, age, height); α_k represents each cohort intercept; and, τ_t are time fixed effects. Standard errors are clustered by family j, and ε_{ijkt} has the usual asymptotic assumptions.

The main identification assumption behind this treatment effect is that "conditional on family composition, the *partial* group is a valid counterfactual for the *full* group". To test this assumption, I compare the balance in observable covariates between treatment groups, conditional on controlling for the family composition variation. Table 2.2 shows the raw means for the parental and family controls by treatment group at baseline (MxFLS-1, 2002). The last two columns show the estimates from a balance analysis on each covariate –and, their incidence for missing information– using my main specification. While we observe differences in the raw means between groups, none of these are statistically significant from zero after controlling for family composition (columns 6 and 7). For example, mothers and fathers from the full group are slightly older at the time of their first child is born than their counterparts from the partial group. However, these differences are not statistically significant from zero after controlling for family composition. Similarly, mothers in the full group have on average one more year of schooling, while fathers have half of a year less than their counterparts in the partial group. Still, conditional on family composition, none of these are statistically significant.

5. Results

Table 2.3 shows my main results, using height as the outcome of interest. My treatment variable (*Full*) measures the average treatment effect of the treated (ATT) for receiving Progresa's education cash transfer –up to 3 years earlier– unconditional to school attendance. On average, receiving *Full* treatment earlier in time increases children's height by 0.9 cm (column 5). However, none of these are statistically significant. As expected, a higher socioeconomic index and higher parents' height have a positive and significant effect on children's height. Further, given the differences in biological growth by sex, girls have are on average 2 cm shorter than boys.

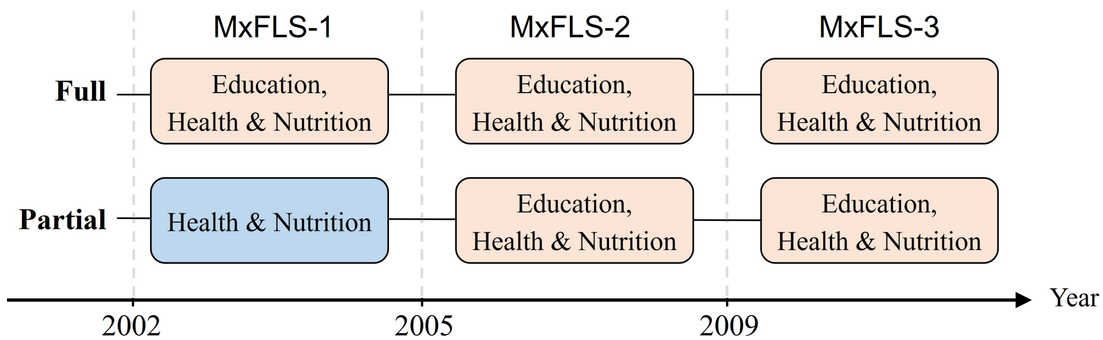
Similarly, Table 2.4 shows an increase of 0.09 SD (column 5) in standardized height-by-age (z-scores) for children who received earlier the education CT –though not statistically significant. Again, I observe a protective effect of socioeconomic index, parental height and father's schooling on children's standardized height. While my estimates are imprecise, their magnitude is similar to previous literature evaluating the effects of Progresa on children's height using the RCT, between 0.03–0.2 SD (Manley, Fernald and Gertler, 2015; Fernald, Gertler and Neufeld, 2009, 2008). Still, my main limitation refers to the size of my sample, and the lack of power to estimate an ATT using only 172 individuals.

6. Conclusions

This paper contributes new evidence on the impact of conditional and unconditional cash transfer (CT) programs on children's health outcomes, focusing on the Progresa program in Mexico. Leveraging longitudinal data from the Mexican Family Life Survey (MxFLS) spanning from 2002 to 2012, I utilize a novel identification strategy to explore how the conditionality of benefits shapes the program's effects, particularly on children's height outcomes. By exploiting variation in the age of first-born children, I distinguish between those who receive the education cash transfer unconditionally at an early age and those who receive it conditionally later. Despite the widespread positive effects of Progresa, particularly its conditional cash transfer component on school attendance, the analysis finds non-significant effects on children's standardized height. However, the study underscores the influence of socioeconomic status and parental characteristics on children's height outcomes. The findings highlight the importance of considering program design and exposure timing in assessing CT programs' impact on child development outcomes, with policy implications aimed at reducing intergenerational poverty. Additionally, the study's methodology offers insights into evaluating program effects beyond the controlled setting of randomized controlled trials (RCTs), providing valuable evidence for broader population-level impacts post-expansion of Progresa to urban areas.

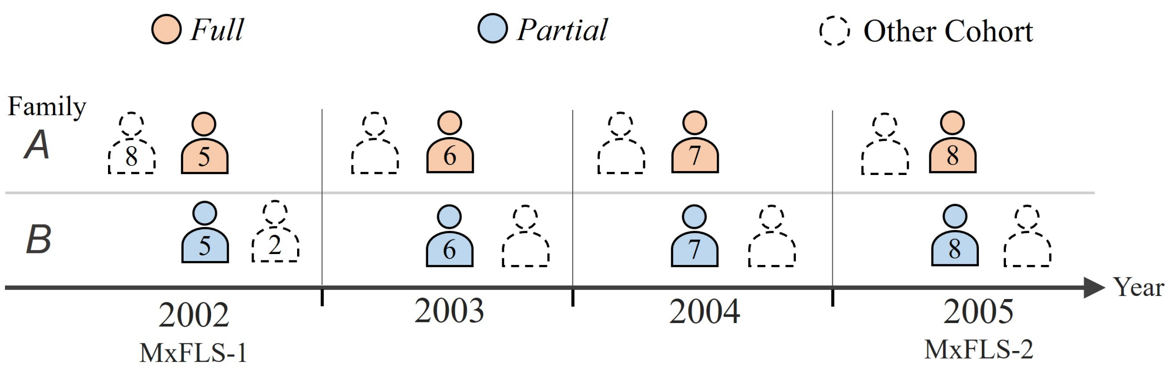
7. Figures

Figure 2.1: Treatment Groups for Birth Cohorts 1994-1997



Note: For these birth cohorts, children are not yet eligible to receive Progresa's education CT in 2002.

Figure 2.2: Treatment Variation by Family Composition on Progresa's Education Transfer (Example for Cohort of 1997)



Note: Each figure represents an individual i from family $j \in \{A, B\}$ from cohort k with their expected age shown inside for every year t.

8. Tables

Table 2.1: Descriptive Statistics at Baseline by Cohort of Birth (MxFLS-1, 2002)

	1994		1995		1996		1997	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female (%)	30.3	46.67	32.1	47.12	49.0	50.49	45.7	50.54
Family Size	3.5	1.00	3.6	1.17	3.6	1.09	3.2	0.97
Birth Order	2.2	0.86	2.7	1.40	2.8	1.30	2.5	1.24
Birth Gap	2.8	1.58	2.6	1.62	2.8	1.62	3.0	1.43
Total Siblings $\geq$8y	1.8	1.00	1.6	1.32	1.5	1.33	1.1	1.19
Total Sisters $\geq$12y	0.4	0.49	0.4	0.72	0.2	0.55	0.2	0.55
Household Size	5.7	1.49	5.9	1.52	5.8	1.40	5.7	1.69
SES Index (percentile)	13.3	10.27	17.6	15.53	18.1	14.57	16.8	17.22
Mother's Age (first born)	22.1	5.00	21.6	4.04	20.2	3.42	23.1	5.00
Mother's Schooling (years)	4.6	2.56	5.2	3.04	4.8	2.95	4.5	3.57
Father's Age (first born)	25.1	7.29	25.8	6.88	23.7	4.30	28.2	8.08
Father's Schooling (years)	5.7	2.88	4.7	2.79	5.2	3.15	4.2	3.24
Observations	33		53		51		35	

Notes: Sample restricted to *Progresa* beneficiary rural families with 2 to 5 children and siblings' birth gap less or equal than 6 years. Source: MxFLS.

Table 2.2: Balance Table, Birth Cohorts: 1994-1997

	Full		Partial		Full vs. Partial	
	Mean	SD	Mean	SD	β	SE
Household Size	6.06	1.32	5.28	1.70	0.625	(0.433)
SES Index (percentile)	16.90	14.95	16.52	14.43	7.582	(5.809)
Mother's Age (first born)	22.16	4.59	20.45	3.73	2.641	(1.958)
$\mathbb{1}\{$Mother's Age (first born) $\neq \cdot\}$	0.97	0.16	0.97	0.18	0.004	(0.021)
Mother's Schooling (years)	4.45	3.06	5.60	2.86	0.108	(1.198)
Mother's Height (m)	1.51	0.06	1.52	0.06	0.027	(0.021)
$\mathbb{1}\{$Mother's Height (m) $\neq \cdot\}$	0.95	0.22	0.93	0.26	-0.019	(0.013)
Father's Age (first born)	26.43	7.49	23.55	4.07	1.745	(2.507)
$\mathbb{1}\{$Father's Age (first born) $\neq \cdot\}$	0.89	0.31	0.88	0.33	-0.009	(0.024)
Father's Schooling (years)	4.74	3.07	5.35	2.92	-0.113	(1.337)
$\mathbb{1}\{$Father's Schooling (years) $\neq \cdot\}$	0.88	0.33	0.90	0.31	-0.006	(0.026)
Father's Height (m)	1.63	0.07	1.65	0.06	-0.031	(0.031)
$\mathbb{1}\{$Father's Height (m) $\neq \cdot\}$	0.72	0.45	0.79	0.41	0.019	(0.019)
Observations	114		58			

Notes: Sample restricted to *Progresa* beneficiary rural families with 2 to 5 children and siblings' birth gap less or equal than 6 years. SE clustered by family. β coefficients (column 6) are not statistically significant (p >0.1). Linear regression includes family characteristics, cohort of birth fixed effects, and longitudinal sample weights. Source: MxFLS.

Table 2.3: Analysis on Children's Height, 1994-1997

	Height (cm)				
	(1)	(2)	(3)	(4)	(5)
Full: early education CT	0.796	0.392	1.332	0.841	0.941
	(3.223)	(2.836)	(2.828)	(2.667)	(2.064)
Female	-2.475*	-1.793	-1.628	-1.164	-2.070**
	(1.481)	(1.297)	(1.228)	(1.202)	(0.987)
Household Size		0.106	-0.032	-0.083	-0.355
		(0.480)	(0.480)	(0.460)	(0.408)
SES Index (percentile)		0.126***	0.104***	0.089***	0.041
		(0.041)	(0.035)	(0.033)	(0.025)
Mother's Age (first born)			-0.240*	-0.226	-0.143
			(0.133)	(0.152)	(0.121)
Mother's Schooling (years)			0.264	0.060	-0.078
			(0.203)	(0.249)	(0.173)
Father's Age (first born)				0.055	0.106
				(0.100)	(0.090)
Father's Schooling (years)				0.596**	0.201
				(0.241)	(0.194)
Mother's Height (cm)					0.501***
					(0.121)
Father's Height (cm)					0.363***
					(0.093)
Observations	511	511	511	511	511
R^2 (adjusted)	0.860	0.870	0.873	0.878	0.904

Notes: Sample restricted to *Progresa* beneficiary rural families with 2 to 5 children and siblings' birth gap less or equal than 6 years. SE clustered by family. Includes family characteristics, cohort of birth fixed effects, and longitudinal sample weights. Parental covariates are interacted with a missing-value indicator to control for attrition bias. Source: MxFLS. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 2.4: Analysis on Children's Standardized Height, 1994-1997

	Height-for-Age (z-score)				
	(1)	(2)	(3)	(4)	(5)
Full: early education CT	0.095	0.032	0.153	0.090	0.087
	(0.445)	(0.372)	(0.390)	(0.382)	(0.335)
Female	-0.228	-0.115	-0.083	-0.001	-0.112
	(0.231)	(0.198)	(0.187)	(0.181)	(0.150)
Household Size		-0.018	-0.028	-0.032	-0.068
		(0.068)	(0.074)	(0.071)	(0.062)
SES Index (percentile)		0.022***	0.018***	0.016***	0.010**
		(0.006)	(0.005)	(0.005)	(0.004)
Mother's Age (first born)			-0.031	-0.027	-0.013
			(0.020)	(0.023)	(0.019)
Mother's Schooling (years)			0.042	0.008	-0.010
			(0.030)	(0.035)	(0.026)
Father's Age (first born)				0.004	0.013
				(0.014)	(0.013)
Father's Schooling (years)				0.090***	0.032
				(0.031)	(0.027)
Mother's Height (cm)					0.071***
					(0.016)
Father's Height (cm)					0.046***
					(0.013)
Observations	511	511	511	511	511
R^2 (adjusted)	0.171	0.250	0.269	0.302	0.440

Notes: Sample restricted to *Progresa* beneficiary rural families with 2 to 5 children and siblings' birth gap less or equal than 6 years. SE clustered by family. Includes family characteristics, cohort of birth fixed effects, and longitudinal sample weights. Parental covariates are interacted with a missing-value indicator to control for attrition bias. Source: MxFLS. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Chapter 3

Colonial Agricultural Estates and Rural Development in 20th-century Mexico

1. Introduction

Colonial haciendas were "the central institution of Mexican rural life" (Van Young 2006, *xxii*). These country houses with agricultural lands and breeding pastures for cattle, horses and sheep relied on native labor for the cultivation of crops and grew from encroachments on native land (Gerhard 1975; Simpson 1952). Yet, the colonial hacienda also became the institution around which rural economic, political, and social life evolved. In central Mexico, late-colonial haciendas functioned as hubs of rural economic activity linking the countryside to the colonial economy that profited from mining and trade with Spain and the rest of the world.

By the early 20th century, the hacienda lost its grip on the rural scene and ceased to function as an agricultural production unit. Nonetheless, the agglomeration effects from the late-colonial hacienda in central Mexico—as a dynamic and market-oriented rural enterprise (Gibson 1964; Van Young 2006; Tutino 2011)—might have altered the path of development of Mexican municipalities in the 20th century. We focus geographically on the central highlands where haciendas developed first: the central Mesa, east and west (Figure 3.1). Our main objective is to study the long-lasting economic disparities between municipalities in central Mexico close and far from colonial haciendas.

We build an original dataset of late colonial haciendas and identify the present-day location of the hacienda headquarters (*casco*). To our knowledge, this is the first attempt at a comprehensive list of geolocated late-colonial haciendas in central Mexico. Our sample does not represent the whole of rural life in central Mexico, nor can we assume that haciendas were homogeneous. Rather, our emphasis is on the hacienda as the geographic point of contact between the colonial economy and the rural economy and society. We obtain two measures of hacienda: a dichotomous variable that takes the value of 1 if the municipality has at least one hacienda, and 0 otherwise; and the distance from the centroid of each municipality to the nearest hacienda locality. We study the time-disaggregated differences in literacy and poverty between municipalities close and far from colonial haciendas with information from the 20th-century available censuses.

We implement two main empirical strategies: (i) we analyze the variation in each census cross-section; and (ii) we pool the census data to account for time trends in the outcome variables and cluster errors at the municipality level. It is possible that we identify only haciendas that were large enough to become a locality in themselves or with characteristics that allowed them to survive the 19th century. To account for this potential selection bias, we include geographic and socioeconomic controls to ameliorate the possibility of unobserved characteristics that could confound inference (e.g. agricultural potential of the land, closeness to economic activity, differential access to labor) and also restrict our analysis to municipalities within 100 kilometers of hacienda headquarters.

We find that municipalities closer to a hacienda in the late 18th century have on average higher rates of literacy and a lower poverty index throughout the 20th century compared to municipalities similar in other respects but farther away from a colonial hacienda, in both the cross-section and pooled specifications. Municipalities within 30km to a hacienda have literacy rates that are on average 9% higher than the mean literacy rate during the first half of the 20th century, and around 5% higher after 1960; the marginalization index is 6.3% smaller than the mean index, on average, for 1970–1990. The increases in literacy are statistically significant for all years, except 1900, and reach a peak between 1940 and 1960. The results hold restricting the sample to municipalities without a late-colonial hacienda.

An important concern for our analysis is that the location of colonial haciendas was not random, which implies potential endogeneity in our hacienda variable. We undertake tests of sensitivity to unobservables and implement two quasi-experimental techniques to corroborate our findings. First, we restrict the sample to municipalities with haciendas and their neighboring municipalities. Conditional on geographic and socioeconomic controls, we assume that neighboring municipalities are a valid counterfactual (proxy-control group), and we replicate our main analysis. The results are similar and larger in magnitude but with a larger variance.

In addition, we estimate an Average Treatment Effect on the Treated (ATT) using nearest-neighbor matching (NNM). We define our treatment group by proximity to hacienda, using both the full and restricted-neighbor sample. The estimations corroborate our findings. On average, municipalities within 29km to an hacienda have between 1.8 and 3.8 percentage points higher literacy than their counterparts; and between 2.7 and 4.5 index points lower marginalization. This represents an 8.8% increase in the mean literacy rate and a 5.3% decrease in the mean poverty index.

Finally, we perform a placebo-type test by replicating the empirical analysis with another major ecological zone in Mexico, the South Mesa, where haciendas did not play an important role linking rural economic activity to colonial mining and trade. We find that in the South Mesa closeness to hacienda headquarters in the late colonial period is not related to higher literacy or less poverty in the 20th century.

We find no empirical support for a path-dependence explanation based on location fundamentals (Ellison and Glaeser 2010; Gallup, Sachs and Mellinger 1999; Easterly and Levine 2003). Hacienda locations may have remained centers for agricultural economic activity after the hacienda demise in the early 20th century, due to, for instance, the suitability of land and climate for agriculture. However, we find that proximity to hacienda is related to more urban localities, a lower proportion of workers in agriculture and a higher proportion of workers in manufactures and services throughout the second half of the 20th-century. This supports, rather, an agglomeration effects and local scale economies explanation for path dependence (Krugman 1991; Comin, Easterly and Gong 2010; Bleakley and Lin 2012). During the colonial period, haciendas attracted population, both permanent and temporary workers, who sometimes preferred the 'perhaps more predictable economic authority of the landlord' to the 'arbitrary political will of the *cacique* and *corregidor*' (Knight 2002, 89)—the political authorities of native pueblos and towns.

Capital investments and links to the mining and commercial economies during colonial times appear to have attracted commercial and non-agricultural entrepreneurs years later, facilitating the 20th century transition from the old agricultural order to the growing industrial and commercial sectors. By means of a mediation analysis, we find that a reduction in the proportion of agricultural workers mediates between 20 and 36 percent of the increase in literacy, and up to 70 percent of the fall in the poverty index. An increase in the proportion of workers in manufactures and services mediates up to 24% of the legacy of haciendas for literacy and 48% for poverty in the second half of the 20th century. Areas close to market-oriented haciendas remained more economically dynamic, and kept attracting population and services over time.

Proximity to railroads and land redistribution in the early 20th century may have resulted in a more efficient allocation of resources in municipalities close to haciendas, and thus higher literacy and less poverty (Sellars and Alix-Garcia 2018; Garfias 2018). Yet, while we find that the proportion of railroad stations and of land redistributed closer to hacienda headquarters is higher on average, the variables mediate less than 10% of the hacienda-proximity difference.

Our findings are in line with others who find links between colonial land inequality and economic development outcomes, such as Daron Acemoglu, María Angélica Bautista, Pablo Querubín and James Robinson (2008), Dell (2010), and Nunn (2008). The mechanism we propose, however, is distinct. While Acemoglu et al. (2008) and Dell (2010) highlight the importance of landowners for guaranteeing government investment in public goods, we point to the role of landed estates as centers linking rural economic activity to the main colonial economic activities, mining and trade. Our analysis relates also to the larger literature studying historical legacies and long-term development in Latin America and beyond.[1] Our results suggests that the initial native population density, land quality and availability, native migration and epidemics, and mineral and other resource potential combined in colonial Mexico to shape economic activity and the rural environs during the colonial period and years later.

Our main contribution is to underscore the role of economic complementarities for understanding path dependence and long term development. The complementarity between late-colonial haciendas and mining and trade in central Mexico appears to have set municipalities close to haciendas on a path of industrialization, urbanization, and the rise of the proletariat. Hacienda headquarters remained focal centers for the location of markets, population, and services after the hacienda demise due to the importance of late-colonial haciendas as hubs of economic activity in the region. In this way, our work highlights the role

[1] See Colmenares (1969); Mahoney (2010); Bleakley and Lin (2012); Fergusson, Larreguy and Riaño (2015); Waldinger (2016); Faguet, Matajira and Sánchez (2017); Valencia Caicedo (2019); Fujiwara, Laudares and Caicedo (2019), among others.

of economic geography and historical rural development for understanding current regional disparities in Mexico.

2. Origins, demise, and path dependence

The central mesa, our focus region, has a combination of soil and climate conducive to productive agriculture. It has the characteristics of tropical highlands: long growing seasons that allow for at least two crops; temperate and rainy summers, and mild nights and winters except in the mountains (McBride 1923, 6-14). The eastern central mesa, including the valley of Mexico and surrounding areas, has allowed for dense populations in past and present. In this area began five hundred years ago the colonization of what is today central Mexico. Colonial settlements in the western central mesa began later. Except for some native communities close to lakes and depressions of ancient lakes in highland Michoacán and the Nayarit mountains, mostly semi-nomadic tribes populated the western central mesa (Van Young 2000, 158-59). Despite its agricultural potential (exploited later by the colonists) the west was less densely populated upon Spanish arrival than the settled environs of the valley of Mexico (Brading 1978, 14-15).

2.1 Colonial origins

During the first years, the colonists relied on the natives for foodstuffs. Most of the rural, arable land in the valley of Mexico and surroundings remained populated and cultivated by the natives. Through tribute in kind and labor services the natives provided the Spaniards with the essentials to secure their sustenance.[2] The conquest, however, fractured the pre-colonial confederate systems of storage put in place and organized by the defeated Aztec and that had functioned as a safety net in times of food shortages. The fracture and added

[2]The Spaniards had access to native labor and their produce through the *encomienda* and the *repartimiento*, early institutions that had declined by the late 16th century (Gibson 1967, 66-68; Knight 2002).

pressure on native agricultural output set the stage for famines and epidemics later in the century (Florescano 1969, 155-156). Two large Cocoliztli epidemics, one in 1545-47 and another in 1576-80 decimated the native population and left land barren (Acuna-Soto et al. 2004). The food system could no longer be sustained, and the Spaniards had to venture into agriculture and livestock.

In this way, the Spanish estates—*estancias* or *haciendas*—developed in the late 16th century as a colonial form of land tenure after the early *encomienda* and *repartimiento* institutions declined (Gibson 1967, 66-68; Knight 2002). These estates initially occupied areas close to the native population centers in the central mesa which had seen complex, politically organized societies in pre-colonial times.[3] The arable land in the environs of the central Mexican basin was thus divided between the new colonists and the surviving natives. The Spanish congregated the natives into *pueblos de indios* (Indian villages) organized to resemble towns in Spain: a central plaza, a church, communal lands, and their own local political authorities and tribute-collecting administration.[4]

The expansion of Spanish estates to the Bajío and Nueva Galicia in the center west required the cooperation of the natives from the center east.[5] The Chichimec semi-nomadic tribes resisted the expansion of Spanish colonists. The Crown thus encouraged the migration of the natives from the center east with the Spaniards by granting land endowments to create new pueblos and towns (Powell 1969). This allowed for small-holder cultivation of the land around the villages and towns, in tandem with the development of large estates (Brading 1978, 16-17). The Crown regularized rights over land throughout the 17th century

[3] Colonial settlement and early labor institutions were influenced by the pre-colonial political organization of the native societies encountered by the Europeans in the Americas (Arias and Girod 2014).

[4] Haciendas emerged as private estates yet the mendicant orders also acquired and managed landed estates. The Jesuits acquired large tracts of land in central Mexico and became skilled agriculturalists and cattle farmers: see Riley (1973) and Konrad (1981). The Dominicans owned land in the Oaxaca valley while Augustinians owned some estates in the Bajío. See Chevalier (1999) chapter VII.

[5] The Bajío encompasses the contemporary states of Guanajuato, Querétaro, San Luis Potosí and parts of Michoacán. Nueva Galicia, to the west of the Bajío, includes the contemporary states of Jalisco, Nayarit, Aguascalientes and parts of Zacatecas.

by granting, through *composiciones*, property titles in exchange for a payment (Gibson 1967, 64) validating the possession of small and large tracts of land and limiting future expropriations (Hamnet 1999).

By the 18th century, the colonial hacienda in the central mesa had become a rural institution associated with higher socio-economic status. In 1778, Franciscan friar José Alejandro Patiño described haciendas "[as] country houses belonging to people of more than average means, with lands for cattle, horses, and sheep, breeding pastures, and agricultural lands on which, more or less according to the capabilities of each owner, are produced various grains and livestock."[6] Haciendas were residential communities and political enclaves, with quarters for administrators and permanent peons, a church, and subsistence farming plots. The hacienda provided an opportunity to make a living outside of the native villages and towns, and "served, over time, as the chief engine of Indian acculturation" into the Spanish language, economy, and culture (Knight 2002, 97).

In both the east and west central mesa, by the end of the 18th century haciendas had become important economic centers. Gibson's (1967) classic work on the valley of Mexico emphasizes the commercial nature of haciendas due in large measure to their closeness to the Mexico City market. Haciendas hired labor and relied on the market for the sale of their products, functioning in some cases as modern enterprises. The commercial importance of Nueva Galicia resulted from its trade with the mining centers to the north (Van Young 2006; Brading 1977). Mining and the manufacture of textiles helped the rapid development of agriculture and trade in the region during the 18th century (Brading 1978). In contrast to Chevalier's description of the oppressive, extensive, livestock hacienda to the north, haciendas in central Mexico mixed farming and livestock, varied widely in size, and many used irrigation.

Historians have pointed to the large variation in the nature of colonial haciendas across

[6]From the "Relación goeográfica" about Tlajomulco in Jalisco, cited in Van Young (2006, 107).

regions (Van Young 1983, 14). Size and quality of landholding, labor relations, capital and use of technology, specialization, access to markets, and ownership varied across regions and were influenced by demographic and geographic characteristics. We have described above some differences even within our region of study, the central mesa. Nonetheless, we want to highlight that agricultural potential together with proximity to the most profitable late-colonial economic activities—mining and trade—distinguish colonial haciendas in the central mesa from their namesakes in the north and south. By studying the central mesa, our analysis is focusing on haciendas with such characteristics and their implications for the long-run development of colonial rural Mexico.

2.2 Nineteenth century and structural change

Despite the upheaval sparked by the war of independence (1810–1821), the hacienda as an agricultural estate survived the colonial period and did not decline until the early 20th century. During the 19th century, land changed hands and in some regions land was even further concentrated in yet fewer hands. The creole's climb to political power appears to not have altered the underlying productive arrangements of rural life (Coatsworth 1978, 1999). The economic and social relations of production of the Mexican countryside were already in place by the late 18th century and change in rural society is typically slower than change in the political realm (Van Young 1983, 7).

Mexico underwent a structural transformation in the last two decades of the 19th century. Exports grew as the second industrial revolution increased the demand for minerals Mexico had to offer. Many investments in the export sector were undertaken by foreigners but spilled over also to domestic economic activity and tax receipts. The development of public debt and financial markets made resources available for new productive activities (Marichal 1997). Mexican industrialization took off at the hands of local entrepreneurs who invested in the production of consumption (e.g textiles, soap, beer) and intermediary goods like cement, glass, iron, steel (Kuntz and Speckman 2011, 511-512).

Haciendas participated in the production of agricultural goods to satisfy the demand of the new sectors. The demand for labor in the agricultural and industrial sectors rose and was accompanied by other structural changes: urbanization and the rise of the proletariat (Williamson 2002). Yet, in 1910 the Mexican Revolution erupts and in the next two decades the hacienda as an agricultural estate and as the major institution dominating the rural areas, vanishes. Starting in 1916, the agrarian reform leads to redistribution and reorganization of land and landowners in the rural areas. The largest amount of land redistribution takes place in the 1930s with president Lázaro Cárdenas.

2.3 Path dependence

Haciendas in the central mesa played an important role as centers linking the rural areas to mining and trade with Spain and the rest of the world during the colonial period and the 19th century. The hacienda provided foodstuffs for mines and towns, and attracted labor and markets. The hacienda *casco* (main house) included residential houses for owners and administrators and provided the central meeting place for the community, including a chapel or church and a local store (*tienda de raya*). There was a residential community that included permanent workers and peons. Nearby native villages also provided temporary workers developing a symbiotic relation with haciendas.

Municipalities with a legacy of colonial haciendas may have kept attracting economic activity, even after the demise of these agricultural estates. Models of economic geography provide two explanations for the spatial persistence of economic activity (Bleakley and Lin 2012; Valencia Caicedo 2019): (1) the presence of some fixed natural feature that keeps attracting households and firms, and (2) strong local economies of scale. For the case of haciendas, the first explanation implies that the agricultural potential of the land may have kept attracting agricultural economic activity, large or small, to those locations. The economies of scale explanation emphasizes, rather, sunk investments in hacienda locations that serve as focal points for economic activity not necessarily agricultural; that is, the sunk investments serve to coordinate new activity and attract economic migrants.

As already mentioned, the decline of the hacienda as an agricultural estate went hand in hand with changes in the structure of the economy that began circa 1900 and took full force after the Mexican Revolution: the growth of exports, industrialization, and the rise of the proletariat, which led to urbanization and migration to urban areas. Locations close to a colonial hacienda may have attracted industrial and export activity due to local scale economies for three reasons. First, hacienda locations were relatively more integrated to the larger economy and markets in the 19th century than other rural locations. This integration likely reduced transportation and other transaction costs. Second, haciendas had attracted workers in the past who likely kept coming to those locations while adapting to the demands of the new economic activities. Third, economic integration promoted acculturation. A native or mestizo was more likely to speak Spanish and adopt Spanish ways if he or she had been an active participant in colonial economic exchange.

In this way, even after the demise of the hacienda, the site themselves may have been more likely to attract investments from industrial entrepreneurs and the growing exports sector to the north than other rural areas. Industrialization and modernization typically demand more educated workers than the agricultural sector. Municipalities closer to haciendas in the past may thus have kept attracting economic activity while also fostering social development in rural areas through an increase in the value of literacy.

In the next section, we focus on literacy and poverty as measures of development to study whether proximity to a colonial hacienda shaped municipal development paths after the hacienda ceased to be the central institution of Mexican rural life. Did the focalness of haciendas as hubs of rural economic activity coordinate investments in new economic activities and in so doing influence the social development of rural areas after the hacienda's demise?

3. Data

Our municipal-level data comes from historical and geographic sources. The *municipio* is the smallest politico-territorial division for which we have historical information.[7] We measure our primary outcome of interest, social development, with information on literacy and marginalization from the available censuses between 1900 and 1990 in the Population Census Database (INEGI various years). See Tables A.3 and A.5 in the Appendix for the number of observations by census year and outcome.

We measure literacy as the proportion of the municipal population able to read and write, in Spanish or their native language (Appendix 3.4). Starting in 1970, we also include a marginalization index as a proxy for the share of the population in poor living conditions. The index (0–100) incorporates: (i) educational backwardness, (ii) inadequate housing (dwelling, electricity, water) and (iii) insufficient income (CONAPO, 2000).

Colonial Haciendas

The main explanatory variable is proximity to a large rural estate during the late 18th century. To build the original dataset of colonial haciendas, our primary source is the complete record of Jesuit haciendas expropriated in 1767 from Fonseca and Urrutia (1852, 227-233). The Spanish Crown sent government officials throughout the viceroyalty to create a list of all Jesuit properties in order to sell them. We complement the list of Jesuit haciendas with a list of 70 haciendas, compiled by John Coatsworth, and information from five books that have studied colonial haciendas from historical archives: Brading (1978); Gibson (1964); Rionda Arreguín (2001); Taylor (1972); and Van Young (2006).

[7]Mexico is composed of 32 autonomous states which are divided into municipalities. Municipalities have changed but Mexican public records allow us to identify movements across time.

The sample of haciendas for the Central Mesa includes 304 haciendas distributed along 162 municipalities (Figure 3.2).[8] We recovered from the texts a list of 415 haciendas and were able to identify the exact location of 339 estates (locality and municipality) and only the municipality for the remaining 26. From these, we exclude 11 haciendas located in the north of Mexico, and 50 haciendas in the South Mesa (Oaxaca and Guerrero) located across 34 municipalities. Our location for hacienda refers to the headquarters, or *casco*. The *casco* encompasses the residential houses for owners, administrators and permanent workers, a church or chapel, and other central areas. Our sample may be biased towards haciendas large enough to become a locality in themselves or with characteristics that allowed them to survive the 19th century. Below we discuss how we account for selection bias and ameliorate the possibility of unobserved characteristics that could confound inference.

There is little information on the size or range of haciendas in our sample. A map of hacienda lands would be practically impossible to draw—sometimes not even hacienda owners knew the extent of their own properties. Large estates owned land around their headquarters but also owned other non-adjacent land that allowed access to water and pastureland, not necessarily within the radius of the main hacienda settlement. The hacienda San Xavier in the valley of Mexico, for example, consisted of "scattered lands ... over an extensive area, interrupted and broken by smaller possessions of other persons or Indian towns." (Gibson 1964, 290).

We measure proximity to hacienda with the (Haversine) distance from the centroid of each municipality to the nearest locality with a colonial hacienda. This distance measures the municipal closeness to the hacienda headquarters or casco, regardless of whether there is a colonial hacienda in the municipality. We also define a dichotomous variable that takes the value of 1 if the municipality has at least one hacienda, and 0 otherwise. In the analysis below, we interact proximity to hacienda with this dichotomous variable to disaggregate the

[8]The number of municipalities is based on the 1970 census. The number of municipalities with haciendas changes depending on the municipalities with information in each census.

results for municipalities without haciendas but close to an hacienda locality.

There is a positive relation between our outcomes and proximity to hacienda in the raw data (Figure 3.3). Literacy rates decrease as the distance to the nearest hacienda rises while the marginalization index increases for all years. This holds when stratifying by municipalities with and without haciendas (Figures A.3 and A.4).

3.1 Geographic and socioeconomic controls

Geographic characteristics could have an impact on both the location of colonial haciendas and development outcomes in the 20th century. Regions with relatively higher agricultural productivity may be more likely to have an hacienda and also more likely to have more access to schooling than regions with low agricultural productivity, e.g. due to the resulting higher income of the region. We include latitude, median altitude and land gradient as proxies for productivity.[9] In tropical countries like Mexico, regions with relatively high altitudes have more temperate climates and thus better conditions for agriculture; in regions with higher land gradient it is harder to work the land. In addition, we include a measure of soil suitability between 1961-1999. The composition of the soil is indicative of agricultural potential. The index of soil type takes the values $\{0, 1, 2\}$ according to the suitability of the soil, with higher numbers indicating more suitability.[10] We also include the surface area (km^2) to control for the differences in extension across municipalities.

Table 3.1 shows descriptive data on geographic characteristics for municipalities with and without an hacienda. Hacienda municipalities and their nonhacienda neighbors have higher altitude, lower land gradient, and lower 20th-century soil suitability measures relative to the full sample, and to those without hacienda. The lower land gradient and higher altitude

[9] In contrast to current measures of soil suitability, altitude and land gradient are likely to not have changed much since the colonial period.

[10] We obtained the geographic data from the Global Agro-Ecological Zones (GAEZ) provided by the FAO. http://www.fao.org/nr/gaez. Altitude is measured in kilometers.

suggest that hacienda municipalities have terrain more suitable for agriculture compared to all municipalities and to those without haciendas.

Second, mining was a major productive activity in the 18th century. Haciendas may have been more likely to locate close to silver mines in order to provision the mine with food, and municipalities near mines may be more likely to have higher incomes and access to schooling. We use information from von Humboldt (1822) on the location of productive mines circa 1800.[11] We calculate the Haversine distance from the centroid of each municipality to the nearest mine circa 1800. Hacienda municipalities and their nonhacienda neighbors are on average closer to a mine circa 1800 (Table 3.1).

Third, proximity to a colonial city could have an impact on the location of 18th century haciendas and development outcomes in the 20th century. We include the distance from the centroid of each municipality to the nearest urban colonial center (Tanck de Estrada 2002) to control for these differences. Table 3.1 shows that indeed hacienda municipalities are closer to an urban colonial center, and the difference is statistically significant.

Finally, pueblos de indios shared the rural environs with haciendas, as mentioned.[12] Haciendas may have located near pueblos to have access to labor, while pueblos could have influenced development outcomes directly. While we may expect a negative relation between a pueblo legacy and 20th century literacy and marginalization outcomes (due to, for instance, pueblos living in the fringes of colonial society and with distinct languages), we also know the Crown mandated pueblos to teach Spanish in their schools during the second half of the 18th century (Tanck de Estrada, 1999). The latter policy, where successful, may have led to higher literacy and schooling a century later. We include the list of pueblos de indios circa 1800 compiled by Tanck de Estrada (2005). The variable takes the value of 1 if there was at least one pueblo de indios in the municipality. The median is 2 pueblos per municipality; our

[11] We thank Alberto Díaz-Cayeros for sharing the data.

[12] Ranchos also shared the rural environs and where typically smaller agricultural units than haciendas. However, there is not a systematic way to differentiate between haciendas and ranchos.

results are robust (and stronger) if we instead use a threshold of 2 pueblos. The proportion of municipalities with at least one pueblo is larger for hacienda municipalities but the difference is small (Table 3.1 , $p < 0.05$).

3.2 Estimation Strategy

We undertake both cross-sectional and pooled data analyses to exploit variation between municipalities and across time. To mitigate the possibility of selection bias, we restrict our sample to municipalities within 100 kilometers of hacienda headquarters. This way, we exclude municipalities that are likely to be very different from those with haciendas.[13] For our base model, we use ordinary least squares (OLS). Nonetheless, the results are robust to estimating instead a spatial error model using GLS to account for potential spatial autocorrelation (Anselin 2009). The spatial analysis is in Appendix 3.3.

We estimate our main model using two specifications. The first pools the census data to take into account the time trend in our outcomes and allows us to cluster standard errors at the municipality level. The second studies cross-sectional differences in outcomes across municipalities for every census year with robust standard errors.

We test our identification strategy by estimating the relationship between our hacienda variables and the covariates from Table 1. On average, the controls explain around 63.7 percent of the variation in distance to hacienda, while only 19.2 for the dichotomous hacienda variable (Table A.1). Hence, we focus on distance to hacienda as the main explanatory

[13] We choose 100km because (i) it includes all municipalities within one standard deviation of the mean of distance to hacienda, and (ii) after a distance of 100km, the Moran statistic is very close to 0 once we account for spatial autocorrelation in the residuals. See Appendix 3.3.

variable, and estimate the following equations:

$$Y_{ist} \;=\; \alpha \;+\; \sum_{\ell}^{\mathcal{L}} \beta_\ell \, distHac_i \times \mathbb{1}\{t=\ell\} \;+\; \sum_{\ell}^{\mathcal{L}-1} \lambda_\ell \, \mathbb{1}\{t=\ell\} \;+\; \mathbb{X}_i'\gamma \;+\; \theta_s \;+\; \varepsilon_{ist} \tag{3.1}$$

$$Y_{is} \;=\; \alpha \;+\; \beta \, distHac_i \;+\; \mathbb{X}_i'\gamma \;+\; \theta_s \;+\; \varepsilon_{is} \;, \quad \forall t \tag{3.2}$$

where Y_{ist} is the development outcome in municipality i from state s in census year $t \in \{1900, 1930, 1940, 1950, 1960, 1970, 1980, 1990\}$, $distHac_i$ is the distance from the centroid of municipality i to the nearest hacienda locality (expressed in ten kilometers)[14], $\mathbb{X}_i$ is a vector of geographic and demographic controls and includes the binary pueblos variable, θ_s are state fixed effects, and ε is an error term (usual assumptions on ε). We obtain one estimation per year from equation 3.2 while equation 3.1 pools all years in one estimation.

We also analyze whether the relation between proximity to hacienda and our outcomes varies by the presence of an hacienda in the municipality. The equations below interact distance to hacienda with our binary hacienda variable, Hac_i.

$$\begin{aligned} Y_{ist} \;=\; \alpha \;+\; & \sum_{\ell}^{\mathcal{L}} \beta_{1\ell} \, distHac_i \times \mathbb{1}\{t=\ell\} \;+\; \sum_{\ell}^{\mathcal{L}} \beta_{2\ell} \, Hac_i \times distHac_i \times \mathbb{1}\{t=\ell\} \\ & +\; \sum_{\ell}^{\mathcal{L}} \beta_{3\ell} \, Hac_i \times \mathbb{1}\{t=\ell\} \;+\; \sum_{\ell}^{\mathcal{L}-1} \lambda_\ell \, \mathbb{1}\{t=\ell\} \;+\; \mathbb{X}_i'\gamma \;+\; \theta_s \;+\; \varepsilon_{ist} \end{aligned} \tag{3.3}$$

$$Y_{is} \;=\; \alpha \;+ \beta_1 distHac_i \;+ \beta_2 Hac_i \times distHac_i \;+ \beta_3 Hac_i \;+\; \mathbb{X}_i'\gamma \;+\; \theta_s \;+\; \varepsilon_{is} \;, \quad \forall t \tag{3.4}$$

As mentioned before, the initial location of colonial haciendas was not random. Thus, an important concern is the potential endogeneity of our main independent variable, and how this could bias our results. In addition to regressing proximity to hacienda on our controls (Table A.1), we perform a sensitivity test to unobservables using our pooled data specification. Following Oster (2019), we compare the stability of our main coefficients

[14]For the 26 haciendas that we are unable to identify their locality, we use the centroid of the municipality as the coordinates of the hacienda. The results are robust to not including the 26 haciendas.

and movements in R-squared by individually including each covariate and testing the year-coefficients against the model without any controls.

Then, to address potential endogeneity issues, we undertake two more analysis to test the validity of our results. First, we create a restricted sample only for municipalities with haciendas ($N = 162$) and their contiguous neighbors ($N = 445$), and we repeat our main analysis. While this comparison is not perfect, it allows us to treat neighboring municipalities as a proxy-control group. Conditional on geographic and socioeconomic controls, the analysis assumes that neighboring municipalities are a valid counterfactual for municipalities with hacienda presence (see map, Figure A.1).

Second, we propose a quasi-experimental design by implementing a nearest neighbor matching (NNM) strategy. For different thresholds of closeness to nearest hacienda, we stratify our sample between treated (close to hacienda) and control municipalities. Based on our geographic and socioeconomic covariates, the NNM finds the best eligible control municipality to be paired with each hacienda-treated municipality and estimates the Average Treatment Effect on the Treated (ATT) of being δ close to an hacienda. The next section presents these estimates using different parametric and non-parametric techniques, while also varying between our main sample and the restricted neighboring sample.

Finally, to corroborate the robustness of our results, we perform a placebo-type test by replicating the empirical analysis with another major ecological zone in Mexico: the South Mesa. This region includes 541 municipalities in Oaxaca and Guerrero, with 50 colonial haciendas along 34 municipalities (Figure 3.2). The hypothesis behind this falsification test is that South Mesa haciendas played a small role, relative to the Central Mesa, linking the rural world to the large colonial economic activity around mining and trade.

4. Results

The results for our base specifications show that municipalities closer to a colonial hacienda have higher literacy rates and lower poverty indices than those further away throughout the 20th century. Figure 3.4(a) shows the (negative) marginal effect on literacy rates for every 10km increase on distance to hacienda for models (1) and (3), while Figure 3.4(b) shows the marginal effect for models (2) and (4). Models (1) and (2) are estimated for the full and the restricted neighbors sample; for the models with interactions (3 and 4), only the coefficients on nonhacienda municipalities are shown. Notice the *y-axis* is reversed to facilitate the comparison of time-trends and coefficient magnitude. The marginal effects for the restricted neighbors sample are larger in magnitude, but with higher variance. This suggests that most of the observed differences in literacy rates come from those municipalities closer to the headquarters of an hacienda. Yet, the differences for nonhacienda municipalities remain statistically significant, although smaller in magnitude. All estimates are positive and statistically significant after 1900 (Fig. 4).[15]

On average, municipalities have between 0.5 (for 1930) and 1.3 (for 1950) percentage points higher literacy rates for every 10km decrease in distance to hacienda, for the pooled and cross section analyses. Nonhacienda municipalities have slightly lower increases in literacy rates.[16] When restricting to the neighbors sample, municipalities have between 1.3 and 3.9 percentage points higher literacy for every 10km fall in distance to hacienda.

Although the coefficients seem small, the mean literacy rate in Mexico did not reach 50 percent until 1980. For instance, in 1940, the average increase in the literacy rate for a 30km decrease in distance to hacienda is 3.3 percentage points, a 13% increase with respect to the mean literacy rate of 25.3%. Between 1930 and 1950, the results represent an average increase of 10.5% (with respect to the mean) in literacy rates and around 6% after 1950, for

[15] Tables A.2, A.3, and A.4 show the results in table form.

[16] Below we also show the predicted literacy rates for nonhacienda municipalities (Figure 3.8(a)).

a fall in distance to hacienda of 30km. For nonhacienda municipalities, the corresponding increases are 8.2% and 5.1% (Figure 3.4(a) and Table A.2). Notice that the peak increase is around 1940.

Likewise, the marginalization index falls as the municipality gets closer to an hacienda: proximity to haciendas in the past is related to lower poverty years later. Figure 3.5 shows the marginal effects on the index for every 10km of distance to hacienda. On average, the full sample estimations represent a decrease of 6.3% with respect to the mean poverty index for municipalities 30km closer to a hacienda. Similarly to literacy rates, the size of the marginal effect is smaller for nonhacienda municipalities (between 0.4 and 1 points), yet it is statistically significant in both the cross-section and pooled specifications for most years. On average, the estimation represents a 4.5% decrease on the mean poverty index for nonhacienda municipalities 30km closer to a hacienda (Tables A.5 and A.6).

Finally, we do not find statistically significant differences from our sensitivity test to unobservables. Tables A.10 and A.11 show these estimations for literacy rate and marginalization index, respectively. When comparing the p-values from the joint test by including each control individually, we do not find statistically significant differences between year coefficients, except for average land gradient. Nonetheless, the R^2 for the estimation increases proportionally between specifications—suggesting stability across coefficients—and the differences are no longer statistically significant when including any other control.

4.1 Addressing the endogeneity bias

One of the main concerns of our results is the potential endogeneity bias of our measure of hacienda. To the extent that the location of haciendas is correlated with municipality characteristics, our results may be biased. For example, if haciendas located initially in more productive land or better connected to markets, our results might be overestimating the relationship between development and colonial haciendas. To account for this, we estimate an Average Treatment Effect on the Treated (ATT) using nearest-neighbor matching (NNM). We define our treatment group by closeness to haciendas, grouping municipalities within δ distance to an hacienda based on the mean and median: 29 km for the full sample (median=23), and 16 km for the neighbors sample (median=13).

First, we test the validity of the NNM estimates by comparing the balance on covariates between treatment and control groups (Austin, 2009). Figure A.5 shows the standardized differences for different values of δ. As observed in panel A, groups in the main sample are better balanced for a treatment within 29 km of distance to an hacienda (SD<0.25).[17] However, for the neighbors sample, we observe significant differences by state and area of municipality (panel B). To overcome this, we implement a modification in covariates by interacting the area with state dummy variables.[18] This way, we control for the variation in area by state (see map A.1) when constructing the *quasi*-experimental control group for municipalities closer to haciendas. With this modified model, groups are balanced for a treatment within 13 km to a hacienda.[19]

We estimate the ATT using a non-parametric *Malahanobis* matching with one neighbor and bias-adjustment for continuous covariates, as proposed by Abadie and Imbens (2006, 2011).[20] Figure 3.6 shows the ATT year-estimates for the full sample, and neighbors sample. These estimates corroborate the positive relation between proximity to hacienda and social development in the 20th century and provide further evidence on the validity of our results, for both literacy rate and marginalization index. For comparison, we also include the OLS coefficients for our main model, full sample, but replacing distance to hacienda with our

[17] We observe differences in distance to nearest colonial city and median altitude ($SD \geq 0.25$). Yet, our ATTs do not vary by δ, and they are similar to those using the neighbors sample (Tables A.8 and A.9).

[18] Additionally, we replicate all previous analysis using the same modification. The results do not change significantly. For parsimony, we do not include the results but they are available upon request.

[19] As before, the only exception is distance to nearest colonial city.

[20] While the magnitude of the ATT vary by specification, this obtains the most restrictive estimates. Table A.9 shows three other specifications using the mean and median distance in each sample: non-parametric Malahanobis with 2 and 3 neighbors –respectively, and bias-adjustment, and a propensity score matching (PSM) from a logit model with at least 1 neighbor. For the restricted neighbors sample, we estimate the ATT using the modified model with interactions.

dichotomous hacienda variable in model 3.2 (Table A.7).

While the ATT magnitude varies by sample, all estimates are statistically significant, except in 1900 for the neighbors sample. On average, municipalities within 29km to a hacienda have between 1.8 and 3.8 percentage points higher literacy than their counterparts in the full sample; and for the restricted neighbors sample, between 2 and 4.3 percentage points higher literacy for municipalities within 13km to an hacienda (Figure 3.6(a)). The OLS estimates show similar magnitudes and precision.

Figure 3.6(b) corroborates the negative relation between closeness to haciendas and poverty. Municipalities within 29km to an hacienda have, on average, between 2.2 and 3.3 lower and statistically significant marginalization index than those farther away. In contrast to literacy, the ATT results for the restricted neighbors sample are not statistically significant, while the differences between the full sample ATT and OLS estimates are larger.

4.2 Robustness

Hacienda historiography has noted differences in the characteristics of haciendas and pueblos across regions as a result of the initially different rural environments. In this section we undertake a placebo-type test by comparing our results with the South Mesa. To do so, we replicate the main empirical analysis for this region, composed of 541 municipalities in Oaxaca and Guerrero, and with 50 colonial haciendas across 34 municipalities.

The South Mesa is a distinct region of *pura sierra* as Mexicans call it. The valleys with steep slopes, little level ground, and narrow ridges impede large-scale agriculture, and complicate access to Mexico City. Yet, there are pockets throughout that are suitable for agriculture and have been densely populated since ancient times. The Oaxaca plateau is the most important of such fertile areas in the region, home to the native Zapotec and Mixtec cultures. Early on, haciendas were located alongside native towns yet remained relatively small (Taylor 1972). In the valley of Oaxaca, two-thirds of the agricultural land was owned by Indians; Spaniards and creoles owned small haciendas and ranchos (Taylor 1972, 201). In contrast, more than two thirds of the agricultural land was owned by Spaniards in the Central Mesa (Gibson 1964, 277-79).

The extraction of mineral resources was not a major colonial economic activity in the South Mesa in the 18th century. Our data for mines from Humboldt has no mines in Oaxaca in 1810. In the South Mesa region, the municipality closest to a mine is in Guerrero: 96km away. Rather, another export commodity, the cochineal—an insect from which a red dye highly valued in Europe at the time was obtained—played a commercial role comparable to gold and silver by the 18th century. However, the main producers of cochineal were native pueblos in Oaxaca, not haciendas, because of the labor-intensive production process. The dyes produced from cochineal were used in part to pay tribute but were also commercialized through local markets. Indeed, Díaz-Cayeros and Jha (2016) show that localities where cochineal was produced during the colonial period have today a higher female labor force and more political participation compared to those not engaged in cochineal production. Haciendas in this region did not play as important a role in linking rural economic activity to the larger colonial economy as in the Central Mesa. We test this hypothesis by comparing the estimates for literacy rates between regions.[21]

Figure 3.7 shows the placebo estimates for our main model (Model 3.1) and compares them against the Central Mesa (Tables A.12 and A.13). Using the pooled data, we observe a similar increasing trend during the first half of the 20th century in both regions. Nonetheless, in the South Mesa, the relation between proximity to colonial haciendas and literacy rates is negative before 1950. In addition, the placebo estimates across specifications do not share similar trends and are only statistically significant in 1900 and 1930 for the pooled model. Similarly, when estimating the models with interactions, we do not observe a statistically

[21] The 1970 Population Census does not have complete information for Oaxaca at the municipality level. Therefore, we are not able to calculate the marginalization index in 1970 for this region. The results for 1980 and 1990 are in Figures A.7 and A.8.

significant relation between literacy rates and distance to hacienda in the South Mesa (Figure A.6).

We observe a similar contrast between regions when comparing the predicted literacy rates by distance to hacienda (km) for nonhacienda municipalities (Figure 3.8). As proximity to hacienda increases, average predicted literacy falls in the Central Mesa for all years (panel a), but the relation is flat or positive for the South Mesa (panel b). These differences remain statistically different from zero for municipalities within 50km from the closest hacienda, for both the pooled and cross-section analyzes.

The analysis for the South Mesa highlights the specific characteristics of the hacienda in central Mexico that drive our main results. In particular, the placebo results strongly suggest that in the Central Mesa the higher literacy, observed years later in municipalities close to colonial haciendas, is related to the haciendas' role as colonial economic hubs linking the rural areas to mining and colonial trade with Spain. In this way, rather than a characteristic inherent to the hacienda as an agricultural estate, it is the economic complementarities between colonies activities that seem to drive the positive relation between colonial haciendas and our outcomes in the 20th century.

In the next section we test whether local scale economies can explain the relation between proximity to colonial hacienda and our social outcomes in the 20th century.

4.3 Mediators: Economic geography

As mentioned in Section 1, the role of haciendas as hubs of rural, economic activity suggests that haciendas may have played a focal role in coordinating new investments related to industrialization and the growing exports to the north during the 20th century. In this way, proximity to an hacienda in the past would explain path dependence in the location of economic activity. We first provide empirical evidence in support for the local economies of scale explanation. Second, we discuss the natural features explanation.

Local economies of scale

Local increasing returns to scale in hacienda locations may have attracted investments into the new profitable economic activities, contributing to the geography of industrialization and urbanization in 20th-century central Mexico. In this way, hacienda proximity may be related to an increase in the demand for educated workers and the value of literacy.

We analyze the mediating role of local economies of scale with data from the censuses on the proportion of urban localities per municipality and of labor in agriculture, manufacturing, and trade, available starting in 1950. A locality is defined as urban if it has 2,500 inhabitants or more (see Appendix 3.4). We implement a formal mediation model based on Kosuke Imai, Luke Keele, Dustin Tingley and Teppei Yamamoto (2011) using our cross-section specification. The approach relies on the assumption that proximity to a colonial hacienda (the treatment) is quasi-randomly assigned conditional on our geographic and other controls, and that the mediator is ignorable conditional on proximity to hacienda and the controls. To conform our estimation to these assumptions we restrict the sample to hacienda municipalities and their neighbors and define the treatment as being within 13km of a colonial hacienda (see the discussion on balance-tests for our NNM analysis above).

The mediation model utilizes the potential outcomes framework to estimate the causal mediation effect by decomposing the total causal effect into direct and indirect effects.[22] Table 3.3 provides the causal mediation effect estimated for each mediator as a proportion of the total effect of hacienda proximity on the outcome.[23] The estimation shows that the mediation role of urbanization increases with time and goes from mediating 10 percent of

[22] In the first stage, a mediator model is estimated as a function of the treatment and the covariates. Two predictions for the mediator are obtained, one under the treatment and the other under the control. In our case, these correspond to the predicted proportion of urban localities, say, for municipalities within 30km of hacienda and for those farther away. The second stage fits a regression model of the outcome as a function of the mediator, the treatment, and the covariates. The causal mediation effect corresponds to the average difference in the predicted outcome using the two different predicted values of the mediator.

[23] Our results are similar, but smaller in magnitude compared to a standard OLS mediation analysis (See Table A.15).

the impact of hacienda proximity on the literacy rate in 1950 to 37 percent in 1990. The percentages are higher for the index of marginalization mediating from 34 to 71 percent of the total impact of haciendas on the index. Notice that while the legacy of hacienda is mediated by the proportion of urban localities, urban localities are also directly related to our development outcomes, as should be expected.

A lower proportion of workers in agriculture mediates between 19 and 36% of the relation between hacienda proximity and literacy, and more than half of the relation between hacienda proximity and marginalization. The proportion of workers in manufactures mediates between 11 and 24% of the hacienda legacy on literacy after 1960, while up to 44% that of poverty; trade workers mediate between 10 and 24% for literacy and between 20 and 48% for poverty. More urbanization and less agriculture as a result of proximity to a colonial hacienda account for more than half of the reduction in poverty by 1990.

Prior colonial rural hacienda locations appear to have become more commercial and urban than their rural nonhacienda counterparts, and in this way increased literacy and reduced poverty years later. While part of the relation between hacienda and literacy remains to be explained, this evidence suggests that being close to a colonial hacienda set municipalities in central Mexico on a path toward urbanization and integration with the commercial economy by the mid 20th century.

Natural features

Geographic features, like mines, may have driven the local development of haciendas as centers of economic activity. Table 1 documents that indeed, circa 1800, municipalities with an hacienda are closer to a mine (and to an urban area) than those farther away from haciendas. Our main results account for the possible influence of proximity to gold and silver mines circa 1800 by including them as controls.[24]

Haciendas in the Central Mesa also benefited from fertile soil and many invested in irrigation. The sites may have remained important for agricultural production and this may have attracted migrants and economic activity. Table 3.2 documents, however, that the proportion of workers in agriculture is lower and that of urban localities higher, on average, in municipalities closer to haciendas. In addition, Table 3.3 documents that higher literacy rates are associated with a lower proportion of workers in agriculture compared to municipalities similar in other respects but farther away from haciendas. This evidence does not allow us to fully reject the natural features explanation because, for example, the fall in the proportion of workers in agriculture may be due to an increase in agricultural productivity. Even so, altogether, our results strongly suggest an important role for economic complementarities in explaining the legacy of hacienda.

5. Alternative explanations

Two alternative explanations could explain the relation between colonial haciendas and 20th century outcomes: the construction of the railroad that began in the late 19th century and the redistribution of land that followed the Mexican Revolution. The construction of the railroad network allowed for the expansion of trade with the north and through the ports. Closeness to a railroad reduced trade costs for haciendas and could have fostered higher agricultural income and more integration with the market.

The Agrarian reform that began in 1916 allowed for the restitution of land to peasants claiming land dispossession in the 19th century. Later, it also included outright land grants. From the outset, the program had the twofold goal of encouraging commercial agriculture through small property and the endowment of sufficient land to native villages (Brading

[24] New minerals were extracted in the late 19th century yet most new mines were located to the north of our area of study (Velasco Ávila et al. 1988).

1978). To the extent that redistribution made land available to smallholders and reduced land inequality, the reform may have provided economic opportunities for a larger proportion of the population (Engerman and Sokoloff 1997; Acemoglu, Johnson and Robinson 2002). In addition, Garfias (2018) documents that in regions where hacienda land was expropriated, local governments were more likely to invest in state capacity. A stronger local state may have increased the provision of education and other public goods.

We implement below formal mediation models to analyze whether railroads and land reform mediated part of the relation between colonial haciendas and our outcomes.

5.1 Railroads

Our empirical analysis above shows that the differences in literacy begin only in the 1930s and 1940s. In 1900 there does not appear to be a statistically significant higher proportion of literates in municipalities close to a colonial hacienda. Given that railroads had been around for two decades by 1900, the railroads explanation would lead us to expect a positive relation in 1900 yet we do not find a statistically significant one. We digitized the map of railroad stations in Cosío Villegas (1974) to create a dichotomous variable equal to 1 if the municipality has at least one railway station and 0 otherwise.[25] Table 3.2 shows that municipalities close to a hacienda have a higher proportion of railway stations than the average for the full sample.

The top panel of Table 3.4 shows that railway stations have a positive and statistically different from zero relation with literacy, yet railway stations appear to reduce the impact of hacienda on literacy (the causal mediating effect is negative). Even so, the proportion mediated is small: 4% in 1900 and decreasing thereafter. The coefficients on proximity to colonial hacienda remain statistically significant. In a country with many mountain ranges in the center, it is perhaps not surprising the railways' lack of impact and their replacement

[25] There are only fourteen municipalities with more than one railway station; the maximum is three.

by roads during the 20th century.

5.2 *Agrarian Reform*

We use data on land grants executed between 1916 and 1948 from the National Agrarian Registry (Registro Agrario Nacional, RAN).[26] The majority of land actions took place between 1930 and 1940 with president Lázaro Cárdenas. As a percentage of the total surface area of municipalities, on average more land was granted in hacienda municipalities and in those close to haciendas (Table 3.2).

Land redistribution mediates less than 2% of the total effect of hacienda proximity on literacy after 1930, and between 6 and 7% for marginalization (Table 3.4). The coefficients on hacienda remain statistically different from zero after the inclusion of the proportion of land redistributed. The small role of land redistribution may be related to the lack the incomplete property rights of *ejidos*, which scholars have condemned for the lagging behind of regions with a high concentration of ejidal lands (Alain De Janvry, Marco Gonzalez-Navarro and Elisabeth Sadoulet 2014; Michael Albertus, Alberto Díaz-Cayeros, Beatriz Magaloni and Barry R. Weingast 2016; Melissa Dell 2012); others argue the land reform served rather as a political strategy to demobilize peasants in regions with political conflict (Sanderson 1984; Saffon 2014). The land reform spearheaded the demise of the hacienda yet differences between municipalities close and far from haciendas remain in the 20th century and in some cases have amplified.

The reform appears to be positively related to literacy, albeit not to poverty (Table 3.4). While explaining this is outside the scope of this paper, there are studies suggesting possible explanations. For Garfias (2018), expropriation resulted in an increase in local state capacity that may have increased the provision of education and other public goods. Elizalde (2020)

[26]We thank Sánchez-Talanquer (2017, 145) for sharing his data. Results are robust to using land petitions approved by the President between 1916-1976 from Sanderson (2013); not all approved petitions were executed. The RAN data documents grants executed.

finds gains in education in municipalities that were able to restore their rights to ancestral lands—thanks to a pre-colonial legacy of complex indigenous institutions that allowed them to coordinate against the state. Land grants may have facilitated the integration of faraway communities under the umbrella of the state, allowing them to benefit from targeted federal programs.[27]

6. Conclusions

This study sheds light on the legacies of colonial haciendas in central Mexico through a combination of time-disaggregated quantitative analysis and historical narrative. We find that municipalities close in the past to a hacienda have on average higher rates of literacy and a lower poverty index throughout the 20th century than those similar in other respects yet farther away. These findings are robust to various specifications, a nearest neighbor analysis, a placebo-type test, and tests for sensitivity to unobservables. Differences between municipalities in central Mexico close and far from haciendas remain after the hacienda ceased to play a role in agricultural production in the early 20th century.

While our analysis is unable to account for the differences in colonial haciendas across regions highlighted by historians (e.g, size and quality of landholding, labor relations, use of technology, specialization, ownership), our focus on central Mexico highlights the role of economic complementarities between late-colonial, market-oriented haciendas and mining and trade—the most profitable colonial economic activities. The latter complementarity distinguishes colonial haciendas in the Central Mesa from their namesakes in the north and south. Our results apply, thus, to agricultural estates with such characteristics and studies their implications for long-run development.

We show that literacy and poverty are not related to closeness to colonial hacienda in the South Mesa, where the carmine dye produced from cochineal was an important colonial

[27] See Wolf (2017) for an example in the Bajío.

export yet had no economic complementarities with the hacienda. Native pueblos took charge of the exploitation and commercialization of cochineal, not haciendas. The results for the South Mesa suggest that the positive relation between colonial haciendas and our outcomes in the Central Mesa is not inherent to the hacienda as an agricultural estate. Rather, we draw on models of economic geography to explain the path dependence of economic activity in hacienda locations over time.

In municipalities with a history of hacienda presence, agglomeration effects and local scale economies appear to have facilitated the transition from the old agricultural order to the burgeoning industrial and commercial sectors in the early 1900s. We find that the history of colonial haciendas helps explain the geography of occupational specialization: areas closer to a hacienda in the past, have more urban localities, a lower proportion of workers in agriculture, and a higher proportion in trade and manufactures in the second-half of the 20th century. After the demise of the hacienda, localities that had been close to a colonial hacienda kept attracting economic migrants while becoming more urban than those further away from haciendas. The change away from agriculture and toward trade and urbanization increased the value of literacy.

Railway stations and land grants appear to play a small role in explaining the legacy of haciendas. While on average hacienda municipalities are closer to railway stations and received more land grants as a proportion of the total area of the municipality, these variables mediate less than 5% of the relation between hacienda and literacy. Still, we find that the proportion of land grants is positively associated with literacy rates in the second half of the 20th century. This finding contrasts with others that have documented a negative relation between ejidos and economic development. While we show that proximity to an hacienda set municipalities in the central mesa on a path of higher literacy, the land reform appears to have also increased literacy albeit independently of distance to a hacienda in the past. More research is needed to better understand whether and through which mechanisms the land redistribution may have also altered the path of development of municipalities in rural Mexico.

7. Figures

Figure 3.1: Colonial haciendas in the highlands of Central Mexico

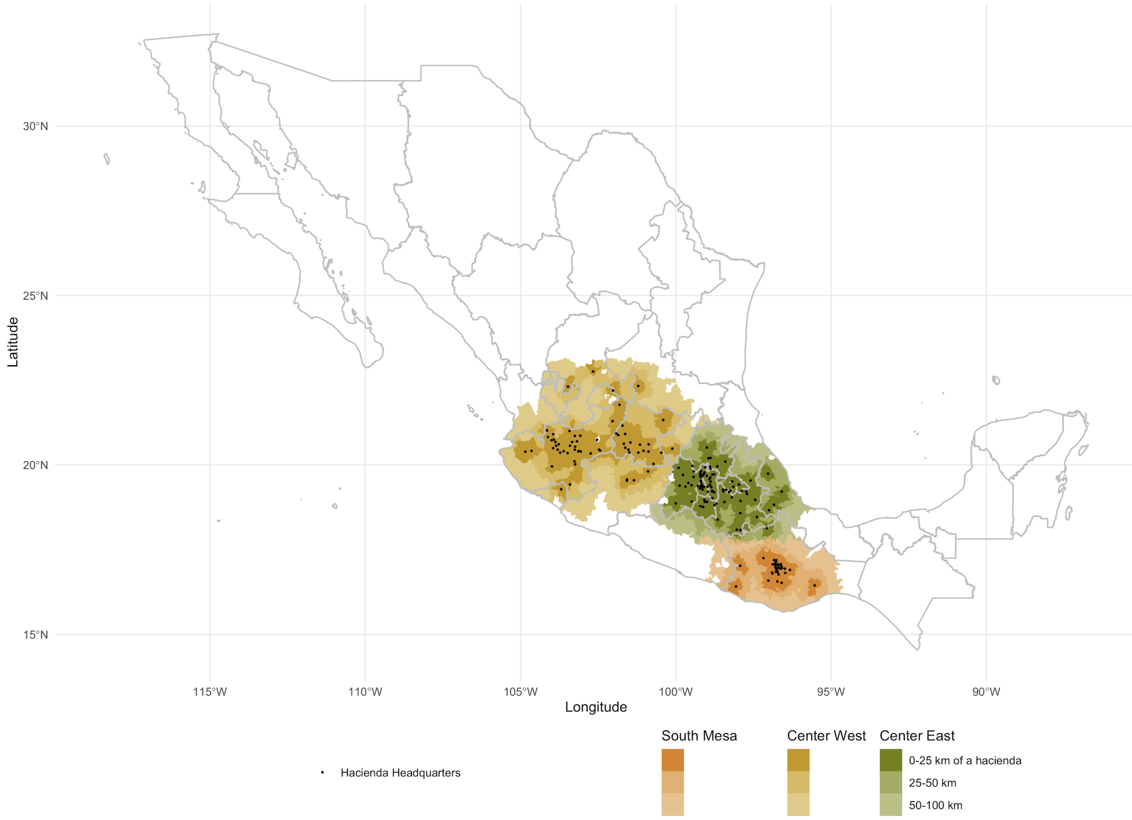


Figure 3.2: Municipalities and colonial haciendas

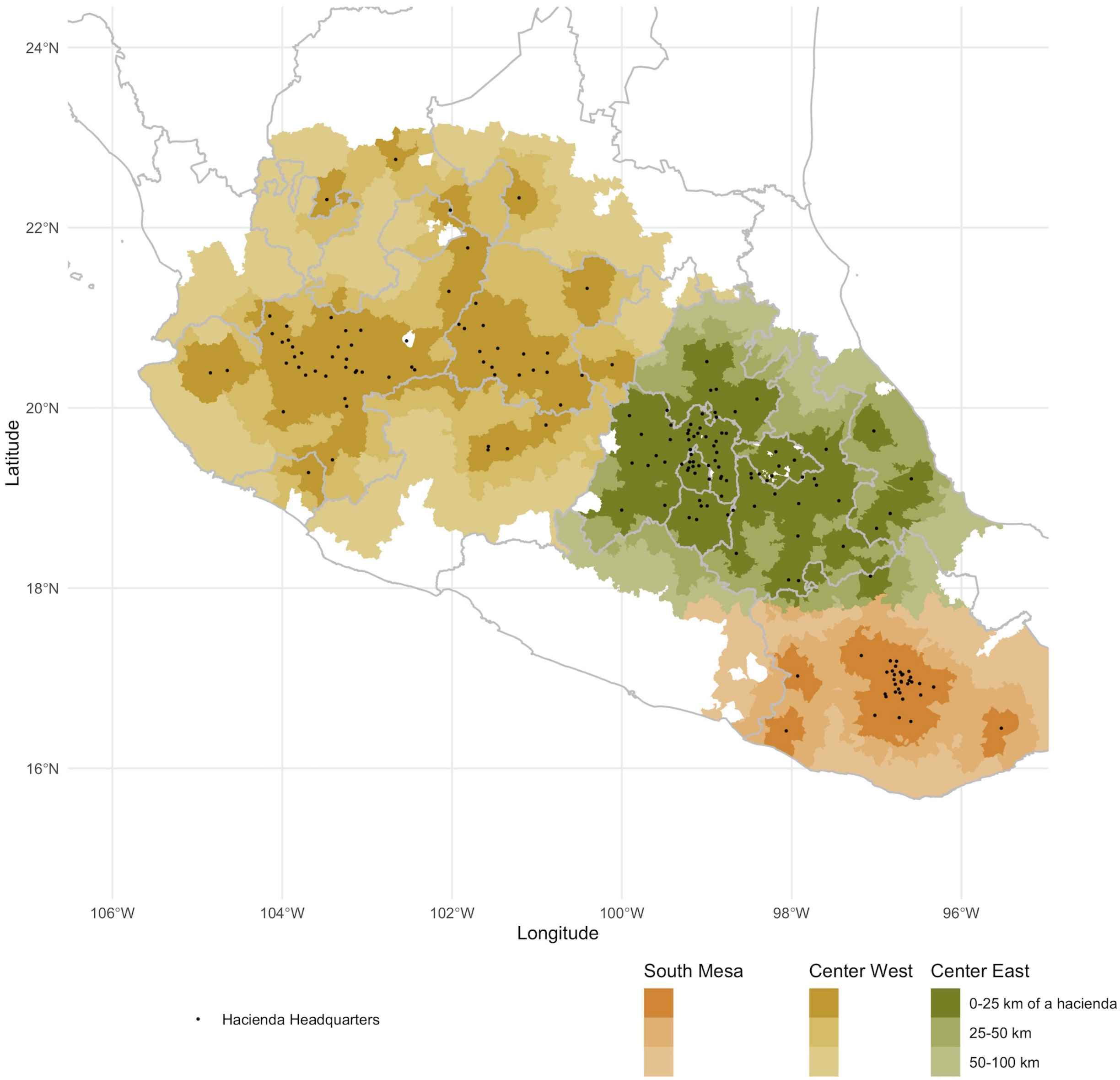
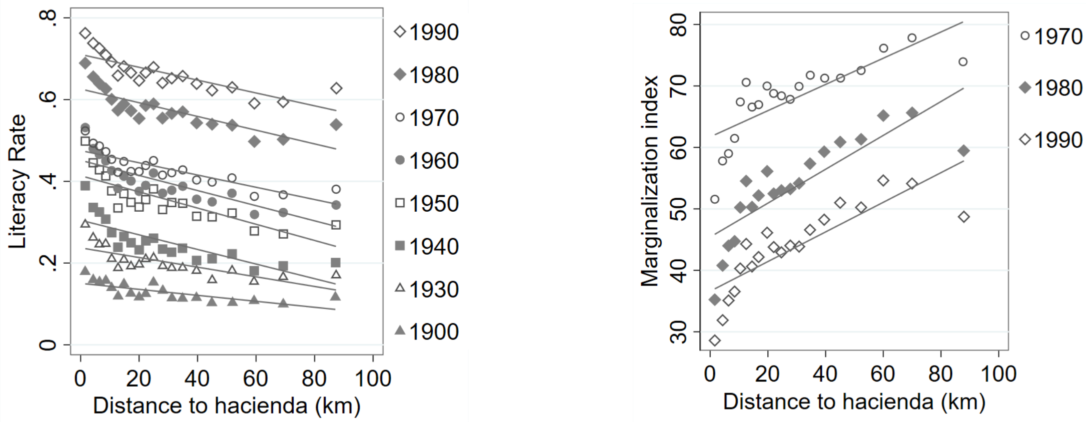


Figure 3.3: Mean of outcomes by distance to hacienda

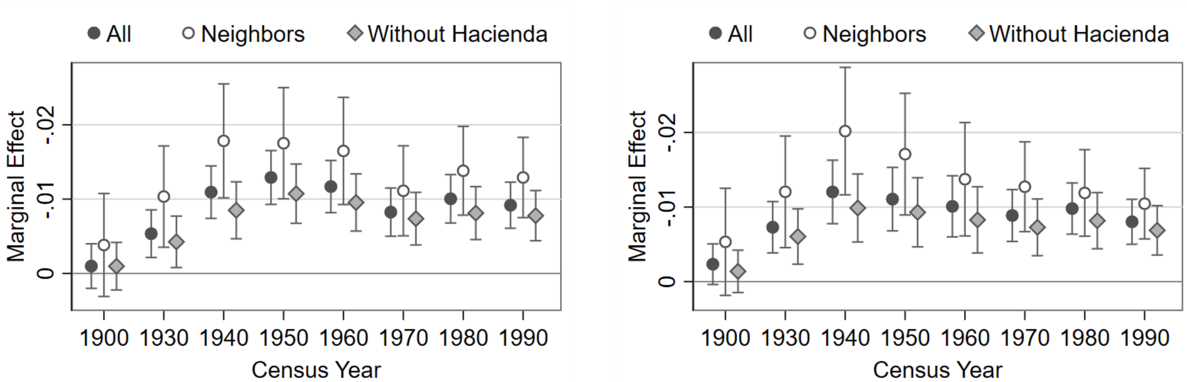
(a) Literacy rate (b) Marginalization index



Notes: Bin-scatter with linear fitted estimates. Sample restricted to municipalities with at least one hacienda within a 100km ratio. See the text for a description of the variables and data sources.

Figure 3.4: Estimates on literacy rates by distance to hacienda, 1900-1990

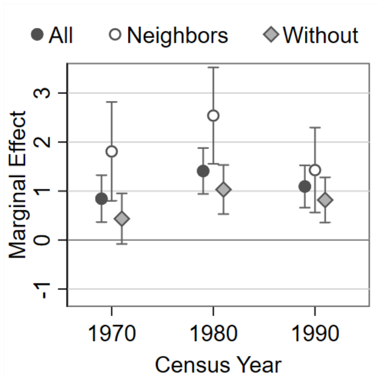
(a) Pooled data (b) Cross section



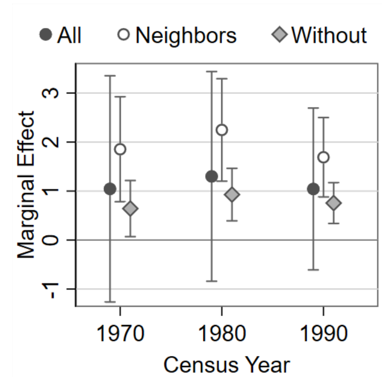
Notes: Marginal effect of distance to nearest hacienda (10km) with 95% confidence intervals over census year. (a) Pooled OLS regression with standard errors clustered at the municipality level; (b) Cross-section OLS regressions with robust standard errors. Municipalities within 100km of closest hacienda headquarters. Includes state fixed effects and all controls.

Figure 3.5: Estimates on marginalization index by distance to hacienda, 1970-1990

(a) Pooled data



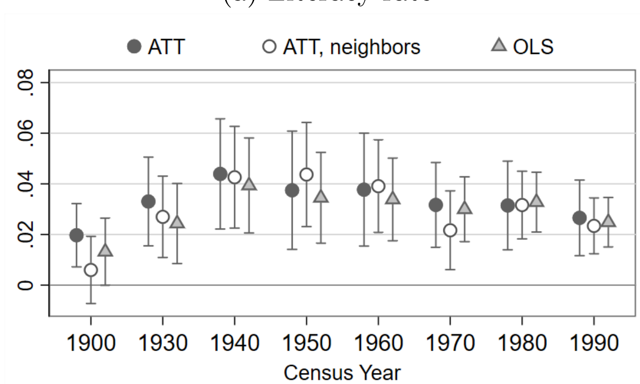
(b) Cross section



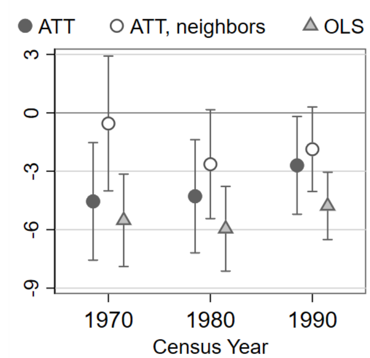
Notes: Marginal effect of distance to nearest hacienda (10km) with 95% confidence intervals over census year. (a) Pooled OLS regression with standard errors clustered at the municipality level; (b) Cross-section OLS with robust standard errors. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

Figure 3.6: Nearest neighbor matching analysis by hacienda proximity, 1900-1990

(a) Literacy rate



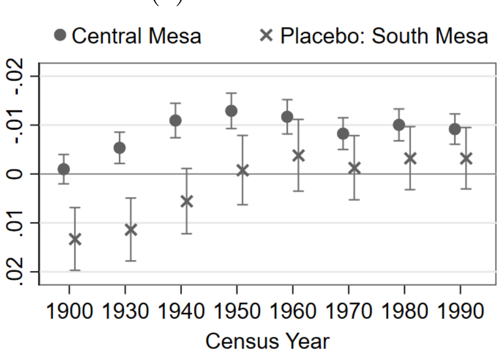
(b) Marginalization index



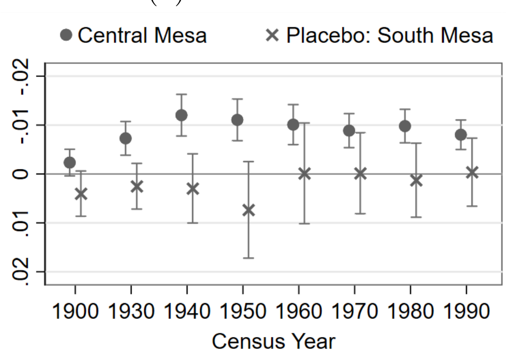
Notes: ATT (Malahanobis, NNM-1) for municipalities within 29km (ATT), and within 13km distance to nearest hacienda (ATT, neighbors). OLS beta coefficient for presence of hacienda (binary) for municipalities within 100km of an hacienda. All estimations include 95% confidence intervals over census year.

Figure 3.7: Placebo estimates for literacy rates by distance to hacienda, 1900-1990

(a) Pooled data



(b) Cross section

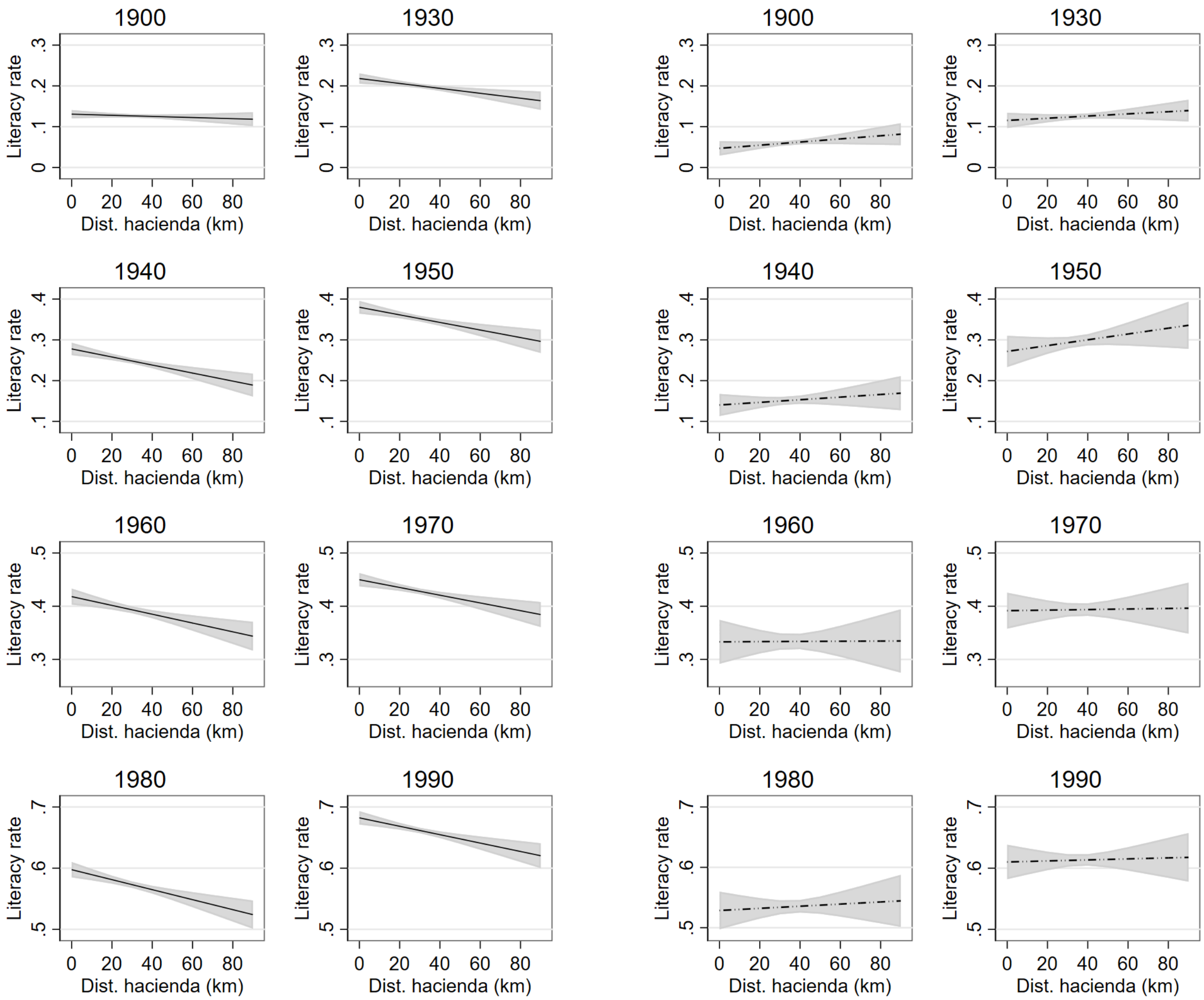


Notes: Marginal effect of distance to nearest hacienda (10km) with 95% confidence intervals over census year. (a) Pooled OLS regression with standard errors clustered at the municipality level; (b) Cross-section OLS with robust standard errors. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

Figure 3.8: Predicted literacy rate by distance to hacienda for municipalities without haciendas, 1900-1990

(a) Central Mesa

(b) Placebo: South Mesa



Notes: Linear prediction for municipalities without haciendas from cross-section OLS with robust standard errors. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

8. Tables

Table 3.1: Statistics by distance to colonial hacienda and hacienda presence

	All		Without Haciendas		Haciendas		Neighbors Without Hac	
	(1) Mean	SD	(2) Mean	SD	(3) Mean	SD	(4) Mean	SD
Dist. nearest hacienda (km)	29.53	22.83	33.37	22.31	6.39	6.23	19.62	11.88
Nearest colonial city (km)	63.45	39.28	66.39	39.60	45.76	32.09	57.36	38.80
Nearest c.1800 mine (km)	126.0	74.42	131.0	76.37	96.3	52.52	118.4	67.56
Median altitude (km)	1.713	0.711	1.667	0.721	1.988	0.580	1.928	0.612
Average land gradient	4.736	3.112	4.948	3.204	3.464	2.083	4.047	2.605
Latitude	19.69	1.093	19.66	1.126	19.86	0.847	19.67	1.042
Soil Suitability	0.204	0.468	0.227	0.483	0.068	0.337	0.144	0.432
Pueblos de indios (prop.)	0.809	0.393	0.798	0.402	0.877	0.330	0.784	0.412
Area of municipality (km^2)	330.3	446.0	321.3	449.9	384.2	419.4	347.4	519.6
Municipalities	1,137		975		162		445	

Notes: Mean and standard deviation using 1970 as reference year for municipalities within 100km of closest hacienda. Differences between columns 2 and 3, and 3 and 4 are statistically significant (except for municipality area, and altitude between columns 3 and 4). The variables are described in the text.

Table 3.2: Statistics by distance to colonial hacienda and hacienda presence

	All		Without Haciendas		Haciendas		Neighbors Without Hac	
	(1) Mean	SD	(2) Mean	SD	(3) Mean	SD	(4) Mean	SD
Dist. to nearest hacienda (km)	29.53	22.8	33.37	22.3	6.39	6.2	19.62	11.9
Urban localities (prop)	0.307	0.31	0.282	0.31	0.448	0.29	0.326	0.31
Workers in agriculture (prop)	0.713	0.22	0.736	0.21	0.573	0.26	0.705	0.22
Workers in manufacture (prop)	0.105	0.12	0.097	0.12	0.150	0.12	0.107	0.12
Workers in trade (prop)	0.050	0.04	0.047	0.04	0.070	0.04	0.050	0.04
Railway station (binary)	0.055	0.23	0.046	0.21	0.111	0.32	0.056	0.23
Granted land (%)	32.93	26.9	31.27	27.0	42.87	23.8	37.91	27.1
Municipalities	1,137		975		162		445	

Notes: Mean and standard deviation using 1970 as reference year for municipalities within 100km of closest hacienda headquarters. Differences between columns 2 and 4, are statistically significant at the 5 percent level except for railway station; they are not between 3 and 4. See the text for a description of the variables.

Table 3.3: Urban localities and occupational specialization as mediators

	Literacy					Marginalization Index		
	1950	1960	1970	1980	1990	1970	1980	1990
Dist Hac<13km	0.054***	0.047***	0.034***	0.030***	0.021***	-3.16***	-2.34***	-1.18*
	(0.0096)	(0.0086)	(0.0070)	(0.0066)	(0.0055)	(0.98)	(0.79)	(0.60)
Urban localities	0.11***	0.11***	0.087***	0.11***	0.098***	-29.7***	-32.0***	-26.2***
(prop)	(0.016)	(0.014)	(0.011)	(0.010)	(0.0083)	(1.52)	(1.20)	(0.92)
Total Effect Mediated (prop)	0.0970	0.1067	0.1385	0.2976	0.3724	0.3542	0.5801	0.7160
Municipalities	597	602	592	609	609	592	609	609
Dist Hac<13km	0.0517***	0.0405***	0.0279***	0.0294***	0.0227***	-1.377**	-2.716***	-1.902***
	(0.00857)	(0.00967)	(0.00635)	(0.00620)	(0.00522)	(0.698)	(0.694)	(0.635)
Workers in	-0.334***	-0.291***	-0.197***	-0.203***	-0.169***	55.48***	50.19***	37.56***
agriculture (prop)	(0.0224)	(0.0210)	(0.0139)	(0.0137)	(0.0120)	(1.530)	(1.526)	(1.460)
Total Effect Mediated (prop)	0.1875	0.3512	0.2993	0.3047	0.3211	0.7015	0.5127	0.5271
Municipalities	570	365	607	609	602	592	609	602
Dist Hac<13km	0.0566***	0.0480***	0.0338***	0.0340***	0.0276***	-2.744***	-3.980***	-2.901***
	(0.00961)	(0.0111)	(0.00688)	(0.00674)	(0.00586)	(1.033)	(0.985)	(0.858)
Workers in	0.383***	0.391***	0.252***	0.311***	0.166***	-75.94***	-71.45***	-39.57***
manufacture (prop)	(0.0513)	(0.0503)	(0.0286)	(0.0321)	(0.0274)	(4.526)	(4.693)	(4.020)
Total Effect Mediated (prop)	0.1071	0.2251	0.1477	0.1930	0.1673	0.4356	0.3066	0.3007
Municipalities	567	365	607	609	602	592	609	602
Dist Hac<13km	0.0526***	0.0478***	0.0307***	0.0376***	0.0285***	-2.436***	-4.633***	-3.069***
	(0.00874)	(0.00988)	(0.00663)	(0.00674)	(0.00566)	(0.859)	(0.898)	(0.773)
Workers in trade	1.527***	1.400***	1.004***	0.671***	0.478***	-289.6***	-187.6***	-121.4***
(prop)	(0.111)	(0.110)	(0.0872)	(0.0710)	(0.0569)	(11.25)	(9.469)	(7.765)
Total Effect Mediated (prop)	0.1719	0.2305	0.2292	0.1018	0.1380	0.4927	0.1964	0.2620
Municipalities	569	365	607	608	602	592	608	602

Notes: Second stage estimations based on Imai et al. (2011). First stage results in Appendix Table A.14. Cross-section OLS with robust standard errors for municipalities within 100km of closest hacienda headquarters. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. Includes all controls and state fixed effects. See the text for a description of the variables and sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table 3.4: Mediators for Literacy and Marginalization Index: Railroads and Land Reform

	Literacy								Marginalization Index		
	1900	1930	1940	1950	1960	1970	1980	1990	1970	1980	1990
Dist Hac<13km	0.020*	0.039***	0.063***	0.061***	0.053***	0.040***	0.042***	0.034***	-5.03**	-5.88***	-4.49***
	(0.0097)	(0.013)	(0.017)	(0.017)	(0.016)	(0.011)	(0.012)	(0.0097)	(2.37)	(1.91)	(1.43)
Railway station	0.058***	0.059**	0.068**	0.056*	0.040	0.034*	0.041**	0.025	-15.3***	-13.5***	-8.95***
(binary)	(0.019)	(0.026)	(0.031)	(0.029)	(0.025)	(0.019)	(0.018)	(0.015)	(3.33)	(2.61)	(2.14)
Total Effect Mediated (prop)	-0.0431	-0.0285	-0.0106	-0.0093	-0.0082	-0.0083	-0.0092	-0.0072	-0.0120	-0.0167	-0.0143
Municipalities	470	554	585	597	602	607	609	609	592	609	609
Dist Hac<13km	0.017*	0.035**	0.060***	0.058***	0.051***	0.038***	0.040***	0.032***	-4.62*	-5.45***	-4.19***
	(0.0084)	(0.013)	(0.016)	(0.017)	(0.016)	(0.010)	(0.012)	(0.0093)	(2.20)	(1.72)	(1.30)
Granted land	0.051***	0.052***	0.064***	0.061**	0.048**	0.048*	0.047	0.047*	-7.17***	-7.67**	-6.18*
(binary)	(0.015)	(0.016)	(0.021)	(0.022)	(0.019)	(0.027)	(0.029)	(0.025)	(2.16)	(3.06)	(2.95)
Total Effect Mediated (prop)	0.0926	0.0440	0.0221	0.0212	0.0192	0.0246	0.0230	0.0285	0.0204	0.0273	0.0290
Municipalities	468	552	583	595	600	604	606	606	589	606	606

Notes: Second stage estimations based on Imai et al. (2011). First stage results in Appendix Table A.14. Cross-section OLS with robust standard errors for municipalities within 100km of closest hacienda headquarters. Granted land equals 1 if the proportion of land granted is greater than zero, and equals 0 otherwise. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. Includes all controls and state fixed effects. See the text for a description of the variables and sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Chapter 4

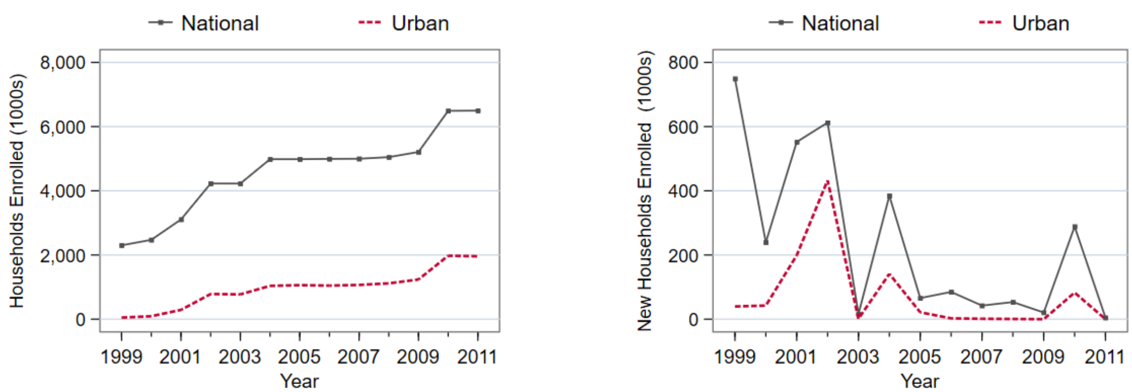
Appendix and Supplementary Material

1. Appendix to “Health Outcomes and Cash Transfers: Evidence from Progresa in Urban Mexico”

1.1 Additional Figures

Figure A.1: Progresa New Household Enrollment, 1999-2011

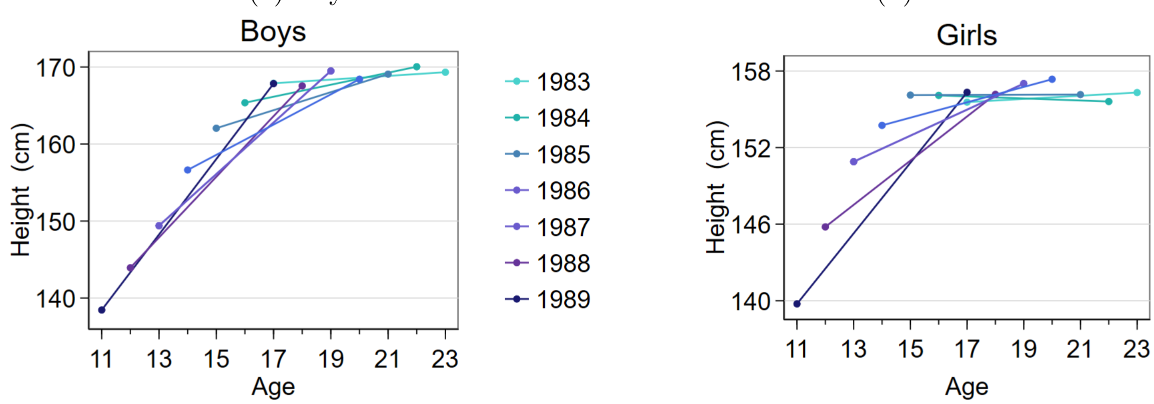
(a) Total Households (b) New Households



Source: Progresa Administrative Records.

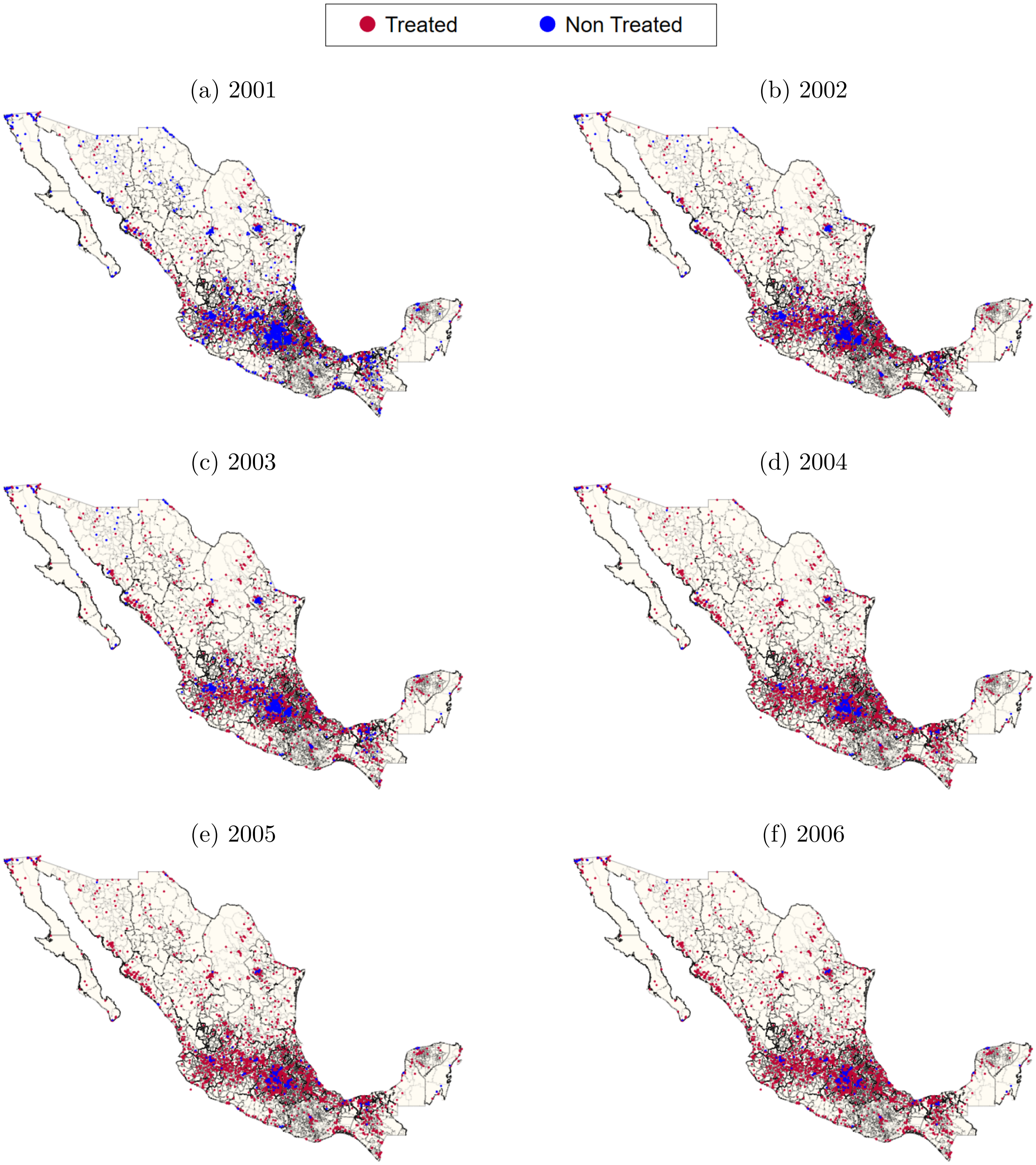
Figure A.2: Children’s Height Trajectory by Sex and Cohort of Birth

(a) Boys (b) Girls



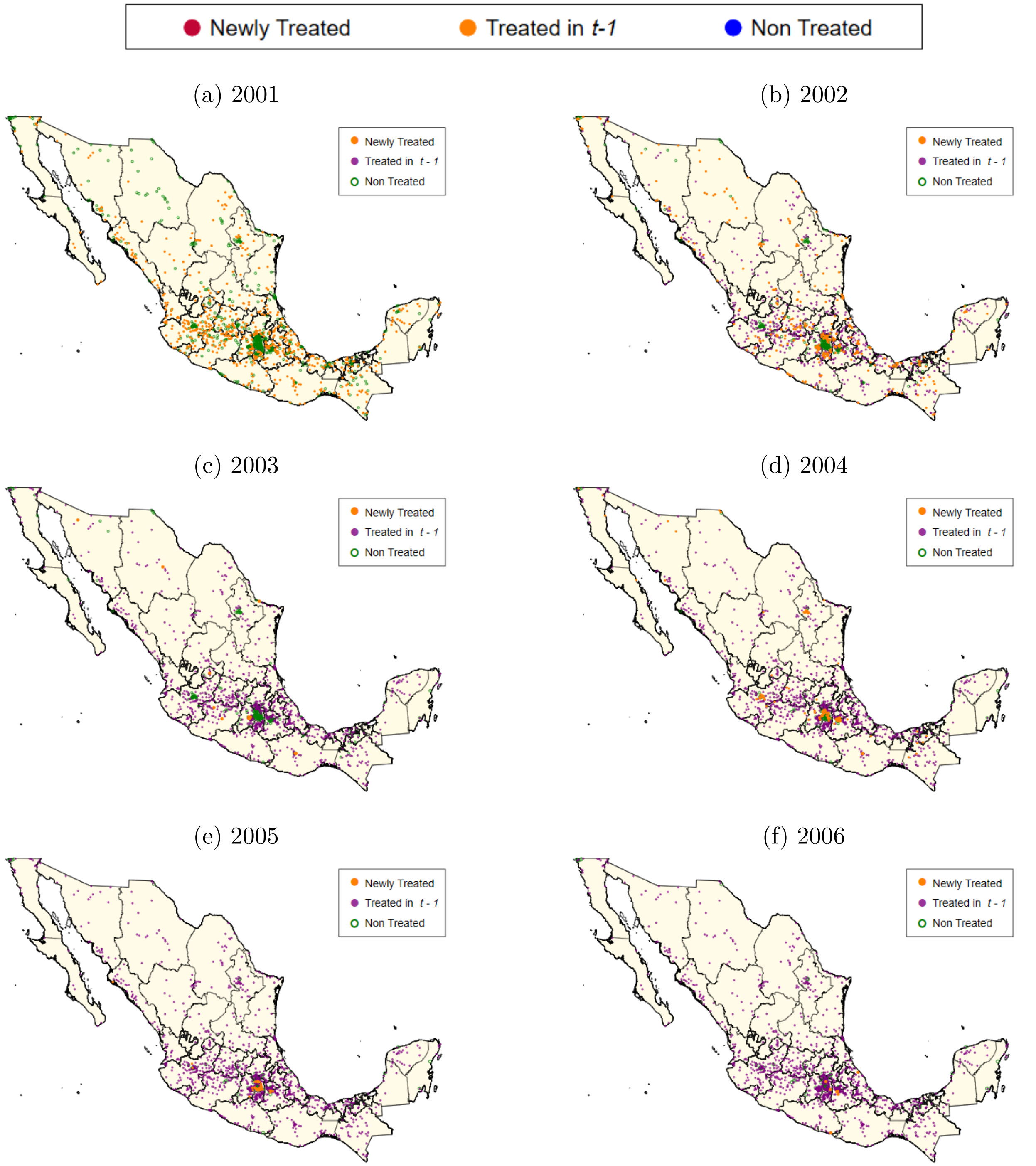
Notes: Mean height in each wave (2000 and 2006) by cohort of birth with their age (horizontal axis) . Sample restricted to children from urban localities treated between 2001-2006. Sources: ENSANUT, Progresa Administrative Records.

Figure A.3: Progresa's Scaling-Up to Urban Localities by Year, 2001-2006



Source: Progresa Administrative Records.

Figure A.4: Progresa's Scaling-Up to New Urban Localities by Year of Entrance, 2001-2006



Source: Progresa Administrative Records.

1.2 Additional Tables

Table A.1: Descriptive Statistics on Urban Households by Socioeconomic Status

	ENSANUT 2000			ENSANUT 2006		
	(1) All	(2) Low SES	(3) High SES	(4) All	(5) Low SES	(6) High SES
Take-up of Progresa (%)	0.0	0.0	0.0	9.8	26.5	0.0
	(0.0)	(0.0)	(0.0)	(29.7)	(44.2)	(0.0)
Household size	3.98	4.76	3.67	4.28	4.33	4.28
	(1.87)	(1.98)	(1.68)	(1.94)	(2.12)	(1.84)
Health Insurance (prop.)	0.58	0.43	0.65	0.61	0.56	0.64
	(0.49)	(0.50)	(0.48)	(0.49)	(0.50)	(0.48)
With children (prop.)	0.68	0.90	0.60	0.69	0.70	0.69
	(0.47)	(0.30)	(0.49)	(0.46)	(0.46)	(0.46)
Number of children	1.49	2.43	1.14	1.56	1.73	1.48
	(1.43)	(1.56)	(1.17)	(1.45)	(1.60)	(1.35)
With adults over 70y (prop.)	0.13	0.03	0.15	0.15	0.20	0.13
	(0.33)	(0.16)	(0.35)	(0.36)	(0.40)	(0.33)
Head of Household						
Age	45.7	36.4	48.0	48.3	49.5	47.7
	(16.1)	(11.8)	(15.9)	(15.3)	(16.8)	(14.5)
Female (prop.)	0.04	0.04	0.04	0.22	0.29	0.19
	(0.19)	(0.21)	(0.19)	(0.42)	(0.45)	(0.39)
Married (prop.)	0.76	0.88	0.72	0.76	0.69	0.79
	(0.43)	(0.33)	(0.45)	(0.43)	(0.46)	(0.40)
Schooling (years)	7.76	6.68	8.21	7.30	5.28	8.58
	(4.42)	(3.60)	(4.64)	(4.46)	(3.86)	(4.34)
House characteristics						
Rooms per person	0.61	0.36	0.71	0.58	0.51	0.62
	(0.42)	(0.18)	(0.45)	(0.37)	(0.35)	(0.37)
Firm roof (prop.)	0.76	0.54	0.86	0.80	0.51	0.97
	(0.42)	(0.50)	(0.34)	(0.40)	(0.50)	(0.17)
Firm floor (prop.)	0.96	0.88	0.99	0.96	0.89	1.00
	(0.20)	(0.33)	(0.08)	(0.20)	(0.32)	(0.00)
Firm walls (prop.)	0.97	0.93	0.99	0.93	0.84	0.99
	(0.16)	(0.25)	(0.07)	(0.26)	(0.37)	(0.11)
With electricity (prop.)	0.99	0.98	1.00	0.99	0.98	1.00
	(0.09)	(0.14)	(0.04)	(0.09)	(0.15)	(0.00)
With sewage (prop.)	0.94	0.85	0.99	0.96	0.89	1.00
	(0.23)	(0.36)	(0.11)	(0.20)	(0.32)	(0.00)
With water acces (prop.)	0.97	0.92	0.99	0.98	0.94	1.00
	(0.17)	(0.28)	(0.08)	(0.15)	(0.23)	(0.02)
Households (N)	27,981	7,243	17,148	29,349	10,758	16,948

Notes: Sample weighted means with standard deviation in parenthesis below. Low SES corresponds to first index tercile; high SES includes second and third index terciles. Sources: ENSANUT.

Table A.2: Descriptive Statistics on Anthropometric Measures

	Male			Female		
	ENSANUT 2000	ENSANUT 2006	*p*-value	ENSANUT 2000	ENSANUT 2006	*p*-value
Adults						
Height (cm)	166.9	166.9	0.929	154.3	154.2	0.287
Weight (kg)	77.2	78.2	0.002	67.8	69.2	0.000
BMI	27.5	27.9	0.000	28.3	29.0	0.000
Underweight (%)	0.8	0.8	0.963	0.9	0.7	0.098
Overweight (%)	46.1	46.2	0.875	39.0	38.1	0.250
Obesity (%)	25.7	28.2	0.012	33.5	38.5	0.000
Observations	3,684	4,527	8,211	7,858	7,193	15,051
Cohorts: 1983-1989						
Height (cm)	153.9	168.8	0.000	150.9	156.6	0.000
Weight (kg)	50.2	69.3	0.000	49.6	59.4	0.000
BMI	20.8	24.3	0.000	21.5	24.1	0.000
Underweight (%)	5.7	6.2	0.479	5.8	5.4	0.544
Overweight (%)	20.5	24.8	0.000	23.8	24.4	0.633
Obesity (%)	9.2	11.1	0.021	8.7	9.0	0.647
Observations	3,108	2,414	5,522	3,335	2,853	6,188

Notes: Sample weighted means. Adults includes individuals between 25 to 49 years old. Sources: ENSANUT.

Table A.3: Descriptive Statistics on Progresa's Beneficiary Households

	ENSANUT 2000		ENSANUT 2006				
	Rural		Rural		Urban		Mean
	Mean	SD	Mean	SD	Mean	SD	Differences
Household size	5.06	(2.23)	4.83	(2.14)	5.28	(2.21)	0.458***
With children (prop.)	0.84	(0.37)	0.81	(0.40)	0.88	(0.33)	0.070***
Number of children	2.68	(1.95)	2.33	(1.78)	2.69	(1.73)	0.356***
Head of Household							
Age	45.5	(15.3)	47.9	(15.5)	45.4	(14.4)	-2.456***
Female (prop.)	0.03	(0.18)	0.20	(0.40)	0.24	(0.43)	0.046***
Married (prop.)	0.86	(0.35)	0.83	(0.37)	0.79	(0.41)	-0.047***
Schooling (years)	4.23	(2.78)	4.03	(3.23)	4.63	(3.47)	0.605***
House characteristics							
Rooms per person	0.39	(0.27)	0.43	(0.26)	0.37	(0.21)	-0.059***
Firm roof (prop.)	0.38	(0.49)	0.44	(0.50)	0.53	(0.50)	0.092***
Firm floor (prop.)	0.61	(0.49)	0.77	(0.42)	0.83	(0.37)	0.058***
Firm walls (prop.)	0.91	(0.28)	0.79	(0.41)	0.87	(0.34)	0.073***
With electricity (prop.)	0.90	(0.30)	0.95	(0.22)	0.98	(0.14)	0.029***
With sewage (prop.)	0.40	(0.49)	0.69	(0.46)	0.88	(0.33)	0.185***
With water acces (prop.)	0.62	(0.49)	0.81	(0.40)	0.95	(0.23)	0.139***
Households (N)	4,195		10,257		3,151		13,408

Notes: Sample restricted to urban localities treated after 2000 in ENSANUT. No treated localities on 2003 appear in data. Sources: CONAPO, INEGI, Progresa Administrative Records, Ministry of Health, ENSANUT.

Table A.4: Baseline Characteristics for Urban Localities (ENSANUT Sample)

	Means in 2000 by Year of First Treatment				
	(1)	(2)	(3)	(4)	(5)
	2001	2002	2004	2005	After
Marginality (percentile)	54.9	34.3	25.6	24.9	4.9
Social Lag (percentile)	53.5	34.0	29.3	29.7	4.9
Population (1000s)	17.2	129.2	341.5	174.1	688.1
Households (1000s)	4.0	31.5	78.7	41.8	176.7
Female Head of HH (%)	17.8	18.6	16.4	16.6	24.3
Children 6-17y (%)	27.5	26.2	25.2	24.3	19.7
Children not in school (%)	16.5	14.6	13.4	11.3	8.8
Illiteracy Rate (%)	9.4	6.8	5.0	4.5	2.4
No Health Insurance (%)	62.3	50.8	50.5	57.6	45.9
Physicians per 10k	9.4	7.4	6.4	10.5	15.0
Clinics per 100k	11.8	6.7	7.6	5.8	2.3
Localities ($N = 427$)	181	175	54	9	10

Notes: Sample restricted to urban localities treated after 2000 in ENSANUT. No treated localities on 2003 appear in data. Sources: CONAPO, INEGI, Progresa Administrative Records, Ministry of Health, ENSANUT.

Table A.5: Descriptive Statistics in 2000 by Progresa's Scale-up Phase and Type of Locality

	Urban						Rural					
	(1) 1999-2000		(2) 2001-2005		(3) After 2006		(4) 1999-2000		(5) 2001-2005		(6) After 2006	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Mun. Marginality	56.2	21.0	32.5	21.1	5.9	6.9	57.5	24.4	51.7	28.6	55.1	29.4
Population (1000s)	9.7	13.8	50.3	142.0	387.0	482.4	0.40	0.63	0.36	0.84	0.09	0.26
Households (100s)	21.1	34.7	118.2	334.4	991.4	1178.2	0.84	1.36	0.81	1.90	0.19	0.57
Members per house	4.7	0.5	4.3	0.4	4.1	0.7	4.7	0.9	4.7	1.2	4.6	1.3
Pop. Density	3.1	4.2	2.8	7.8	0.1	0.1	5.5	11.1	7.0	16.1	7.6	19.4
Female (%)	51.2	1.3	51.5	1.2	49.5	11.5	50.2	5.3	49.6	7.1	48.7	8.5
Children 6-17y (%)	30.0	2.8	27.2	2.5	21.1	6.8	30.5	7.6	28.3	10.1	27.4	11.7
Illiteracy Rate (%)	19.3	10.5	9.1	5.1	5.6	9.4	22.6	15.0	21.5	18.8	25.3	22.2
Schooling (years)	5.5	1.3	7.2	1.2	8.8	2.2	4.2	1.3	4.4	1.9	4.1	2.0
No Healthcare (%)	80.1	16.3	61.2	17.3	52.6	20.3	86.4	20.4	81.7	24.0	82.6	26.7
Physicians per 100k	43.1	47.6	60.0	71.9	66.1	101.7	21.4	152.5	25.0	533.1	6.9	160.5
Clinics per 100k	10.9	9.2	10.3	10.5	2.3	3.1	18.9	135.6	17.2	220.0	6.5	157.4
Hospitals per million	4.8	21.7	8.6	25.2	2.9	4.2	0.3	16.6	1.9	151.0	0.4	41.1
Geographic Region												
North (%)	17.3	38.0	18.7	39.0	5.6	23.6	18.7	39.0	24.1	42.8	28.4	45.1
Center (%)	39.8	49.1	53.9	49.9	94.4	23.6	41.2	49.2	43.6	49.6	26.7	44.2
South (%)	42.9	49.7	27.5	44.6	0.0	0.0	40.1	49.0	32.3	46.8	45.0	49.7
Localities (N)	134		1,154		18		18,351		26,945		17,699	

Notes: Means and standard deviations by locality. Urban localities have 5,000 inhabitants or more. Municipality marginality index expressed in percentiles, population density refers to mean by municipality. Sources: CONAPO, INEGI, Progresa Administrative Records, Ministry of Health.

Table A.6: Intent-to-Treat Effects on Anthropometric Measures (Cohorts: 1983-1989)

	Height (cm)		Weight (kg)		BMI	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Years Treated	0.875***	0.216	1.246***	0.279	0.222	0.108
	(0.254)	(0.242)	(0.447)	(0.477)	(0.175)	(0.180)
SES Index	0.052***	0.023	0.057*	0.083***	0.015	0.027**
	(0.020)	(0.016)	(0.033)	(0.028)	(0.011)	(0.010)
(SES Index) ^{2}	-0.0001	0.0000	-0.0002	-0.0007**	-0.0001	-0.0003**
	(0.0002)	(0.0002)	(0.0004)	(0.0003)	(0.0001)	(0.0001)
Locality Controls						
Marginality	0.001	-0.026**	0.021	-0.006	0.010	0.004
(percentile)	(0.014)	(0.012)	(0.019)	(0.015)	(0.007)	(0.007)
Children 6-17y (%)	-0.266**	-0.151	-0.388*	-0.263*	-0.105	-0.056
	(0.118)	(0.109)	(0.205)	(0.157)	(0.084)	(0.067)
Physicians per 1000s	0.063	-0.237	0.067	-0.170	0.068	0.024
	(0.195)	(0.221)	(0.308)	(0.232)	(0.105)	(0.123)
State FE	yes	yes	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes
Mean DV	154.0	150.9	50.3	49.5	20.8	21.5
Observations	5,254	5,913	5,298	5,823	5,242	5,760
R^2	0.678	0.388	0.462	0.268	0.210	0.160

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.7: Intent-to-Treat Effects on BMI Categories (Cohorts: 1983-1989)

	Underweight		Overweight		Obesity	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Years Treated	-0.0006	0.0105	0.0240	0.0367*	0.0157	0.0219
	(0.0127)	(0.0118)	(0.0184)	(0.0190)	(0.0107)	(0.0144)
SES Index	-0.0009	-0.0006	0.0006	0.0026**	-0.0000	0.0012*
	(0.0010)	(0.0007)	(0.0013)	(0.0011)	(0.0008)	(0.0007)
(SES Index) ^{2}	0.00001	0.00001	-0.00000	-0.00003**	0.00000	-0.00001
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Locality Controls						
Marginality	-0.0001	0.0009	0.0007	0.0007	0.0004	0.0010**
(percentile)	(0.0005)	(0.0007)	(0.0008)	(0.0007)	(0.0005)	(0.0005)
Children 6-17y (%)	-0.0087**	-0.0018	-0.0133	0.0011	-0.0092	-0.0070
	(0.0038)	(0.0049)	(0.0098)	(0.0063)	(0.0058)	(0.0056)
Physicians per 1000s	-0.0002	0.0053	-0.0023	-0.0070	0.0094	-0.0140
	(0.0094)	(0.0065)	(0.0120)	(0.0113)	(0.0090)	(0.0088)
State FE	yes	yes	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes
Mean DV	0.064	0.055	0.330	0.341	0.095	0.070
Observations	3,517	3,886	4,977	5,520	3,679	3,964
R^2	0.032	0.039	0.047	0.041	0.058	0.092

Notes: Comparison group is normal weight. Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p<0.01$, ** $p<0.05$, * $p<0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.8: Intent-to-Treat Effects on Boys' Height

	Boys' Height (cm)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.380*	0.360*	0.365*	0.368*	0.423**	0.424**	0.405**	0.405**
	(0.211)	(0.211)	(0.201)	(0.195)	(0.179)	(0.179)	(0.177)	(0.178)
Age		1.061**						
		(0.513)						
SES Index			0.053***	0.049***	0.049***	0.042	0.043***	0.046*
(percentile)			(0.008)	(0.008)	(0.008)	(0.027)	(0.008)	(0.026)
(SES Index) ^{2}						0.0001		-0.0000
						(0.0003)		(0.0003)
Mother's Educ $\geq$ 6y							1.398***	1.406***
							(0.417)	(0.413)
Locality Controls								
Marginality				-0.019	0.036**	0.036**	0.039**	0.039**
(percentile)				(0.013)	(0.017)	(0.017)	(0.017)	(0.017)
Children 6-17y (%)				-0.059	-0.439***	-0.439***	-0.434***	-0.434***
				(0.139)	(0.155)	(0.155)	(0.154)	(0.154)
Physicians per 1000s				0.512	0.453	0.456	0.445	0.444
				(0.420)	(0.376)	(0.375)	(0.379)	(0.378)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	144.1	144.1	144.1	144.1	144.1	144.1	144.1	144.1
Observations	2,702	2,702	2,702	2,702	2,702	2,702	2,702	2,702
R^2	0.744	0.744	0.753	0.755	0.765	0.765	0.767	0.767

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.9: Intent-to-Treat Effects on Boys' Standardized Height for Age

	Boys' Height-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.045	0.048	0.043	0.043	0.050**	0.050**	0.048*	0.048*
	(0.030)	(0.030)	(0.028)	(0.027)	(0.025)	(0.025)	(0.025)	(0.025)
Age		-0.145**						
		(0.065)						
SES Index			0.007***	0.007***	0.007***	0.006*	0.006***	0.007**
(percentile)			(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.004)
(SES Index) ^{2}						0.0000		-0.0000
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.198***	0.202***
							(0.054)	(0.054)
Locality Controls								
Marginality				-0.003	0.005**	0.005**	0.005**	0.005**
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.017	-0.067***	-0.067***	-0.066***	-0.066***
				(0.020)	(0.022)	(0.022)	(0.021)	(0.021)
Physicians per 1000s				0.068	0.058	0.058	0.057	0.056
				(0.046)	(0.041)	(0.041)	(0.042)	(0.042)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	-0.34	-0.34	-0.34	-0.34	-0.34	-0.34	-0.34	-0.34
Observations	2,702	2,702	2,702	2,702	2,702	2,702	2,702	2,702
R^2	0.085	0.088	0.120	0.129	0.167	0.167	0.174	0.174

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.10: Intent-to-Treat Effects on Girls' Height

	Girls' Height (cm)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.192	0.178	0.189	0.208	0.212	0.208	0.204	0.192
	(0.176)	(0.178)	(0.178)	(0.170)	(0.163)	(0.164)	(0.165)	(0.165)
Age		1.640***						
		(0.443)						
SES Index			0.037***	0.023***	0.023***	0.030	0.017***	0.039*
(percentile)			(0.007)	(0.006)	(0.006)	(0.022)	(0.006)	(0.021)
(SES Index) ^{2}						-0.0001		-0.0002
						(0.0002)		(0.0002)
Mother's Educ $\geq$ 6y							1.604***	1.665***
							(0.413)	(0.419)
Locality Controls								
Marginality				-0.069***	-0.039***	-0.038***	-0.035**	-0.033**
(percentile)				(0.012)	(0.015)	(0.015)	(0.014)	(0.014)
Children 6-17y (%)				0.124	-0.113	-0.111	-0.113	-0.107
				(0.107)	(0.145)	(0.146)	(0.140)	(0.141)
Physicians per 1000s				-0.151	-0.148	-0.144	-0.160	-0.148
				(0.265)	(0.288)	(0.287)	(0.273)	(0.273)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3
Observations	2,960	2,960	2,960	2,960	2,960	2,960	2,960	2,960
R^2	0.443	0.447	0.455	0.472	0.492	0.492	0.498	0.499

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.11: Intent-to-Treat Effects on Girls' Standardized Height for Age

	Girls' Height-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.017	0.017	0.017	0.020	0.018	0.017	0.016	0.015
	(0.027)	(0.027)	(0.027)	(0.026)	(0.025)	(0.025)	(0.025)	(0.025)
Age		-0.044						
		(0.064)						
SES Index			0.005***	0.003***	0.003***	0.004	0.002***	0.005
(percentile)			(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
(SES Index) ^{2}						-0.0000		-0.0000
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.233***	0.240***
							(0.062)	(0.063)
Locality Controls								
Marginality				-0.010***	-0.006***	-0.006***	-0.005**	-0.005**
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				0.012	-0.020	-0.020	-0.020	-0.020
				(0.016)	(0.022)	(0.022)	(0.021)	(0.021)
Physicians per 1000s				-0.032	-0.028	-0.028	-0.030	-0.028
				(0.039)	(0.043)	(0.043)	(0.040)	(0.040)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	-0.31	-0.31	-0.31	-0.31	-0.31	-0.31	-0.31	-0.31
Observations	2,960	2,960	2,960	2,960	2,960	2,960	2,960	2,960
R^2	0.111	0.111	0.130	0.160	0.190	0.191	0.200	0.201

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.12: Intent-to-Treat Effects on Boys' Weight

	Boys' Weight (kg)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.545**	0.524*	0.532*	0.534**	0.633**	0.626**	0.618**	0.608**
	(0.273)	(0.271)	(0.272)	(0.268)	(0.275)	(0.272)	(0.276)	(0.273)
Age		1.133						
		(0.817)						
SES Index			0.042***	0.039***	0.042***	0.083**	0.036***	0.088**
(percentile)			(0.011)	(0.011)	(0.011)	(0.039)	(0.011)	(0.039)
$(\text{SES Index})^2$						-0.0005		-0.0006
						(0.0004)		(0.0004)
Mother's Educ $\geq$ 6y							1.201**	1.332**
							(0.541)	(0.543)
Locality Controls								
Marginality				-0.011	0.034	0.034	0.037	0.037
(percentile)				(0.019)	(0.024)	(0.024)	(0.025)	(0.025)
Children 6-17y (%)				-0.150	-0.262	-0.264	-0.256	-0.259
				(0.162)	(0.208)	(0.209)	(0.207)	(0.207)
Physicians per 1000s				0.241	0.291	0.273	0.283	0.261
				(0.353)	(0.324)	(0.325)	(0.322)	(0.323)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7
Observations	2,726	2,726	2,726	2,726	2,726	2,726	2,726	2,726
R^2	0.538	0.538	0.542	0.543	0.554	0.554	0.555	0.555

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.13: Intent-to-Treat Effects on Boys' Standardized Weight for Age

	Boys' Weight-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.038	0.040	0.036	0.036	0.048*	0.047*	0.046*	0.045*
	(0.030)	(0.030)	(0.029)	(0.028)	(0.028)	(0.027)	(0.028)	(0.027)
Age		-0.138*						
		(0.074)						
SES Index			0.005***	0.004***	0.004***	0.009**	0.004***	0.009**
(percentile)			(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.004)
(SES Index) ^{2}						-0.0001		-0.0001
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.142***	0.156***
							(0.054)	(0.054)
Locality Controls								
Marginality				-0.001	0.005*	0.005*	0.005*	0.005*
(percentile)				(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Children 6-17y (%)				-0.031*	-0.044*	-0.045**	-0.044*	-0.044*
				(0.017)	(0.023)	(0.023)	(0.023)	(0.023)
Physicians per 1000s				0.044	0.038	0.037	0.038	0.035
				(0.032)	(0.029)	(0.029)	(0.029)	(0.029)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Observations	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700
R^2	0.024	0.026	0.035	0.040	0.066	0.067	0.069	0.070

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.14: Intent-to-Treat Effects on Girls' Weight

	Girls' Weight (kg)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.791**	0.772**	0.787**	0.804**	0.845***	0.789**	0.837***	0.773**
	(0.322)	(0.324)	(0.325)	(0.322)	(0.315)	(0.317)	(0.312)	(0.313)
Age		1.449**						
		(0.660)						
SES Index			0.037***	0.028**	0.025*	0.121***	0.021	0.128***
(percentile)			(0.014)	(0.014)	(0.013)	(0.036)	(0.014)	(0.035)
(SES Index) ^{2}						-0.0011***		-0.0012***
						(0.0004)		(0.0004)
Mother's Educ $\geq$ 6y							1.191	1.474*
							(0.797)	(0.773)
Locality Controls								
Marginality				-0.040**	-0.001	0.004	0.002	0.008
(percentile)				(0.018)	(0.024)	(0.025)	(0.024)	(0.024)
Children 6-17y (%)				-0.001	-0.349	-0.329	-0.350	-0.328
				(0.206)	(0.278)	(0.279)	(0.277)	(0.279)
Physicians per 1000s				0.475	0.503	0.560	0.494	0.556
				(0.333)	(0.379)	(0.382)	(0.371)	(0.372)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	42.8	42.8	42.8	42.8	42.8	42.8	42.8	42.8
Observations	2,929	2,929	2,929	2,929	2,929	2,929	2,929	2,929
R^2	0.335	0.337	0.340	0.344	0.358	0.361	0.359	0.363

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.15: Intent-to-Treat Effects on Girls' Standardized Weight for Age

	Girls' Weight-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.082**	0.082**	0.083**	0.085***	0.088***	0.083***	0.088***	0.082***
	(0.033)	(0.033)	(0.033)	(0.033)	(0.031)	(0.031)	(0.031)	(0.031)
Age		-0.007						
		(0.062)						
SES Index			0.004***	0.003**	0.003**	0.013***	0.003**	0.013***
(percentile)			(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
(SES Index) ^{2}						-0.0001***		-0.0001***
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.057	0.085
							(0.069)	(0.068)
Locality Controls								
Marginality				-0.003**	0.001	0.002	0.001	0.002
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.027*	-0.064***	-0.062***	-0.064***	-0.062***
				(0.016)	(0.022)	(0.022)	(0.022)	(0.022)
Physicians per 1000s				0.032	0.037	0.043	0.037	0.042
				(0.033)	(0.036)	(0.036)	(0.036)	(0.036)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Observations	2,910	2,910	2,910	2,910	2,910	2,910	2,910	2,910
R^2	0.027	0.027	0.036	0.046	0.064	0.069	0.065	0.070

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.16: Intent-to-Treat Effects on Boys' BMI

	Boys' BMI							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.102	0.097	0.101	0.100	0.131	0.128	0.130	0.126
	(0.093)	(0.092)	(0.093)	(0.092)	(0.095)	(0.093)	(0.096)	(0.093)
Age		0.235						
		(0.266)						
SES Index			0.005	0.004	0.005	0.026*	0.004	0.027*
(percentile)			(0.004)	(0.004)	(0.004)	(0.015)	(0.004)	(0.015)
(SES Index) ^{2}						-0.0002		-0.0003
						(0.0002)		(0.0002)
Mother's Educ $\geq$ 6y							0.090	0.147
							(0.180)	(0.180)
Locality Controls								
Marginality				0.001	0.007	0.007	0.008	0.008
(percentile)				(0.006)	(0.008)	(0.008)	(0.008)	(0.008)
Children 6-17y (%)				-0.064	-0.032	-0.033	-0.031	-0.032
				(0.054)	(0.074)	(0.075)	(0.074)	(0.075)
Physicians per 1000s				0.019	0.028	0.020	0.028	0.018
				(0.108)	(0.116)	(0.116)	(0.116)	(0.116)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
Observations	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697
R^2	0.198	0.199	0.199	0.200	0.214	0.216	0.214	0.216

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.17: Intent-to-Treat Effects on Boys' Standardized BMI for Age

	Boys' BMI-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.010	0.012	0.010	0.010	0.021	0.020	0.021	0.020
	(0.027)	(0.027)	(0.027)	(0.026)	(0.026)	(0.025)	(0.026)	(0.025)
Age		-0.079						
		(0.070)						
SES Index			0.001	0.001	0.001	0.006	0.001	0.006
(percentile)			(0.001)	(0.001)	(0.001)	(0.005)	(0.001)	(0.005)
(SES Index)^2						-0.0001		-0.0001
						(0.0001)		(0.0001)
Mother's Educ $\geq$ 6y							0.026	0.038
							(0.053)	(0.052)
Locality Controls								
Marginality				0.002	0.003	0.003	0.003	0.003
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.028*	-0.011	-0.011	-0.011	-0.011
				(0.016)	(0.021)	(0.021)	(0.021)	(0.021)
Physicians per 1000s				0.009	0.010	0.008	0.010	0.007
				(0.036)	(0.039)	(0.039)	(0.039)	(0.039)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Observations	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697
R^2	0.013	0.014	0.014	0.015	0.034	0.036	0.034	0.036

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.18: Intent-to-Treat Effects on Girls' BMI

	Girls' BMI							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.368***	0.366***	0.368***	0.367***	0.390***	0.369***	0.391***	0.369***
	(0.124)	(0.125)	(0.125)	(0.124)	(0.120)	(0.120)	(0.120)	(0.121)
Age		0.242						
		(0.245)						
SES Index			0.006	0.005	0.005	0.043***	0.005	0.043***
(percentile)			(0.005)	(0.005)	(0.005)	(0.014)	(0.005)	(0.013)
(SES Index)^2						-0.0004***		-0.0004***
						(0.0002)		(0.0002)
Mother's Educ $\geq$ 6y							-0.109	-0.004
							(0.307)	(0.300)
Locality Controls								
Marginality				0.002	0.014	0.016*	0.014	0.016*
(percentile)				(0.007)	(0.009)	(0.009)	(0.009)	(0.009)
Children 6-17y (%)				-0.080	-0.173*	-0.165	-0.173*	-0.165
				(0.070)	(0.100)	(0.102)	(0.100)	(0.102)
Physicians per 1000s				0.243**	0.274**	0.295**	0.274**	0.295**
				(0.105)	(0.118)	(0.116)	(0.118)	(0.116)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Observations	2,907	2,907	2,907	2,907	2,907	2,907	2,907	2,907
R^2	0.191	0.192	0.192	0.195	0.209	0.213	0.209	0.213

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.19: Intent-to-Treat Effects on Girls' Standardized BMI for Age

	Girls' BMI-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.074**	0.074**	0.074**	0.073**	0.078***	0.073**	0.078***	0.073**
	(0.030)	(0.030)	(0.030)	(0.030)	(0.028)	(0.028)	(0.028)	(0.029)
Age		0.001						
		(0.057)						
SES Index			0.001	0.001	0.001	0.010***	0.001	0.010***
(percentile)			(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
(SES Index) ^{2}						-0.0001***		-0.0001***
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							-0.053	-0.030
							(0.061)	(0.060)
Locality Controls								
Marginality				0.002	0.003*	0.004*	0.003	0.004*
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.034**	-0.050***	-0.048**	-0.050***	-0.048**
				(0.014)	(0.019)	(0.019)	(0.019)	(0.019)
Physicians per 1000s				0.045*	0.050*	0.055**	0.050*	0.055**
				(0.025)	(0.027)	(0.026)	(0.027)	(0.026)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Observations	2,907	2,907	2,907	2,907	2,907	2,907	2,907	2,907
R^2	0.021	0.021	0.022	0.027	0.044	0.049	0.044	0.049

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.20: Intent-to-Treat Effects on Boys' Underweight Prevalence

	Boys' Underweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0124 (0.0087)	0.0127 (0.0088)	0.0122 (0.0087)	0.0122 (0.0086)	0.0087 (0.0086)	0.0089 (0.0086)	0.0086 (0.0085)	0.0090 (0.0085)
Age		-0.0148 (0.0167)						
SES Index (percentile)			0.0002 (0.0004)	0.0001 (0.0004)	0.0002 (0.0004)	-0.0021 (0.0016)	0.0001 (0.0004)	-0.0021 (0.0016)
(SES Index) ^{2}						0.00003 (0.00002)		0.00003 (0.00002)
Mother's Educ $\geq$ 6y							0.0049 (0.0212)	-0.0011 (0.0193)
Locality Controls								
Marginality (percentile)				-0.0004 (0.0006)	-0.0002 (0.0008)	-0.0002 (0.0007)	-0.0002 (0.0008)	-0.0002 (0.0007)
Children 6-17y (%)				0.0012 (0.0053)	-0.0067 (0.0052)	-0.0069 (0.0051)	-0.0067 (0.0052)	-0.0069 (0.0051)
Physicians per 1000s				-0.0060 (0.0142)	-0.0043 (0.0117)	-0.0032 (0.0114)	-0.0044 (0.0117)	-0.0032 (0.0115)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
Observations	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792
R^2	0.023	0.023	0.023	0.024	0.049	0.053	0.049	0.053

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.21: Intent-to-Treat Effects on Girls' Underweight Prevalence

	Girls' Underweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	-0.0032	-0.0030	-0.0031	-0.0027	-0.0026	-0.0020	-0.0030	-0.0024
	(0.0080)	(0.0080)	(0.0079)	(0.0079)	(0.0078)	(0.0078)	(0.0079)	(0.0079)
Age		-0.0119						
		(0.0173)						
SES Index			0.0003	0.0002	0.0001	-0.0009	0.0000	-0.0008
(percentile)			(0.0003)	(0.0003)	(0.0003)	(0.0009)	(0.0003)	(0.0009)
(SES Index) ^{2}						0.00001		0.00001
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0195	0.0172
							(0.0157)	(0.0150)
Locality Controls								
Marginality				-0.0009**	-0.0000	-0.0001	0.0000	-0.0001
(percentile)				(0.0004)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Children 6-17y (%)				0.0070*	0.0003	0.0001	0.0003	0.0001
				(0.0039)	(0.0058)	(0.0058)	(0.0057)	(0.0058)
Physicians per 1000s				-0.0001	0.0038	0.0035	0.0040	0.0037
				(0.0066)	(0.0052)	(0.0052)	(0.0050)	(0.0050)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
Observations	2,022	2,022	2,022	2,022	2,022	2,022	2,022	2,022
R^2	0.005	0.006	0.007	0.011	0.029	0.030	0.030	0.031

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.22: Intent-to-Treat Effects on Boys' Overweight Prevalence

	Boys' Overweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0041	0.0045	0.0040	0.0037	0.0024	0.0021	0.0026	0.0022
	(0.0123)	(0.0122)	(0.0124)	(0.0122)	(0.0127)	(0.0124)	(0.0127)	(0.0124)
Age		-0.0236						
		(0.0278)						
SES Index			0.0005	0.0006	0.0006	0.0029*	0.0007	0.0029*
(percentile)			(0.0005)	(0.0006)	(0.0005)	(0.0015)	(0.0005)	(0.0015)
(SES Index)^2						-0.00003		-0.00003
						(0.00002)		(0.00002)
Mother's Educ $\geq$ 6y							-0.0180	-0.0131
							(0.0260)	(0.0256)
Locality Controls								
Marginality				0.0008	0.0014	0.0014	0.0014	0.0014
(percentile)				(0.0008)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Children 6-17y (%)				-0.0066	-0.0106	-0.0106	-0.0107	-0.0106
				(0.0064)	(0.0090)	(0.0090)	(0.0090)	(0.0090)
Physicians per 1000s				0.0056	0.0095	0.0088	0.0096	0.0090
				(0.0186)	(0.0154)	(0.0153)	(0.0154)	(0.0153)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.317	0.317	0.317	0.317	0.317	0.317	0.317	0.317
Observations	2,339	2,339	2,339	2,339	2,339	2,339	2,339	2,339
R^2	0.009	0.010	0.010	0.011	0.032	0.034	0.032	0.034

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.23: Intent-to-Treat Effects on Girls' Overweight Prevalence

	Girls' Overweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0293**	0.0296**	0.0293**	0.0294**	0.0295**	0.0280**	0.0293**	0.0276*
	(0.0145)	(0.0146)	(0.0145)	(0.0145)	(0.0139)	(0.0142)	(0.0139)	(0.0142)
Age		-0.0300						
		(0.0260)						
SES Index			0.0005	0.0004	0.0005	0.0031**	0.0004	0.0033**
(percentile)			(0.0005)	(0.0005)	(0.0005)	(0.0015)	(0.0005)	(0.0015)
(SES Index)^2						-0.00003*		-0.00003**
						(0.00002)		(0.00002)
Mother's Educ $\geq$ 6y							0.0171	0.0244
							(0.0262)	(0.0263)
Locality Controls								
Marginality				-0.0002	0.0012	0.0014	0.0013	0.0014
(percentile)				(0.0007)	(0.0009)	(0.0010)	(0.0009)	(0.0010)
Children 6-17y (%)				-0.0021	-0.0113	-0.0104	-0.0113	-0.0103
				(0.0064)	(0.0076)	(0.0076)	(0.0076)	(0.0076)
Physicians per 1000s				0.0104	0.0183*	0.0197**	0.0181*	0.0196*
				(0.0097)	(0.0099)	(0.0099)	(0.0100)	(0.0100)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Observations	2,647	2,647	2,647	2,647	2,647	2,647	2,647	2,647
R^2	0.021	0.021	0.022	0.022	0.038	0.040	0.038	0.041

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.24: Intent-to-Treat Effects on Boys' Obesity Prevalence

	Boys' Obesity							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0096	0.0096	0.0091	0.0090	0.0106*	0.0104*	0.0100	0.0097
	(0.0063)	(0.0063)	(0.0063)	(0.0063)	(0.0063)	(0.0063)	(0.0064)	(0.0064)
Age		-0.0034						
		(0.0181)						
SES Index			0.0006**	0.0005*	0.0005**	0.0016*	0.0004*	0.0016*
(percentile)			(0.0002)	(0.0003)	(0.0003)	(0.0009)	(0.0003)	(0.0009)
(SES Index) ^{2}						-0.00001		-0.00001
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0215	0.0238
							(0.0161)	(0.0165)
Locality Controls								
Marginality				-0.0008*	-0.0001	-0.0001	-0.0001	-0.0001
(percentile)				(0.0004)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Children 6-17y (%)				0.0027	0.0006	0.0006	0.0006	0.0006
				(0.0041)	(0.0059)	(0.0060)	(0.0059)	(0.0060)
Physicians per 1000s				0.0006	0.0001	-0.0002	-0.0003	-0.0007
				(0.0077)	(0.0078)	(0.0079)	(0.0077)	(0.0078)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115
Observations	1,872	1,872	1,872	1,872	1,872	1,872	1,872	1,872
R^2	0.014	0.014	0.017	0.020	0.037	0.038	0.038	0.039

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.25: Intent-to-Treat Effects on Girls' Obesity Prevalence

	Girls' Obesity							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0167***	0.0171***	0.0168***	0.0171***	0.0177***	0.0167***	0.0178***	0.0169***
	(0.0055)	(0.0056)	(0.0056)	(0.0055)	(0.0058)	(0.0057)	(0.0058)	(0.0057)
Age		-0.0220						
		(0.0176)						
SES Index			0.0006**	0.0005**	0.0006**	0.0020**	0.0006**	0.0020**
(percentile)			(0.0003)	(0.0003)	(0.0003)	(0.0008)	(0.0003)	(0.0008)
$(\text{SES Index})^2$						-0.00002*		-0.00002*
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							-0.0097	-0.0061
							(0.0172)	(0.0168)
Locality Controls								
Marginality				-0.0003	0.0003	0.0004	0.0002	0.0004
(percentile)				(0.0004)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Children 6-17y (%)				0.0005	-0.0029	-0.0026	-0.0029	-0.0026
				(0.0048)	(0.0067)	(0.0067)	(0.0067)	(0.0067)
Physicians per 1000s				-0.0009	-0.0006	-0.0003	-0.0007	-0.0004
				(0.0059)	(0.0060)	(0.0061)	(0.0060)	(0.0060)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.072	0.072	0.072	0.072	0.072	0.072	0.072	0.072
Observations	2,026	2,026	2,026	2,026	2,026	2,026	2,026	2,026
R^2	0.022	0.024	0.027	0.028	0.045	0.048	0.046	0.048

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.26: Intent-to-Treat Effects on Boys' Height

	Boys' Height (cm)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.639**	0.596*	0.735**	0.715**	0.878***	0.875***	0.881***	0.875***
	(0.303)	(0.304)	(0.296)	(0.289)	(0.256)	(0.254)	(0.258)	(0.256)
Age		1.466***						
		(0.429)						
SES Index			0.053***	0.046***	0.046***	0.052***	0.042***	0.055***
(percentile)			(0.006)	(0.006)	(0.005)	(0.020)	(0.006)	(0.019)
(SES Index) ^{2}						-0.0001		-0.0001
						(0.0002)		(0.0002)
Mother's Educ $\geq$ 6y							0.826*	0.857*
							(0.466)	(0.471)
Locality Controls								
Marginality				-0.049***	0.001	0.001	0.003	0.003
(percentile)				(0.012)	(0.014)	(0.014)	(0.013)	(0.013)
Children 6-17y (%)				0.127	-0.265**	-0.266**	-0.270**	-0.272**
				(0.118)	(0.118)	(0.118)	(0.116)	(0.116)
Physicians per 1000s				0.114	0.062	0.063	0.041	0.044
				(0.221)	(0.195)	(0.195)	(0.191)	(0.192)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0
Observations	5,254	5,254	5,254	5,254	5,254	5,254	5,254	5,254
R^2	0.647	0.649	0.660	0.665	0.678	0.678	0.679	0.679

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.27: Intent-to-Treat Effects on Boys' Standardized Height for Age

	Boys' Height-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.067	0.069	0.081*	0.078*	0.099***	0.100***	0.099***	0.098***
	(0.043)	(0.043)	(0.042)	(0.040)	(0.035)	(0.034)	(0.034)	(0.034)
Age		-0.041						
		(0.055)						
SES Index			0.007***	0.006***	0.007***	0.006**	0.006***	0.007**
(percentile)			(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
(SES Index)^2						0.0000		-0.0000
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.137**	0.139**
							(0.056)	(0.056)
Locality Controls								
Marginality				-0.005***	0.002	0.002	0.002	0.002
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				0.011	-0.047***	-0.047***	-0.047***	-0.047***
				(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Physicians per 1000s				0.041	0.029	0.029	0.026	0.026
				(0.031)	(0.023)	(0.023)	(0.023)	(0.023)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49	-0.49
Observations	4,644	4,644	4,644	4,644	4,644	4,644	4,644	4,644
R^2	0.075	0.076	0.112	0.122	0.157	0.157	0.161	0.161

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.28: Intent-to-Treat Effects on Girls' Height

	Girls' Height (cm)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.068	0.059	0.081	0.129	0.215	0.216	0.247	0.237
	(0.269)	(0.267)	(0.262)	(0.250)	(0.243)	(0.242)	(0.243)	(0.241)
Age		0.469						
		(0.435)						
SES Index			0.036***	0.025***	0.024***	0.023	0.019***	0.029*
(percentile)			(0.005)	(0.005)	(0.005)	(0.016)	(0.005)	(0.015)
(SES Index) ^{2}						0.0000		-0.0001
						(0.0002)		(0.0002)
Mother's Educ $\geq$ 6y							1.266***	1.294***
							(0.253)	(0.255)
Locality Controls								
Marginality				-0.070***	-0.026**	-0.026**	-0.023**	-0.023*
(percentile)				(0.010)	(0.012)	(0.012)	(0.012)	(0.012)
Children 6-17y (%)				0.158	-0.151	-0.151	-0.152	-0.151
				(0.099)	(0.109)	(0.109)	(0.108)	(0.107)
Physicians per 1000s				-0.256	-0.237	-0.237	-0.242	-0.242
				(0.202)	(0.221)	(0.221)	(0.217)	(0.217)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	150.9	150.9	150.9	150.9	150.9	150.9	150.9	150.9
Observations	5,913	5,913	5,913	5,913	5,913	5,913	5,913	5,913
R^2	0.328	0.328	0.342	0.362	0.388	0.388	0.393	0.393

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.29: Intent-to-Treat Effects on Girls' Standardized Height for Age

	Girls' Height-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.020	0.023	0.023	0.023	0.033	0.033	0.036	0.034
	(0.047)	(0.047)	(0.046)	(0.044)	(0.042)	(0.042)	(0.042)	(0.041)
Age		-0.093						
		(0.070)						
SES Index			0.005***	0.004***	0.004***	0.004	0.003***	0.005*
(percentile)			(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
(SES Index) ^{2}						-0.0000		-0.0000
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.183***	0.188***
							(0.046)	(0.046)
Locality Controls								
Marginality				-0.010***	-0.003*	-0.003*	-0.003	-0.002
(percentile)				(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				0.023*	-0.024	-0.024	-0.023	-0.023
				(0.014)	(0.016)	(0.016)	(0.016)	(0.016)
Physicians per 1000s				-0.039	-0.042	-0.042	-0.045	-0.044
				(0.030)	(0.034)	(0.034)	(0.033)	(0.033)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61	-0.61
Observations	5,190	5,190	5,190	5,190	5,190	5,190	5,190	5,190
R^2	0.084	0.085	0.102	0.125	0.156	0.156	0.162	0.162

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.30: Intent-to-Treat Effects on Boys' Weight

	Boys' Weight (kg)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.970**	0.915**	1.055**	1.063**	1.253***	1.246***	1.258***	1.245***
	(0.457)	(0.442)	(0.438)	(0.439)	(0.447)	(0.447)	(0.442)	(0.441)
Age		2.103***						
		(0.619)						
SES Index			0.047***	0.041***	0.044***	0.057*	0.039***	0.061*
(percentile)			(0.008)	(0.008)	(0.008)	(0.033)	(0.008)	(0.032)
(SES Index) ^{2}						-0.0002		-0.0002
						(0.0004)		(0.0004)
Mother's Educ $\geq$ 6y							1.054**	1.109**
							(0.515)	(0.500)
Locality Controls								
Marginality				-0.028*	0.021	0.021	0.024	0.024
(percentile)				(0.015)	(0.019)	(0.019)	(0.019)	(0.019)
Children 6-17y (%)				-0.195	-0.386*	-0.388*	-0.391*	-0.395*
				(0.144)	(0.204)	(0.205)	(0.204)	(0.204)
Physicians per 1000s				0.122	0.064	0.067	0.042	0.046
				(0.334)	(0.309)	(0.308)	(0.304)	(0.303)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3
Observations	5,298	5,298	5,298	5,298	5,298	5,298	5,298	5,298
R^2	0.444	0.446	0.449	0.451	0.462	0.462	0.462	0.462

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.31: Intent-to-Treat Effects on Boys' Standardized Weight for Age

	Boys' Weight-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.079	0.078	0.089*	0.090*	0.109**	0.106**	0.108**	0.105**
	(0.053)	(0.052)	(0.050)	(0.049)	(0.049)	(0.048)	(0.048)	(0.047)
Age		0.026						
		(0.062)						
SES Index			0.005***	0.005***	0.005***	0.010***	0.004***	0.010***
(percentile)			(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.003)
(SES Index)^2						-0.0001		-0.0001*
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.146***	0.160***
							(0.045)	(0.044)
Locality Controls								
Marginality				-0.002	0.002	0.002	0.003	0.003
(percentile)				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.023	-0.039**	-0.039**	-0.040**	-0.040**
				(0.014)	(0.019)	(0.019)	(0.019)	(0.019)
Physicians per 1000s				0.036	0.032	0.034	0.029	0.030
				(0.030)	(0.025)	(0.025)	(0.025)	(0.025)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Observations	4,637	4,637	4,637	4,637	4,637	4,637	4,637	4,637
R^2	0.020	0.020	0.034	0.040	0.058	0.059	0.061	0.063

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.32: Intent-to-Treat Effects on Girls' Weight

	Girls' Weight (kg)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.212	0.190	0.224	0.261	0.345	0.279	0.360	0.291
	(0.484)	(0.481)	(0.483)	(0.476)	(0.471)	(0.477)	(0.469)	(0.474)
Age		0.829						
		(0.637)						
SES Index			0.028***	0.021**	0.020**	0.083***	0.017*	0.086***
(percentile)			(0.009)	(0.009)	(0.009)	(0.028)	(0.009)	(0.028)
(SES Index) ^{2}						-0.0007**		-0.0008**
						(0.0003)		(0.0003)
Mother's Educ $\geq$ 6y							0.653	0.839
							(0.576)	(0.572)
Locality Controls								
Marginality				-0.042***	-0.009	-0.006	-0.007	-0.004
(percentile)				(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Children 6-17y (%)				0.004	-0.264*	-0.263*	-0.264*	-0.263*
				(0.161)	(0.158)	(0.157)	(0.157)	(0.156)
Physicians per 1000s				-0.142	-0.169	-0.170	-0.171	-0.173
				(0.213)	(0.233)	(0.232)	(0.234)	(0.233)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Observations	5,823	5,823	5,823	5,823	5,823	5,823	5,823	5,823
R^2	0.248	0.248	0.251	0.254	0.267	0.268	0.268	0.269

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.33: Intent-to-Treat Effects on Girls' Standardized Weight for Age

	Girls' Weight-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.036	0.038	0.038	0.039	0.042	0.034	0.042	0.034
	(0.042)	(0.043)	(0.042)	(0.041)	(0.039)	(0.038)	(0.039)	(0.038)
Age		-0.063						
		(0.043)						
SES Index			0.003***	0.002***	0.002***	0.009***	0.002***	0.009***
(percentile)			(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)
(SES Index)^2						-0.0001***		-0.0001***
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							-0.020	-0.003
							(0.055)	(0.056)
Locality Controls								
Marginality				-0.004***	-0.001	-0.001	-0.001	-0.001
(percentile)				(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.012	-0.034**	-0.034**	-0.034**	-0.034**
				(0.014)	(0.017)	(0.017)	(0.017)	(0.017)
Physicians per 1000s				0.008	0.015	0.017	0.015	0.017
				(0.028)	(0.029)	(0.029)	(0.029)	(0.029)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Observations	5,084	5,084	5,084	5,084	5,084	5,084	5,084	5,084
R^2	0.019	0.020	0.025	0.033	0.051	0.053	0.051	0.053

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.34: Intent-to-Treat Effects on Boys' BMI

	Boys' BMI							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.169	0.155	0.178	0.190	0.227	0.222	0.228	0.222
	(0.174)	(0.170)	(0.171)	(0.170)	(0.176)	(0.175)	(0.175)	(0.174)
Age		0.472**						
		(0.198)						
SES Index			0.005*	0.005	0.005*	0.015	0.004	0.015
(percentile)			(0.003)	(0.003)	(0.003)	(0.011)	(0.003)	(0.011)
(SES Index) ^{2}						-0.0001		-0.0001
						(0.0001)		(0.0001)
Mother's Educ $\geq$ 6y							0.156	0.183
							(0.171)	(0.165)
Locality Controls								
Marginality				0.003	0.010	0.010	0.010	0.010
(percentile)				(0.005)	(0.007)	(0.007)	(0.007)	(0.007)
Children 6-17y (%)				-0.117**	-0.103	-0.105	-0.104	-0.106
				(0.057)	(0.084)	(0.084)	(0.084)	(0.084)
Physicians per 1000s				0.068	0.065	0.068	0.062	0.063
				(0.105)	(0.106)	(0.105)	(0.106)	(0.104)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Observations	5,242	5,242	5,242	5,242	5,242	5,242	5,242	5,242
R^2	0.197	0.199	0.198	0.200	0.209	0.210	0.210	0.210

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.35: Intent-to-Treat Effects on Boys' Standardized BMI for Age

	Boys' BMI-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.041	0.040	0.044	0.048	0.057	0.055	0.057	0.054
	(0.055)	(0.054)	(0.054)	(0.052)	(0.055)	(0.054)	(0.054)	(0.053)
Age		0.045						
		(0.060)						
SES Index			0.001	0.001	0.002*	0.006*	0.001	0.007*
(percentile)			(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.003)
(SES Index) ^{2}						-0.0001		-0.0001
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							0.060	0.072
							(0.046)	(0.044)
Locality Controls								
Marginality				0.002	0.002	0.002	0.002	0.002
(percentile)				(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.035**	-0.015	-0.015	-0.016	-0.016
				(0.016)	(0.020)	(0.020)	(0.020)	(0.020)
Physicians per 1000s				0.012	0.014	0.015	0.013	0.014
				(0.028)	(0.025)	(0.025)	(0.025)	(0.025)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Observations	4,632	4,632	4,632	4,632	4,632	4,632	4,632	4,632
R^2	0.011	0.012	0.012	0.015	0.028	0.029	0.029	0.030

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.36: Intent-to-Treat Effects on Girls' BMI

	Girls' BMI							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.120	0.117	0.121	0.122	0.134	0.108	0.130	0.106
	(0.179)	(0.179)	(0.179)	(0.178)	(0.178)	(0.180)	(0.179)	(0.181)
Age		0.162						
		(0.223)						
SES Index			0.001	0.001	0.001	0.027**	0.001	0.026**
(percentile)			(0.003)	(0.003)	(0.003)	(0.010)	(0.003)	(0.010)
(SES Index)^2						-0.0003**		-0.0003**
						(0.0001)		(0.0001)
Mother's Educ $\geq$ 6y							-0.163	-0.094
							(0.207)	(0.207)
Locality Controls								
Marginality				0.001	0.003	0.004	0.003	0.004
(percentile)				(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Children 6-17y (%)				-0.036	-0.056	-0.056	-0.056	-0.056
				(0.057)	(0.067)	(0.067)	(0.068)	(0.067)
Physicians per 1000s				0.039	0.025	0.024	0.025	0.024
				(0.100)	(0.124)	(0.123)	(0.123)	(0.123)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Observations	5,760	5,760	5,760	5,760	5,760	5,760	5,760	5,760
R^2	0.149	0.150	0.149	0.150	0.158	0.160	0.159	0.160

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.37: Intent-to-Treat Effects on Girls' Standardized BMI for Age

	Girls' BMI-for-Age (z-score)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.036	0.037	0.037	0.037	0.035	0.027	0.033	0.026
	(0.044)	(0.044)	(0.044)	(0.043)	(0.040)	(0.040)	(0.040)	(0.040)
Age		-0.026						
		(0.044)						
SES Index			0.001	0.001	0.001	0.008***	0.001	0.007***
(percentile)			(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
(SES Index)^2						-0.0001***		-0.0001***
						(0.0000)		(0.0000)
Mother's Educ $\geq$ 6y							-0.107**	-0.092*
							(0.050)	(0.051)
Locality Controls								
Marginality				0.001	-0.000	0.000	-0.000	-0.000
(percentile)				(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Children 6-17y (%)				-0.024*	-0.016	-0.016	-0.017	-0.017
				(0.013)	(0.015)	(0.015)	(0.015)	(0.015)
Physicians per 1000s				0.023	0.033	0.035	0.034	0.036
				(0.028)	(0.029)	(0.028)	(0.029)	(0.028)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Observations	5,081	5,081	5,081	5,081	5,081	5,081	5,081	5,081
R^2	0.013	0.013	0.013	0.016	0.032	0.036	0.035	0.037

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.38: Intent-to-Treat Effects on Boys' Underweight Prevalence

	Boys' Underweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	-0.0009	-0.0002	-0.0005	-0.0008	-0.0011	-0.0006	-0.0011	-0.0006
	(0.0129)	(0.0128)	(0.0129)	(0.0128)	(0.0129)	(0.0127)	(0.0129)	(0.0126)
Age		-0.0226						
		(0.0174)						
SES Index			0.0002	0.0001	0.0001	-0.0009	0.0001	-0.0009
(percentile)			(0.0003)	(0.0003)	(0.0003)	(0.0010)	(0.0003)	(0.0010)
(SES Index) ^{2}						0.00001		0.00001
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0091	0.0068
							(0.0142)	(0.0136)
Locality Controls								
Marginality				-0.0005	-0.0001	-0.0001	-0.0001	-0.0001
(percentile)				(0.0003)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Children 6-17y (%)				-0.0012	-0.0087**	-0.0087**	-0.0088**	-0.0087**
				(0.0036)	(0.0038)	(0.0038)	(0.0038)	(0.0037)
Physicians per 1000s				-0.0045	-0.0000	-0.0002	-0.0002	-0.0003
				(0.0093)	(0.0095)	(0.0094)	(0.0095)	(0.0094)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064
Observations	3,517	3,517	3,517	3,517	3,517	3,517	3,517	3,517
R^2	0.013	0.014	0.013	0.015	0.032	0.032	0.032	0.033

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.39: Intent-to-Treat Effects on Girls' Underweight Prevalence

	Girls' Underweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0062	0.0062	0.0062	0.0067	0.0099	0.0105	0.0100	0.0105
	(0.0125)	(0.0125)	(0.0125)	(0.0125)	(0.0119)	(0.0118)	(0.0118)	(0.0118)
Age		0.0014						
		(0.0129)						
SES Index			0.0001	0.0001	0.0001	-0.0006	-0.0000	-0.0005
(percentile)			(0.0003)	(0.0003)	(0.0002)	(0.0007)	(0.0003)	(0.0007)
(SES Index) ^{2}						0.00001		0.00001
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0215	0.0202
							(0.0151)	(0.0151)
Locality Controls								
Marginality				-0.0002	0.0009	0.0009	0.0009	0.0009
(percentile)				(0.0004)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Children 6-17y (%)				0.0079**	-0.0019	-0.0018	-0.0017	-0.0017
				(0.0039)	(0.0049)	(0.0049)	(0.0049)	(0.0049)
Physicians per 1000s				0.0051	0.0054	0.0053	0.0053	0.0053
				(0.0066)	(0.0065)	(0.0065)	(0.0065)	(0.0065)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
Observations	3,886	3,886	3,886	3,886	3,886	3,886	3,886	3,886
R^2	0.019	0.019	0.019	0.022	0.039	0.039	0.040	0.041

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.40: Intent-to-Treat Effects on Boys' Overweight Prevalence

	Boys' Overweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0210	0.0207	0.0220	0.0223	0.0240	0.0240	0.0241	0.0240
	(0.0183)	(0.0181)	(0.0181)	(0.0176)	(0.0184)	(0.0184)	(0.0183)	(0.0183)
Age		0.0127						
		(0.0234)						
SES Index			0.0006*	0.0005	0.0006*	0.0006	0.0006	0.0006
(percentile)			(0.0003)	(0.0004)	(0.0004)	(0.0013)	(0.0004)	(0.0013)
(SES Index) ^{2}						-0.00000		-0.00000
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0069	0.0070
							(0.0203)	(0.0197)
Locality Controls								
Marginality				0.0002	0.0007	0.0007	0.0007	0.0007
(percentile)				(0.0006)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Children 6-17y (%)				-0.0131*	-0.0133	-0.0133	-0.0133	-0.0133
				(0.0070)	(0.0099)	(0.0098)	(0.0099)	(0.0098)
Physicians per 1000s				-0.0046	-0.0023	-0.0023	-0.0025	-0.0025
				(0.0111)	(0.0120)	(0.0120)	(0.0120)	(0.0120)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330
Observations	4,977	4,977	4,977	4,977	4,977	4,977	4,977	4,977
R^2	0.035	0.035	0.036	0.039	0.047	0.047	0.047	0.047

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.41: Intent-to-Treat Effects on Girls' Overweight Prevalence

	Girls' Overweight							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0378**	0.0380**	0.0379**	0.0378**	0.0392**	0.0367*	0.0393**	0.0369*
	(0.0185)	(0.0186)	(0.0185)	(0.0188)	(0.0188)	(0.0190)	(0.0189)	(0.0190)
Age		-0.0090						
		(0.0222)						
SES Index			0.0001	0.0001	0.0001	0.0026**	0.0001	0.0027**
(percentile)			(0.0003)	(0.0003)	(0.0003)	(0.0011)	(0.0003)	(0.0011)
(SES Index) ^{2}						-0.00003**		-0.00003**
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0026	0.0094
							(0.0203)	(0.0206)
Locality Controls								
Marginality				-0.0004	0.0006	0.0007	0.0006	0.0007
(percentile)				(0.0006)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Children 6-17y (%)				0.0066	0.0011	0.0011	0.0011	0.0011
				(0.0059)	(0.0063)	(0.0063)	(0.0063)	(0.0063)
Physicians per 1000s				-0.0074	-0.0071	-0.0070	-0.0071	-0.0071
				(0.0094)	(0.0113)	(0.0113)	(0.0113)	(0.0113)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.341	0.341	0.341	0.341	0.341	0.341	0.341	0.341
Observations	5,520	5,520	5,520	5,520	5,520	5,520	5,520	5,520
R^2	0.024	0.024	0.024	0.025	0.039	0.041	0.039	0.041

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.42: Intent-to-Treat Effects on Boys' Obesity Prevalence

	Boys' Obesity							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0120	0.0120	0.0123	0.0126	0.0156	0.0157	0.0157	0.0157
	(0.0102)	(0.0102)	(0.0101)	(0.0101)	(0.0106)	(0.0107)	(0.0104)	(0.0105)
Age		-0.0019						
		(0.0127)						
SES Index			0.0003	0.0002	0.0002	-0.0000	0.0001	0.0000
(percentile)			(0.0002)	(0.0002)	(0.0002)	(0.0008)	(0.0002)	(0.0008)
(SES Index) ^{2}						0.00000		0.00000
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							0.0210	0.0208
							(0.0137)	(0.0139)
Locality Controls								
Marginality				-0.0003	0.0004	0.0004	0.0005	0.0005
(percentile)				(0.0004)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Children 6-17y (%)				-0.0081**	-0.0092	-0.0092	-0.0094	-0.0094
				(0.0038)	(0.0058)	(0.0058)	(0.0058)	(0.0058)
Physicians per 1000s				0.0085	0.0094	0.0094	0.0089	0.0089
				(0.0083)	(0.0090)	(0.0090)	(0.0090)	(0.0090)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095
Observations	3,679	3,679	3,679	3,679	3,679	3,679	3,679	3,679
R^2	0.041	0.041	0.042	0.048	0.058	0.058	0.059	0.059

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.43: Intent-to-Treat Effects on Girls' Obesity Prevalence

	Girls' Obesity							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Treated	0.0203	0.0204	0.0201	0.0202	0.0226	0.0219	0.0226	0.0219
	(0.0139)	(0.0136)	(0.0138)	(0.0141)	(0.0143)	(0.0144)	(0.0143)	(0.0144)
Age		-0.0056						
		(0.0221)						
SES Index			0.0003	0.0004	0.0003	0.0012*	0.0003	0.0012*
(percentile)			(0.0002)	(0.0002)	(0.0002)	(0.0007)	(0.0002)	(0.0007)
(SES Index) ^{2}						-0.00001		-0.00001
						(0.00001)		(0.00001)
Mother's Educ $\geq$ 6y							-0.0057	-0.0036
							(0.0167)	(0.0169)
Locality Controls								
Marginality				0.0001	0.0009**	0.0010**	0.0009**	0.0010**
(percentile)				(0.0004)	(0.0005)	(0.0005)	(0.0004)	(0.0005)
Children 6-17y (%)				-0.0004	-0.0070	-0.0070	-0.0070	-0.0070
				(0.0041)	(0.0055)	(0.0056)	(0.0055)	(0.0056)
Physicians per 1000s				-0.0103	-0.0140	-0.0140	-0.0140	-0.0140
				(0.0092)	(0.0089)	(0.0088)	(0.0089)	(0.0088)
State FE	no	no	no	no	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Mean DV	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
Observations	3,964	3,964	3,964	3,964	3,964	3,964	3,964	3,964
R^2	0.079	0.079	0.080	0.080	0.091	0.092	0.092	0.092

Notes: Sample restricted to birth cohorts from 1983 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.44: Intent-to-Treat Effects by Socioeconomic Status on Anthropometric Measures

	Height (cm)		Weight (kg)		BMI	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Low SES × Years Treated	0.694***	0.349*	1.107***	1.269***	0.281**	0.534***
	(0.244)	(0.198)	(0.378)	(0.373)	(0.117)	(0.142)
High SES × Years Treated	0.208	0.207	0.146	0.673*	-0.037	0.322**
	(0.191)	(0.177)	(0.323)	(0.358)	(0.112)	(0.135)
SES Index	0.119***	0.107***	0.184***	0.221***	0.053***	0.060***
(percentile)	(0.035)	(0.026)	(0.042)	(0.043)	(0.017)	(0.017)
$(\text{SES Index})^2$	-0.0005	-0.0007***	-0.0012***	-0.0018***	-0.0004**	-0.0005***
	(0.0004)	(0.0003)	(0.0004)	(0.0005)	(0.0002)	(0.0002)
Locality Controls						
Marginality	0.042**	-0.029*	0.038	0.016	0.008	0.016
(percentile)	(0.016)	(0.015)	(0.026)	(0.026)	(0.009)	(0.010)
Children 6-17y (%)	-0.394**	-0.138	-0.205	-0.343	-0.023	-0.152
	(0.155)	(0.152)	(0.224)	(0.293)	(0.079)	(0.109)
Physicians per 1000s	0.489	-0.122	0.261	0.678*	0.006	0.339***
	(0.388)	(0.289)	(0.336)	(0.393)	(0.114)	(0.124)
State FE	yes	yes	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes
Mean DV	144.1	145.2	41.7	42.8	19.8	20.0
Observations	2,511	2,720	2,530	2,688	2,506	2,670
R^2	0.771	0.502	0.561	0.366	0.227	0.211

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.45: Intent-to-Treat Effects by Socioeconomic Status on BMI Categories

	Underweight		Overweight		Obesity	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Low SES × Years Treated	0.0116	-0.0110	0.0273*	0.0448***	0.0198**	0.0227***
	(0.0112)	(0.0078)	(0.0162)	(0.0158)	(0.0095)	(0.0072)
High SES × Years Treated	0.0096	0.0006	-0.0165	0.0188	0.0050	0.0131*
	(0.0103)	(0.0097)	(0.0138)	(0.0154)	(0.0074)	(0.0072)
SES Index	-0.0036*	-0.0010	0.0055***	0.0060***	0.0027**	0.0029***
(percentile)	(0.0021)	(0.0009)	(0.0018)	(0.0020)	(0.0011)	(0.0009)
$(\text{SES Index})^2$	0.00004	0.00001	-0.00004**	-0.00005***	-0.00002*	-0.00002**
	(0.00002)	(0.00001)	(0.00002)	(0.00002)	(0.00001)	(0.00001)
Locality Controls						
Marginality	-0.0003	0.0001	0.0016	0.0015	-0.0003	0.0005
(percentile)	(0.0008)	(0.0006)	(0.0012)	(0.0010)	(0.0007)	(0.0005)
Children 6-17y (%)	-0.0070	0.0004	-0.0117	-0.0077	0.0017	-0.0021
	(0.0057)	(0.0063)	(0.0092)	(0.0079)	(0.0063)	(0.0070)
Physicians per 1000s	-0.0066	-0.0013	0.0072	0.0222**	-0.0006	-0.0004
	(0.0119)	(0.0054)	(0.0136)	(0.0102)	(0.0072)	(0.0065)
State FE	yes	yes	yes	yes	yes	yes
Cohort × Time FE	yes	yes	yes	yes	yes	yes
Mean DV	0.068	0.069	0.318	0.289	0.115	0.077
Observations	1,667	1,845	2,168	2,424	1,739	1,851
R^2	0.058	0.032	0.045	0.046	0.043	0.053

Notes: Sample restricted to birth cohorts from 1987 to 1989 from urban localities treated between 2001-2005. All regressions include sample weights; standard errors clustered by locality. Individual covariates are interacted with a missing-value indicator to control for attrition bias. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

Table A.46: First Stage OLS Estimates on Take-up Rate (Binary)

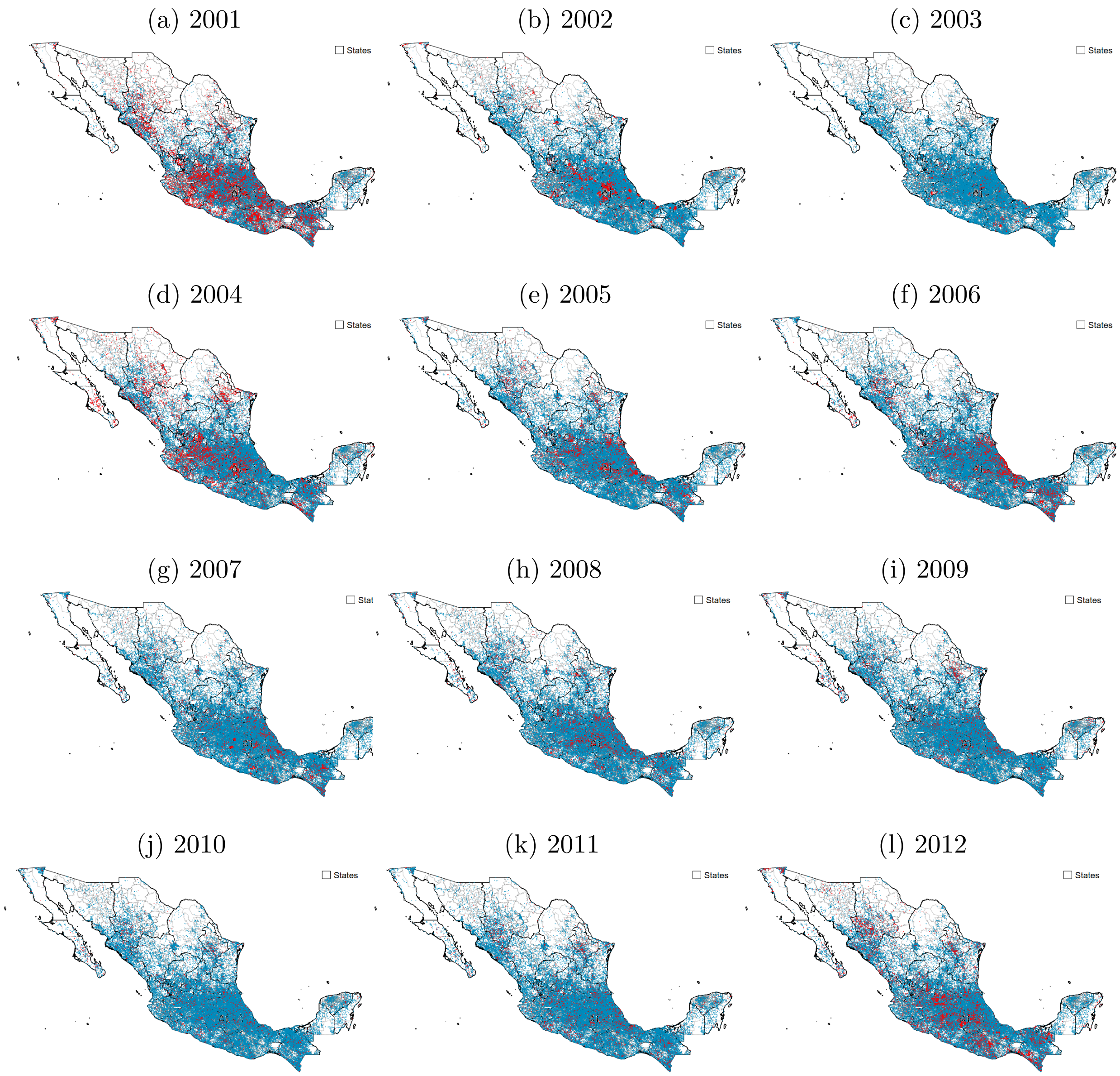
	Take-up in 2006						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treated=1	0.147***	0.135***	0.135***	0.134***	0.134***	0.134***	0.136***
	(0.026)	(0.024)	(0.022)	(0.022)	(0.022)	(0.021)	(0.021)
SES Index			-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
(percentile)			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mun. Marginality Index				0.003***	0.003***	0.002**	0.002*
(percentile)				(0.001)	(0.001)	(0.001)	(0.001)
Locality Controls							
Physicians per 1000s					-0.023***	-0.031***	-0.028***
					(0.006)	(0.007)	(0.007)
Illiteracy Rate (%)						0.016***	0.014**
						(0.005)	(0.006)
Mean Schooling (years)						0.035***	0.053***
						(0.012)	(0.013)
Members per Household							0.085
							(0.054)
Female (%)							-0.024**
							(0.011)
State FE	no	yes	yes	yes	yes	yes	yes
Cohort $\times$ Time FE	yes	yes	yes	yes	yes	yes	yes
Mean DV	144.7	144.7	144.7	144.7	144.7	144.7	144.7
Observations	5,714	5,714	5,714	5,714	5,714	5,714	5,714
R^2	0.118	0.155	0.261	0.278	0.283	0.291	0.298

Notes: Sample restricted to children born between 1987–1989 from urban localities not treated by 2000. Standard errors clustered by locality. All regressions include sample weights. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.
Sources: ENSANUT, Progresa Administrative Records, CONAPO, INEGI, Ministry of Health.

2. Appendix to "Childhood Interventions and Social Mobility: The Case of Progresa Program in Mexico"

2.1 Additional Figures

Figure A.1: Progresa Coverage across Locality by Year, 2001-2012

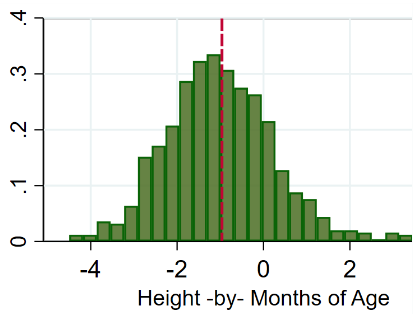


Notes: Source:

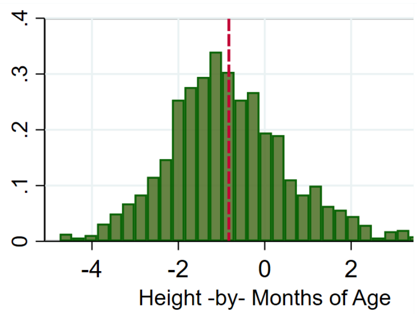
Figure A.2: Histograms on Height -by- Months of Age

Progresa Beneficiaries

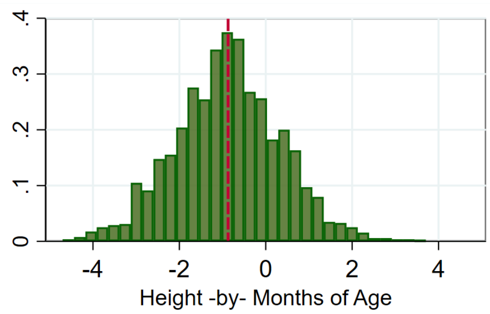
(a) MxFLS-1: 2002



(b) MxFLS-2: 2005-06

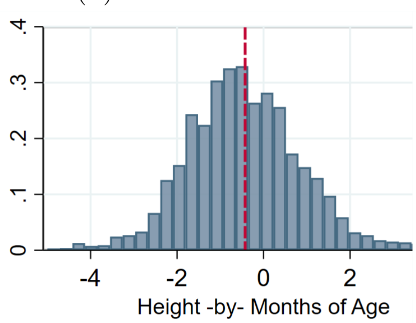


(c) MxFLS-3: 2009-12

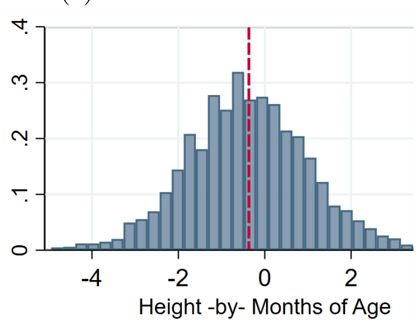


Non-Beneficiaries

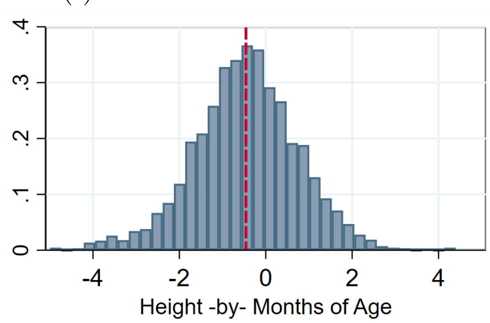
(d) MxFLS-1: 2002



(e) MxFLS-2: 2005-06



(f) MxFLS-3: 2009-12



Notes: Standardized height by months of age for children between 0-18 years old (WHO Child Growth Standards, 2006). Source: MxFLS.

Table A.1: Predicting Treatment Group in First Wave, Birth Cohorts: 1994-1997

	Full: Early Education CT			
	(1)	(2)	(3)	(4)
Family Size	-0.015	-0.018	-0.015	-0.018
	(0.019)	(0.019)	(0.019)	(0.020)
Birth Order	0.109***	0.108***	0.109***	0.108***
	(0.036)	(0.039)	(0.035)	(0.039)
Birth Gap	-0.028**	-0.032**	-0.028**	-0.032**
	(0.012)	(0.015)	(0.013)	(0.016)
Birth Order=2 × Birth Gap	0.126***	0.132***	0.126***	0.132***
	(0.017)	(0.016)	(0.016)	(0.016)
Birth Order=3 × Birth Gap	0.097***	0.105***	0.097***	0.105***
	(0.016)	(0.020)	(0.017)	(0.021)
Birth Order=4 × Birth Gap	0.030	0.042*	0.030	0.042
	(0.020)	(0.025)	(0.022)	(0.027)
Birth Order=5 × Birth Gap	-0.033	-0.019	-0.033	-0.019
	(0.023)	(0.028)	(0.026)	(0.031)
Total Siblings ≥8y	0.220***	0.214***	0.220***	0.214***
	(0.039)	(0.049)	(0.040)	(0.051)
Total Sisters ≥12y	-0.011	-0.025	-0.011	-0.025
	(0.032)	(0.031)	(0.035)	(0.033)
Birth Cohort FE	No	Yes	No	Yes
Standard Errors	Robust	Robust	Clustered	Clustered
Observations	172	172	172	172
R^2	0.942	0.943	0.942	0.943

Notes: Sample restricted to *Progresa* beneficiary rural families with 2 to 5 children and siblings' birth gap less or equal than 6 years. Source: MxFLS. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

3. Appendix to "Colonial Agricultural Estates and Rural Development in 20th-century Mexico"

3.1 Additional Figures

Figure A.1: Colonial Haciendas and Neighbors

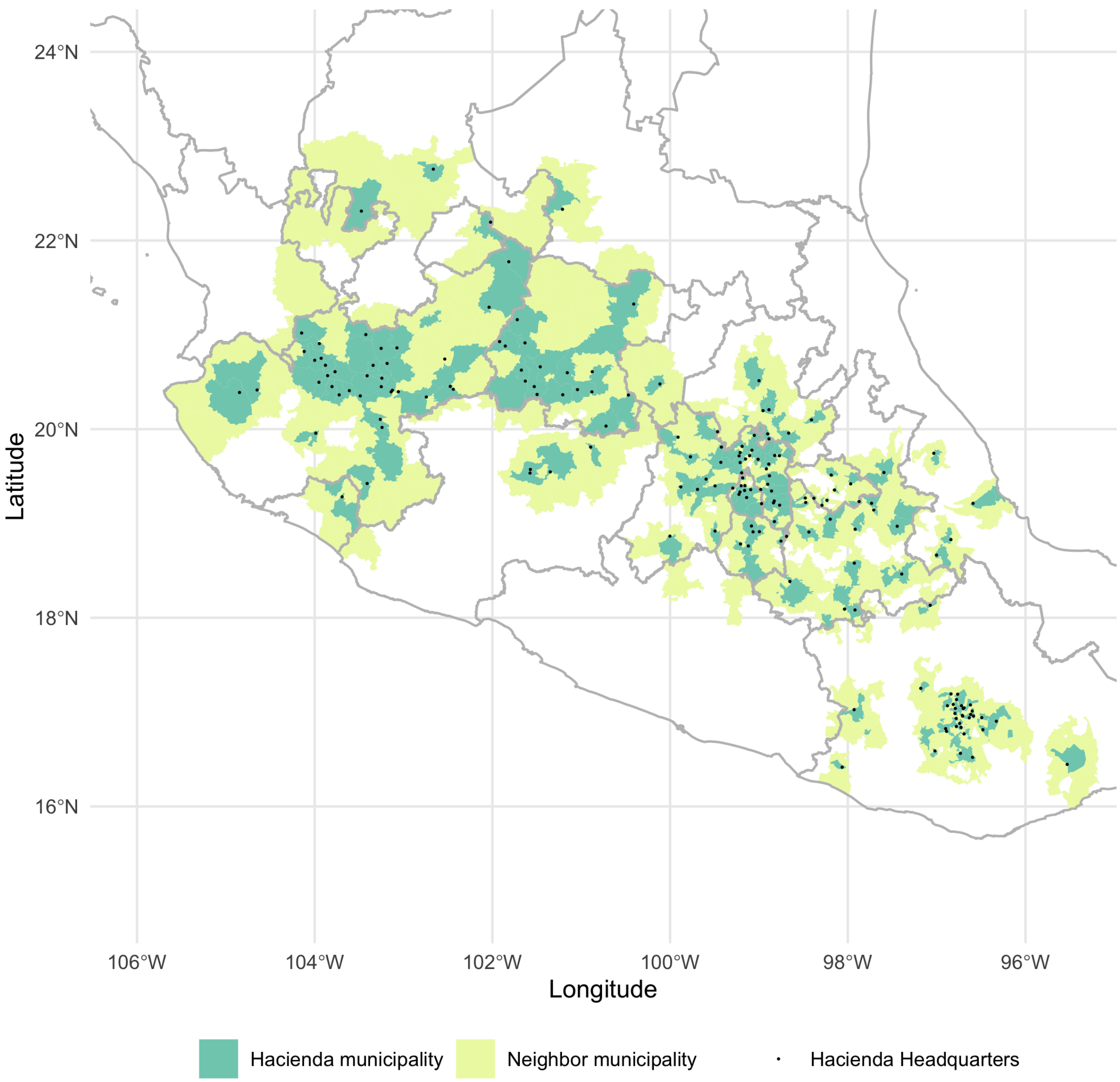
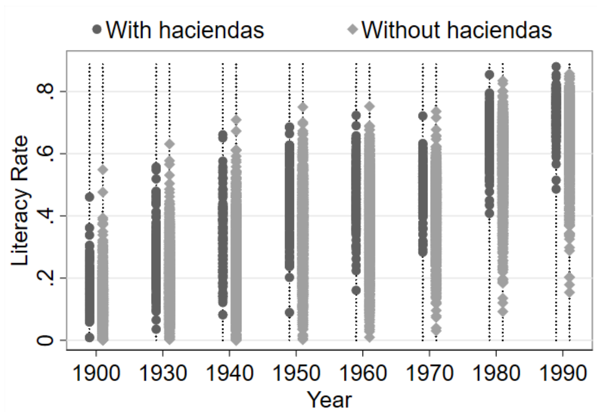
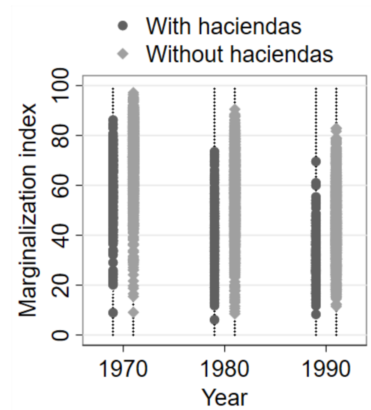


Figure A.2: Mean Development Outcomes by Presence of Hacienda

(a) Literacy



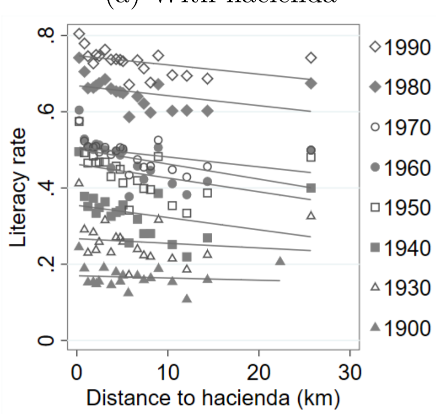
(b) Marginalization index



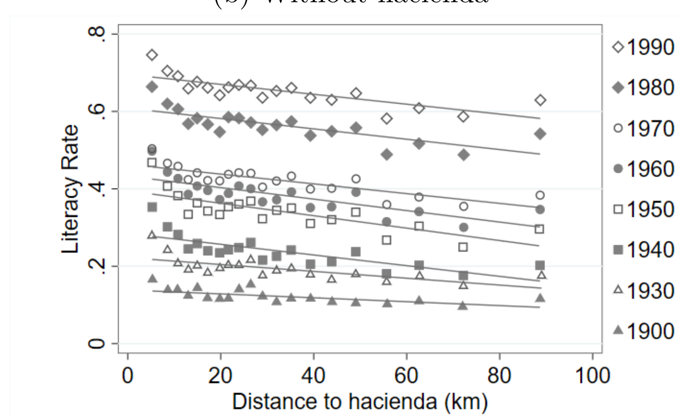
Notes: Dot-graph. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources.

Figure A.3: Mean of Literacy by Presence and Distance to Hacienda

(a) With hacienda



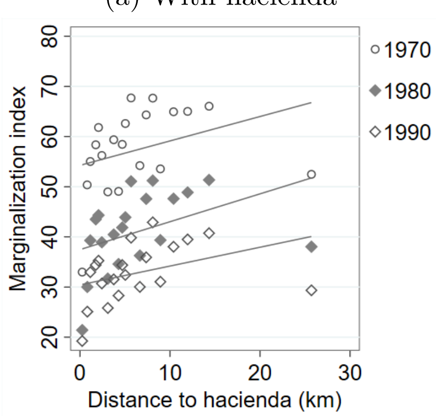
(b) Without hacienda



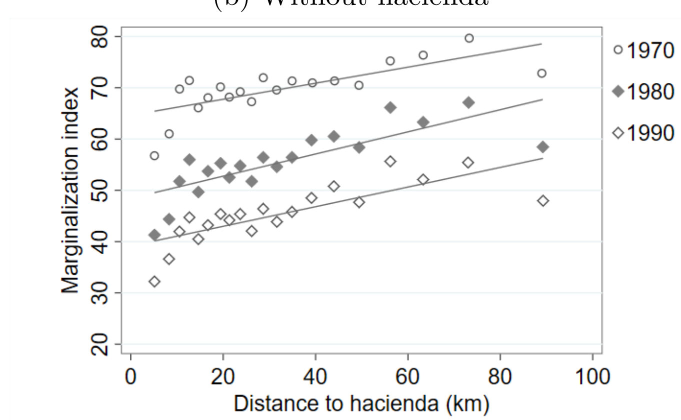
Notes: Bin-scatter with linear fitted estimates. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources.

Figure A.4: Mean of Marginalization Index by Presence and Distance to Hacienda

(a) With hacienda



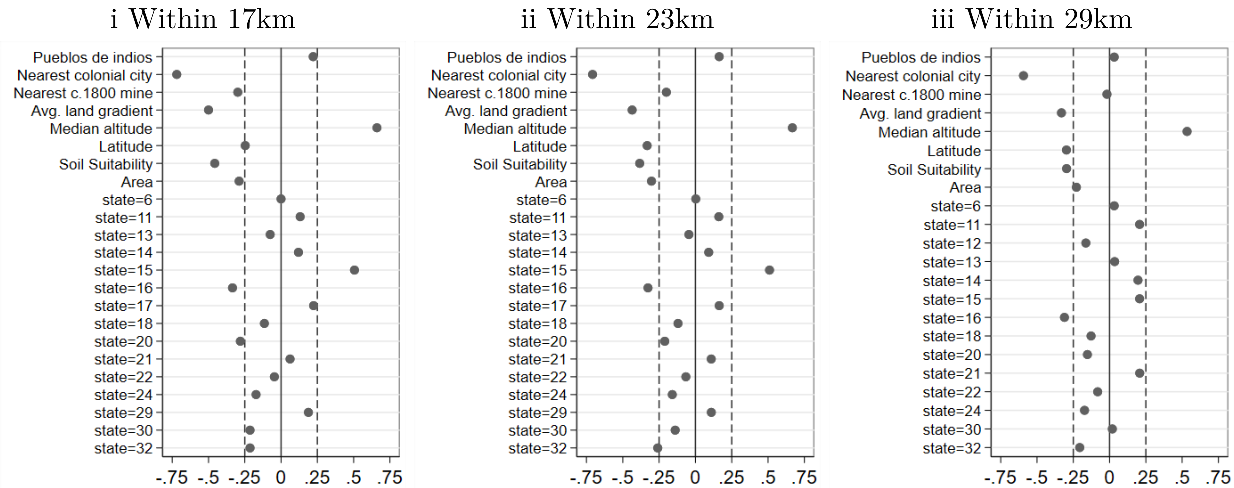
(b) Without hacienda



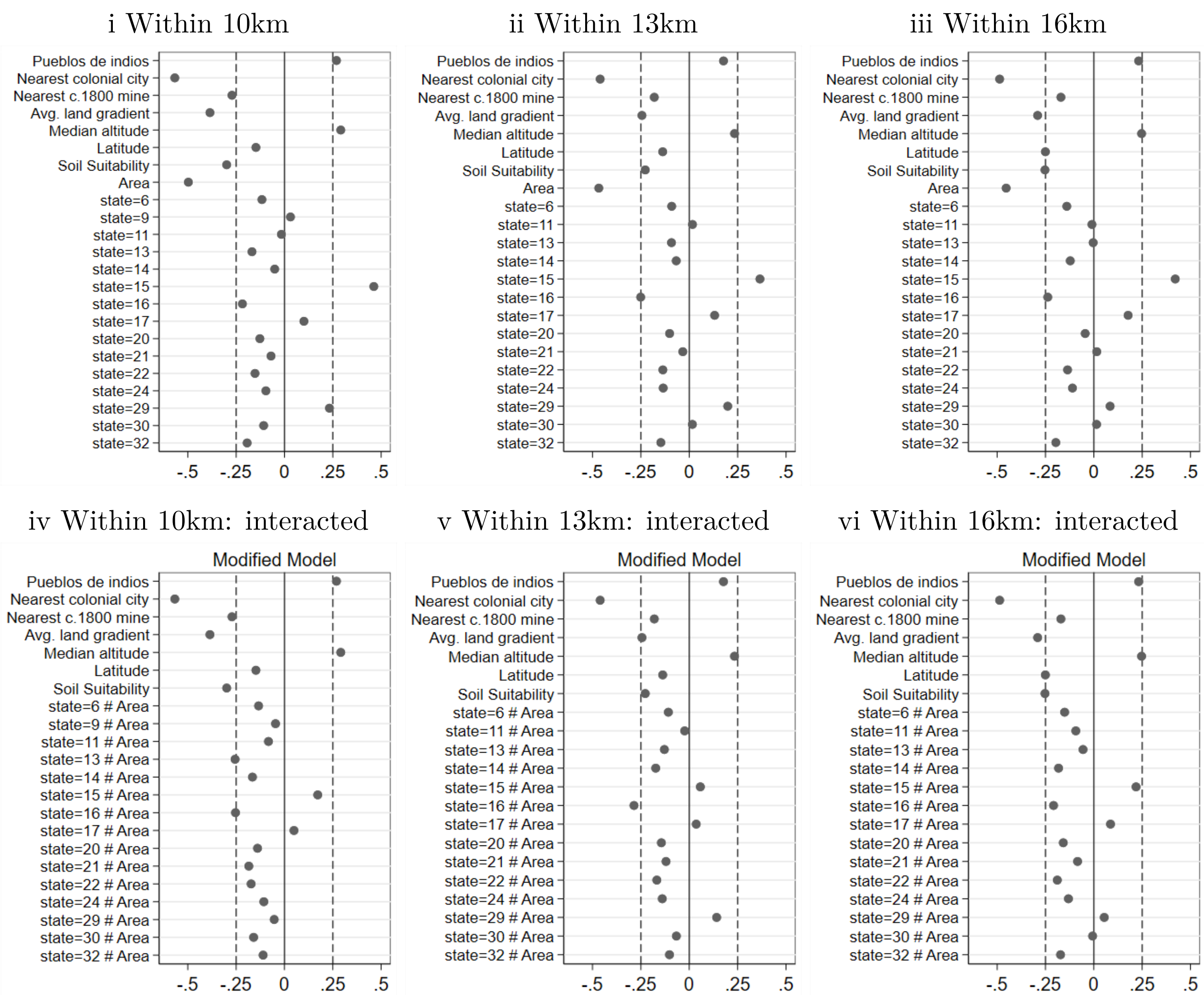
Notes: Bin-scatter with linear fitted estimates. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources.

Figure A.5: Balance Test between Treatment and Control groups, Standardized Differences on Covariates

Panel A: Main Sample



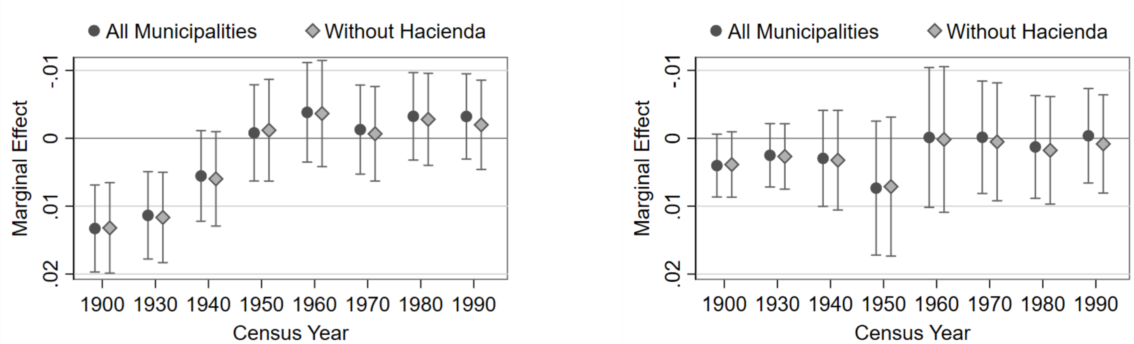
Panel B: Restricted Neighbors Sample



Notes: For every δ, a municipality is treated if $\mathbb{1}\{Distance_m \leq \delta\}$. See the text for a description of the variables and data sources.

Figure A.6: Placebo Estimates on Literacy rates by Distance to Hacienda, 1900-1990

(a) Pooled Data (b) Cross section



Notes: Marginal effect of distance to nearest hacienda (10km) with 95% CI over census year. (a) Pooled OLS with SE clustered by municipality; (b) Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

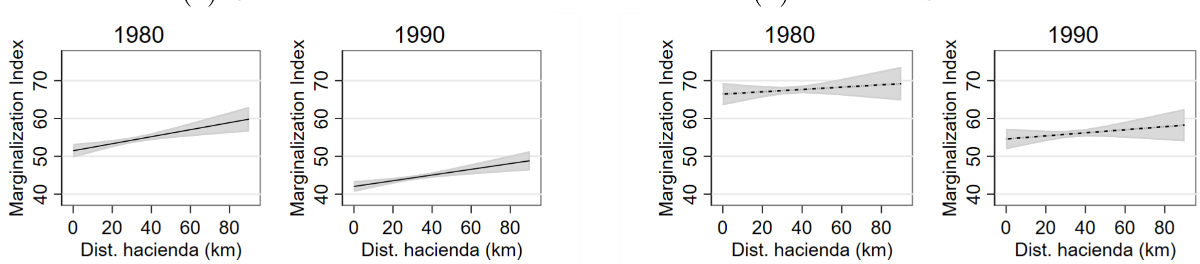
Figure A.7: Placebo Estimates on Marginalization Index by Distance to Hacienda, 1980-1990

(a) Pooled Data (b) Cross section

Notes: Marginal effect of distance to nearest hacienda (10km) with 95% CI over census year. (a) Pooled OLS with SE clustered by municipality; (b) Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

Figure A.8: Predicted Marginalization Index by Distance to Hacienda for Municipalities Without Haciendas, 1980-1990

(a) Central Mesa (b) Placebo: South Mesa



Notes: Linear prediction for municipalities without haciendas from cross-section OLS with robust SE. Municipalities within 100km of an hacienda. Includes all controls and state fixed effects.

3.2 Additional Tables

Table A.1: Mean Dependent Variable Regression by Measure of Colonial Hacienda

	Main Sample			Neighbors Sample		
	Hacienda (binary)	Dist. hacienda (10km)	Hacienda within 29km	Hacienda (binary)	Dist. hacienda (10km)	Hacienda within 13km
Pueblos de indios (prop.)	0.045**	0.055	-0.004	0.080*	-0.166	0.066
	(0.023)	(0.132)	(0.032)	(0.045)	(0.117)	(0.055)
Nearest colonial city (km)	-2.203***	20.093***	-3.628***	-2.851***	11.036***	-2.583***
	(0.357)	(1.717)	(0.390)	(0.637)	(1.672)	(0.745)
Nearest c.1800 mine (km)	-0.218	2.196	0.234	-0.555	1.128	-0.198
	(0.241)	(1.411)	(0.319)	(0.519)	(1.497)	(0.610)
Average land gradient	-0.006**	0.087***	-0.022***	-0.002	0.050**	-0.013
	(0.003)	(0.016)	(0.004)	(0.008)	(0.020)	(0.009)
Median altitude (km)	-0.011	-1.191***	0.189***	-0.054	-0.250**	0.006
	(0.017)	(0.091)	(0.020)	(0.042)	(0.103)	(0.050)
Latitude	0.004	0.812***	-0.178***	-0.017	0.345***	0.026
	(0.018)	(0.101)	(0.024)	(0.044)	(0.123)	(0.055)
Soil Suitability	-0.020	0.362***	-0.149***	-0.022	0.307**	-0.071
	(0.020)	(0.116)	(0.029)	(0.046)	(0.130)	(0.053)
Area (100 km^2)	0.007***	0.040***	-0.006**	0.009**	0.064***	-0.014***
	(0.003)	(0.013)	(0.003)	(0.004)	(0.011)	(0.005)
Constant	0.231	-13.222***	4.134***	0.833	-5.768**	0.183
	(0.390)	(2.057)	(0.507)	(0.871)	(2.412)	(1.088)
R-squared	0.192	0.636	0.506	0.140	0.462	0.207
Municipalities	1,137	1,137	1,137	607	607	607
Mean dep. var.	0.14	2.95	0.59	0.27	1.61	0.49

Notes: Cross-section OLS with robust SE, base year is 1960. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.2: Pooled Data Differences in Literacy by Distance to Hacienda, 1900-1990

	Main Sample						Neighbors Sample			
	Model 1		Model 2		Hac (binary)		Model 1		Model 2	
Year = 1990	0.557***	(0.004)	0.550***	(0.005)	0.526***	(0.003)	0.566***	(0.005)	0.557***	(0.008)
1990× Distance	-0.009***	(0.002)					-0.013***	(0.003)		
1990× Dist × Hac			-0.013**	(0.007)					-0.013**	(0.006)
1990× Dist × Without			-0.008***	(0.002)					-0.009**	(0.003)
1990× Hacienda			0.020***	(0.007)	0.029***	(0.006)			0.016*	(0.009)
Year = 1980	0.472***	(0.005)	0.462***	(0.006)	0.438***	(0.003)	0.481***	(0.006)	0.466***	(0.009)
1980× Distance	-0.010***	(0.002)					-0.014***	(0.003)		
1980× Dist × Hac			-0.015**	(0.007)					-0.015**	(0.007)
1980× Dist × Without			-0.008***	(0.002)					-0.008**	(0.004)
1980× Hacienda			0.029***	(0.008)	0.038***	(0.006)			0.028***	(0.010)
Year = 1970	0.321***	(0.004)	0.317***	(0.005)	0.295***	(0.003)	0.323***	(0.006)	0.312***	(0.009)
1970× Distance	-0.008***	(0.002)					-0.011***	(0.003)		
1970× Dist × Hac			-0.015*	(0.008)					-0.015*	(0.007)
1970× Dist × Without			-0.007***	(0.002)					-0.006	(0.004)
1970× Hacienda			0.013	(0.009)	0.019***	(0.007)			0.021**	(0.010)
Year = 1960	0.298***	(0.005)	0.287***	(0.006)	0.258***	(0.004)	0.305***	(0.007)	0.284***	(0.010)
1960× Distance	-0.012***	(0.002)					-0.016***	(0.004)		
1960× Dist × Hac			-0.028**	(0.011)					-0.028***	(0.011)
1960× Dist × Without			-0.010***	(0.002)					-0.008*	(0.005)
1960× Hacienda			0.038***	(0.011)	0.043***	(0.008)			0.045***	(0.013)
Year = 1950	0.260***	(0.005)	0.249***	(0.007)	0.216***	(0.004)	0.266***	(0.007)	0.244***	(0.010)
1950× Distance	-0.013***	(0.002)					-0.018***	(0.004)		
1950× Dist × Hac			-0.025**	(0.011)					-0.025**	(0.011)
1950× Dist × Without			-0.011***	(0.002)					-0.009*	(0.005)
1950× Hacienda			0.036***	(0.012)	0.047***	(0.009)			0.044***	(0.014)
Year = 1940	0.151***	(0.005)	0.139***	(0.006)	0.114***	(0.003)	0.161***	(0.006)	0.139***	(0.010)
1940× Distance	-0.011***	(0.002)					-0.018***	(0.004)		
1940× Dist × Hac			-0.022*	(0.012)					-0.021*	(0.012)
1940× Dist × Without			-0.008***	(0.002)					-0.009*	(0.005)
1940× Hacienda			0.039***	(0.012)	0.045***	(0.009)			0.042***	(0.014)
Year = 1930	0.085***	(0.004)	0.080***	(0.005)	0.068***	(0.002)	0.089***	(0.005)	0.079***	(0.008)
1930× Distance	-0.005***	(0.002)					-0.010***	(0.003)		
1930× Dist × Hac			-0.001	(0.010)					-0.001	(0.010)
1930× Dist × Without			-0.004**	(0.002)					-0.006	(0.004)
1930× Hacienda			0.011	(0.010)	0.016*	(0.008)			0.014	(0.013)
Year = 1900										
1900× Distance	-0.001	(0.002)					-0.004	(0.004)		
1900× Dist × Hac			0.013	(0.010)					0.013	(0.010)
1900× Dist × Without			-0.001	(0.002)					-0.003	(0.004)
1900× Hacienda			-0.009	(0.010)	-0.007	(0.007)			-0.009	(0.013)
Pueblos de indios	-0.004	(0.007)	-0.005	(0.007)	-0.006	(0.007)	0.009	(0.008)	0.008	(0.008)
Nearest colonial city	-0.063	(0.098)	-0.051	(0.098)	-0.175*	(0.096)	-0.138	(0.124)	-0.136	(0.123)
Nearest c.1800 mine	0.058	(0.067)	0.056	(0.067)	0.044	(0.068)	0.143	(0.097)	0.146	(0.096)
Avg. land gradient	-0.014***	(0.001)	-0.014***	(0.001)	-0.014***	(0.001)	-0.013***	(0.002)	-0.014***	(0.002)
Median altitude	0.001	(0.005)	0.003	(0.005)	0.012**	(0.005)	-0.026***	(0.008)	-0.024***	(0.008)
Latitude	-0.002	(0.005)	-0.004	(0.005)	-0.010**	(0.005)	0.009	(0.008)	0.007	(0.008)
Soil Suitability	0.001	(0.006)	0.000	(0.006)	-0.002	(0.006)	-0.015**	(0.007)	-0.017**	(0.008)
Area (100 km^2)	-0.001*	(0.001)	-0.001**	(0.001)	-0.002***	(0.001)	-0.001	(0.001)	-0.001	(0.001)
Constant	0.248**	(0.101)	0.273***	(0.101)	0.387***	(0.101)	0.067	(0.151)	0.093	(0.151)
R-squared	0.818		0.819		0.815		0.845		0.847	
Municipalities	8,694		8,694		8,694		4,633		4,633	

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.3: Differences in Literacy by Distance to Hacienda for each year, 1900-1990

	Model 1							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0023*	-0.0073***	-0.0120***	-0.0111***	-0.0101***	-0.0089***	-0.0098***	-0.0080***
	(0.0014)	(0.0018)	(0.0022)	(0.0022)	(0.0021)	(0.0018)	(0.0017)	(0.0015)
Pueblos de indios	-0.002	0.002	0.005	-0.001	-0.002	-0.009	-0.010	-0.009
	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)
Nearest colonial city (km)	-0.071	-0.084	-0.166	-0.113	-0.101	0.023	0.047	-0.036
	(0.102)	(0.113)	(0.130)	(0.132)	(0.123)	(0.098)	(0.104)	(0.087)
Nearest c.1800 mine (km)	0.042	0.060	0.197**	0.031	0.091	0.047	-0.035	0.021
	(0.053)	(0.067)	(0.084)	(0.093)	(0.090)	(0.077)	(0.076)	(0.069)
Average land gradient	-0.006***	-0.010***	-0.013***	-0.016***	-0.015***	-0.013***	-0.017***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Median altitude (km)	-0.001	-0.006	-0.008	0.004	0.005	0.010*	-0.001	0.004
	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Latitude	-0.001	0.001	0.011	-0.004	-0.002	-0.005	-0.013**	-0.007
	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Soil Suitability	0.002	-0.003	-0.005	0.001	0.002	0.000	0.003	0.005
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)
Area (100 km^2)	-0.0004	-0.0015**	-0.0011*	-0.0008	-0.0012*	-0.0010*	-0.0006	-0.0008
	(0.0004)	(0.0006)	(0.0007)	(0.0008)	(0.0007)	(0.0006)	(0.0006)	(0.0005)
Constant	0.184**	0.256**	0.138	0.546***	0.526***	0.614***	0.951***	0.899***
	(0.084)	(0.100)	(0.134)	(0.144)	(0.137)	(0.115)	(0.113)	(0.102)
R-squared	0.373	0.424	0.438	0.435	0.446	0.424	0.515	0.551
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143
Mean dep. var.	0.128	0.203	0.253	0.356	0.397	0.431	0.576	0.664

	Model 2							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0005	-0.0046	-0.0251**	-0.0217*	-0.0224**	-0.0176**	-0.0104	-0.0093
× Hacienda	(0.0099)	(0.0097)	(0.0120)	(0.0113)	(0.0108)	(0.0078)	(0.0077)	(0.0068)
Dist. hacienda (10km)	-0.0014	-0.0060***	-0.0099***	-0.0093***	-0.0083***	-0.0073***	-0.0082***	-0.0069***
× Without	(0.0014)	(0.0019)	(0.0023)	(0.0024)	(0.0023)	(0.0019)	(0.0019)	(0.0017)
Hacienda	0.0105	0.0142	0.0347***	0.0287**	0.0308***	0.0259***	0.0220***	0.0162**
	(0.0101)	(0.0106)	(0.0124)	(0.0121)	(0.0110)	(0.0087)	(0.0079)	(0.0068)
Pueblos de indios	-0.002	0.001	0.003	-0.002	-0.003	-0.011	-0.011	-0.010
	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)
Nearest colonial city (km)	-0.062	-0.076	-0.151	-0.099	-0.086	0.035	0.060	-0.026
	(0.101)	(0.112)	(0.130)	(0.133)	(0.124)	(0.098)	(0.104)	(0.087)
Nearest c.1800 mine (km)	0.042	0.061	0.193**	0.028	0.088	0.046	-0.035	0.021
	(0.053)	(0.067)	(0.084)	(0.093)	(0.091)	(0.077)	(0.076)	(0.070)
Average land gradient	-0.006***	-0.010***	-0.013***	-0.016***	-0.015***	-0.013***	-0.017***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Median altitude (km)	0.001	-0.004	-0.005	0.006	0.007	0.013**	0.001	0.005
	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Latitude	-0.002	0.000	0.009	-0.006	-0.003	-0.007	-0.014**	-0.008
	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Soil Suitability	0.001	-0.004	-0.005	0.001	0.002	0.000	0.003	0.005
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)
Area (100 km^2)	-0.0005	-0.0017***	-0.0013**	-0.0009	-0.0014*	-0.0012**	-0.0008	-0.0009*
	(0.0004)	(0.0006)	(0.0006)	(0.0008)	(0.0007)	(0.0006)	(0.0007)	(0.0006)
Constant	0.193**	0.268***	0.163	0.565***	0.546***	0.632***	0.969***	0.911***
	(0.084)	(0.101)	(0.134)	(0.145)	(0.138)	(0.116)	(0.113)	(0.103)
R-squared	0.375	0.426	0.442	0.437	0.449	0.427	0.518	0.552
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143
Mean dep. var.	0.128	0.203	0.253	0.356	0.397	0.431	0.576	0.664

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.4: Differences in Literacy by Distance to Hacienda for each year (Neighbors Sample), 1900-1990

	Model 1: Neighbors Sample							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0053	-0.0120***	-0.0202***	-0.0171***	-0.0137***	-0.0127***	-0.0119***	-0.0104***
	(0.0037)	(0.0038)	(0.0044)	(0.0042)	(0.0039)	(0.0031)	(0.0030)	(0.0024)
Pueblos de indios	0.003	0.017*	0.020*	0.014	0.014	0.002	0.003	0.001
	(0.010)	(0.009)	(0.012)	(0.011)	(0.010)	(0.009)	(0.008)	(0.007)
Nearest colonial city (km)	-0.241	-0.180	-0.215	-0.131	-0.218	-0.051	-0.023	-0.083
	(0.154)	(0.156)	(0.172)	(0.169)	(0.159)	(0.121)	(0.124)	(0.097)
Nearest c.1800 mine (km)	0.113	0.122	0.329**	0.139	0.228*	0.103	0.052	0.045
	(0.100)	(0.112)	(0.132)	(0.134)	(0.129)	(0.104)	(0.107)	(0.086)
Average land gradient	-0.006***	-0.011***	-0.014***	-0.017***	-0.014***	-0.012***	-0.016***	-0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Median altitude (km)	-0.020**	-0.027***	-0.039***	-0.030***	-0.030***	-0.018*	-0.027***	-0.020**
	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.010)	(0.009)
Latitude	0.008	0.009	0.025**	0.009	0.011	0.004	0.001	0.004
	(0.007)	(0.008)	(0.010)	(0.011)	(0.010)	(0.009)	(0.009)	(0.008)
Soil Suitability	-0.008	-0.017**	-0.023***	-0.013	-0.017	-0.019**	-0.012	-0.009
	(0.008)	(0.008)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	(0.007)
Area (100 km^2)	0.0000	-0.0006	-0.0006	-0.0002	-0.0007	-0.0006	-0.0008	-0.0008
	(0.0006)	(0.0008)	(0.0009)	(0.0010)	(0.0009)	(0.0007)	(0.0009)	(0.0007)
Constant	0.059	0.143	-0.079	0.348	0.327	0.483***	0.727***	0.735***
	(0.142)	(0.158)	(0.202)	(0.216)	(0.211)	(0.175)	(0.174)	(0.152)
R-squared	0.312	0.432	0.447	0.444	0.439	0.393	0.505	0.549
Municipalities	470	554	585	597	602	607	609	609
Mean dep. var.	0.145	0.224	0.283	0.389	0.429	0.456	0.610	0.697

	Model 2: Neighbors Sample							
	1900	1930	1940	1950	1960	1970	1980	1990
Dist. hacienda (10km)	-0.0004	-0.0057	-0.0268**	-0.0219**	-0.0217**	-0.0179**	-0.0082	-0.0080
× Hacienda	(0.0098)	(0.0095)	(0.0111)	(0.0104)	(0.0101)	(0.0075)	(0.0074)	(0.0068)
Dist. hacienda (10km)	-0.0033	-0.0082*	-0.0128**	-0.0100*	-0.0056	-0.0059	-0.0054	-0.0063**
× Without	(0.0046)	(0.0049)	(0.0055)	(0.0053)	(0.0050)	(0.0040)	(0.0037)	(0.0031)
Hacienda	0.0064	0.0146	0.0353**	0.0333**	0.0393***	0.0324***	0.0276***	0.0178**
	(0.0125)	(0.0132)	(0.0150)	(0.0147)	(0.0132)	(0.0107)	(0.0093)	(0.0078)
Pueblos de indios	0.003	0.016*	0.019	0.013	0.013	0.001	0.002	0.000
	(0.010)	(0.009)	(0.012)	(0.011)	(0.010)	(0.009)	(0.008)	(0.007)
Nearest colonial city (km)	-0.236	-0.175	-0.213	-0.129	-0.217	-0.050	-0.019	-0.080
	(0.154)	(0.157)	(0.171)	(0.168)	(0.157)	(0.121)	(0.123)	(0.097)
Nearest c.1800 mine (km)	0.115	0.131	0.332**	0.141	0.230*	0.106	0.058	0.049
	(0.101)	(0.112)	(0.130)	(0.133)	(0.128)	(0.103)	(0.106)	(0.086)
Average land gradient	-0.006***	-0.011***	-0.014***	-0.017***	-0.014***	-0.012***	-0.016***	-0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Median altitude (km)	-0.018**	-0.025***	-0.036***	-0.027**	-0.026***	-0.015	-0.024**	-0.018**
	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.010)	(0.009)
Latitude	0.007	0.008	0.023**	0.007	0.009	0.002	-0.001	0.003
	(0.007)	(0.008)	(0.010)	(0.011)	(0.011)	(0.009)	(0.009)	(0.008)
Soil Suitability	-0.008	-0.018**	-0.025***	-0.015	-0.019*	-0.020**	-0.014	-0.010
	(0.008)	(0.008)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.007)
Area (100 km^2)	-0.0002	-0.0010	-0.0011	-0.0008	-0.0013	-0.0011	-0.0014	-0.0012*
	(0.0006)	(0.0008)	(0.0009)	(0.0010)	(0.0009)	(0.0008)	(0.0009)	(0.0007)
Constant	0.061	0.151	-0.067	0.360*	0.341	0.495***	0.741***	0.744***
	(0.141)	(0.159)	(0.202)	(0.216)	(0.212)	(0.175)	(0.174)	(0.152)
R-squared	0.314	0.436	0.453	0.450	0.448	0.402	0.513	0.554
Municipalities	470	554	585	597	602	607	609	609
Mean dep. var.	0.145	0.224	0.283	0.389	0.429	0.456	0.610	0.697

Notes: Cross-section OLS with robust SE. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.5: Differences in Marginalization Index by Distance to Hacienda for each year, 1970-1990

	Main Sample						Neighbors Sample					
	Model 1			Model 2			Model 1			Model 2		
	1970	1980	1990	1970	1980	1990	1970	1980	1990	1970	1980	1990
Dist. hacienda (10km)	1.04***	1.30***	1.04***				1.85***	2.25***	1.69***			
	(0.27)	(0.26)	(0.20)				(0.55)	(0.53)	(0.41)			
Dist × Hacienda				2.35	2.58	1.38				2.22	2.50	1.15
				(1.57)	(1.65)	(1.34)				(1.57)	(1.74)	(1.44)
Dist × Without				0.64**	0.93***	0.75***				0.86	1.30**	0.93*
				(0.29)	(0.27)	(0.21)				(0.66)	(0.63)	(0.49)
Hacienda				-5.69***	-5.65***	-4.06***				-4.49**	-4.33**	-3.18**
				(1.66)	(1.53)	(1.24)				(1.88)	(1.72)	(1.40)
Pueblos de indios	1.08	0.93	1.09	1.32	1.19	1.28	-0.99	-1.09	-1.03	-0.83	-0.93	-0.90
	(1.18)	(1.09)	(0.84)	(1.17)	(1.09)	(0.84)	(1.48)	(1.40)	(1.07)	(1.48)	(1.39)	(1.06)
Nearest colonial city	24.9	28.2*	15.1	21.9	25.1	12.7	65.1***	47.8**	23.4	64.5***	47.5**	22.9
	(17.0)	(16.0)	(12.7)	(16.9)	(15.9)	(12.8)	(23.2)	(21.0)	(16.5)	(23.1)	(20.9)	(16.4)
Nearest c.1800 mine	-22.8**	-21.9**	-17.7**	-22.5**	-21.6**	-17.6**	-12.9	-7.7	-9.5	-12.7	-8.2	-10.2
	(11.3)	(10.6)	(8.5)	(11.2)	(10.6)	(8.4)	(16.8)	(16.6)	(13.2)	(16.6)	(16.4)	(13.0)
Avg land gradient	1.50***	1.94***	1.92***	1.51***	1.94***	1.92***	2.04***	2.46***	2.26***	2.08***	2.49***	2.29***
	(0.16)	(0.14)	(0.12)	(0.16)	(0.14)	(0.12)	(0.22)	(0.21)	(0.18)	(0.22)	(0.21)	(0.18)
Median altitude	-0.73	-0.79	-1.85***	-1.30	-1.30*	-2.24***	0.86	0.29	0.32	0.41	-0.12	-0.03
	(0.78)	(0.75)	(0.63)	(0.80)	(0.76)	(0.64)	(1.34)	(1.31)	(1.14)	(1.34)	(1.30)	(1.13)
Latitude	-1.31	0.05	0.94	-0.94	0.38	1.19*	-0.24	1.25	0.45	0.07	1.49	0.66
	(0.84)	(0.84)	(0.66)	(0.84)	(0.84)	(0.66)	(1.38)	(1.39)	(1.12)	(1.39)	(1.38)	(1.11)
Soil Suitability	0.94	1.27	0.82	0.97	1.32	0.86	0.54	1.19	1.04	0.81	1.41	1.21
	(0.98)	(0.93)	(0.76)	(0.97)	(0.92)	(0.76)	(1.46)	(1.34)	(1.12)	(1.47)	(1.35)	(1.13)
Area (100 km^2)	0.049	0.146	0.115	0.089	0.184*	0.150*	-0.124	-0.020	0.057	-0.042	0.061	0.131
	(0.09)	(0.10)	(0.08)	(0.08)	(0.10)	(0.08)	(0.12)	(0.13)	(0.10)	(0.12)	(0.13)	(0.11)
Constant	85.3***	40.5**	16.1	80.6***	36.4**	13.1	55.7**	9.2	18.0	52.5*	7.3	16.3
	(17.3)	(17.2)	(13.5)	(17.1)	(17.1)	(13.4)	(27.3)	(27.3)	(21.9)	(27.2)	(27.1)	(21.7)
R-squared	0.393	0.492	0.571	0.401	0.499	0.576	0.430	0.476	0.520	0.437	0.483	0.527
Municipalities	1,061	1,141	1,143	1,061	1,141	1,143	592	609	609	592	609	609
Mean dep. var.	67.9	53.6	43.7	67.9	53.6	43.7	64.4	48.5	38.8	64.4	48.5	38.8

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.6: Pooled Data Differences in Marginalization Index by Distance to Hacienda, 1970-1990

	Main Sample						Neighbors Sample			
	Model 1		Model 2		Hac (binary)		Model 1		Model 2	
Year = 1990	-25.92***	(0.41)	-26.56***	(0.49)	-25.29***	(0.26)	-25.22***	(0.56)	-26.27***	(0.78)
1990× Distance	1.09***	(0.22)					1.43***	(0.44)		
1990× Dist × Hacienda			1.13	(1.33)					0.98	(1.39)
1990× Dist × Without			0.82***	(0.23)					0.72	(0.53)
1990× Hacienda			-3.50***	(1.27)	-4.56***	(0.91)			-2.76*	(1.44)
Year = 1980	-17.05***	(0.33)	-17.20***	(0.42)	-15.22***	(0.23)	-17.35***	(0.42)	-17.86***	(0.64)
1980× Distance	1.41***	(0.24)					2.54***	(0.50)		
1980× Dist × Hacienda			2.93*	(1.64)					2.79*	(1.68)
1980× Dist × Without			1.03***	(0.26)					1.63***	(0.59)
1980× Hacienda			-5.82***	(1.50)	-6.45***	(1.08)			-4.14**	(1.68)
Year = 1970										
1970× Distance	0.84***	(0.24)					1.81***	(0.52)		
1970× Dist × Hacienda			2.23	(1.58)					2.10	(1.61)
1970× Dist × Without			0.44*	(0.26)					0.73	(0.61)
1970× Hacienda			-6.12***	(1.67)	-5.21***	(1.19)			-5.14***	(1.86)
Pueblos de indios	1.03	(0.98)	1.26	(0.98)	1.33	(0.97)	-1.03	(1.23)	-0.88	(1.23)
Nearest colonial city	22.52	(14.56)	19.73	(14.52)	32.57**	(14.20)	45.13**	(19.12)	44.68**	(18.99)
Nearest c.1800 mine	-19.91**	(9.48)	-19.74**	(9.40)	-18.26*	(9.49)	-9.60	(14.63)	-9.94	(14.41)
Average land gradient	1.80***	(0.13)	1.81***	(0.13)	1.87***	(0.13)	2.26***	(0.19)	2.29***	(0.19)
Median altitude	-1.16*	(0.67)	-1.64**	(0.68)	-2.58***	(0.64)	0.48	(1.19)	0.07	(1.18)
Latitude	-0.06	(0.74)	0.26	(0.73)	0.88	(0.73)	0.52	(1.22)	0.77	(1.21)
Soil Suitability	0.99	(0.84)	1.03	(0.84)	1.27	(0.83)	0.94	(1.23)	1.16	(1.24)
Area (100 km^2)	0.10	(0.09)	0.14*	(0.08)	0.19**	(0.08)	-0.03	(0.11)	0.05	(0.11)
Constant	60.5***	(15.1)	56.9***	(15.0)	45.9***	(15.0)	41.2*	(23.9)	39.5*	(23.6)
R-squared	0.627		0.632		0.628		0.642		0.646	
Municipalities	3,345		3,345		3,345		1,810		1,810	

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. $***p < 0.01$; $**p < 0.05$; $*p < 0.1$

Table A.7: Differences in Outcomes by Presence of Hacienda (binary) for each year, 1900-1990

	Literacy								Marginalization index		
	1900	1930	1940	1950	1960	1970	1980	1990	1970	1980	1990
Hacienda	0.013*	0.024***	0.039***	0.034***	0.034***	0.030***	0.033***	0.025***	-5.52***	-5.95***	-4.78***
	(0.007)	(0.008)	(0.010)	(0.009)	(0.008)	(0.007)	(0.006)	(0.005)	(1.21)	(1.11)	(0.88)
Pueblos de indios	-0.002	0.000	0.002	-0.004	-0.004	-0.011	-0.012	-0.011*	1.34	1.30	1.36
	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)	(0.007)	(0.008)	(0.006)	(1.17)	(1.08)	(0.83)
Nearest colonial city	-0.084	-0.173	-0.313**	-0.254*	-0.227*	-0.089	-0.078	-0.143*	32.01*	41.10***	25.70**
	(0.096)	(0.108)	(0.127)	(0.131)	(0.122)	(0.097)	(0.104)	(0.087)	(16.54)	(15.65)	(12.46)
Nearest c.1800 mine	0.039	0.051	0.180**	0.014	0.076	0.034	-0.050	0.007	-21.26*	-20.24*	-16.19*
	(0.053)	(0.068)	(0.085)	(0.094)	(0.092)	(0.078)	(0.077)	(0.070)	(11.28)	(10.67)	(8.47)
Avg land gradient	-0.007***	-0.011***	-0.014***	-0.017***	-0.016***	-0.014***	-0.018***	-0.016***	1.58***	2.02***	1.98***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.16)	(0.14)	(0.12)
Median altitude	0.002	0.003	0.006	0.017**	0.017***	0.021***	0.011*	0.013***	-2.13***	-2.41***	-3.15***
	(0.004)	(0.005)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.74)	(0.71)	(0.60)
Latitude	-0.003	-0.004	0.001	-0.013*	-0.010	-0.013**	-0.021***	-0.013***	-0.39	1.12	1.79***
	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)	(0.006)	(0.005)	(0.005)	(0.82)	(0.83)	(0.66)
Soil Suitability	0.001	-0.006	-0.009	-0.002	-0.001	-0.002	0.000	0.002	1.12	1.63*	1.11
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)	(0.97)	(0.91)	(0.76)
Area (100 km^2)	-0.001	-0.002***	-0.002***	-0.002*	-0.002**	-0.002***	-0.001*	-0.001**	0.13	0.24**	0.19**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.08)	(0.10)	(0.08)
Constant	0.21***	0.34***	0.29**	0.68***	0.65***	0.72***	1.07***	1.00***	71.7***	24.7	3.6
	(0.08)	(0.10)	(0.13)	(0.14)	(0.14)	(0.12)	(0.11)	(0.10)	(16.9)	(17.1)	(13.5)
R-squared	0.375	0.420	0.431	0.429	0.441	0.419	0.510	0.545	0.398	0.493	0.571
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143	1,061	1,141	1,143
Mean dep. var.	0.13	0.20	0.25	0.36	0.40	0.43	0.58	0.66	67.9	53.6	43.7

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.8: Nearest Neighbor Matching by Closeness to Hacienda for each year, 1900-1990

	Within 23km				Within 29km			
	NNM-1	NNM-2	NNM-3	PSM	NNM-1	NNM-2	NNM-3	PSM
Literacy								
Year = 1900	0.0156**	0.0159***	0.0140**	-0.0151	0.0183**	0.0197***	0.0191***	0.0068
(N=666)	[.0024,.029]	[.004,.028]	[.0029,.025]	[-.04,.0095]	[.0043,.032]	[.0072,.032]	[.0073,.031]	[-.015,.029]
Year = 1930	0.0396***	0.0387***	0.0335***	0.0256**	0.0334***	0.0331***	0.0281***	0.0229*
(N=774)	[.022,.057]	[.022,.055]	[.018,.049]	[.0051,.046]	[.014,.053]	[.016,.051]	[.012,.045]	[-.0033,.049]
Year = 1940	0.0592***	0.0565***	0.0528***	0.0356***	0.0379***	0.0439***	0.0375***	0.0294*
(N=805)	[.038,.081]	[.037,.076]	[.035,.071]	[.013,.058]	[.013,.063]	[.022,.066]	[.017,.058]	[-.0013,.06]
Year = 1950	0.0551***	0.0474***	0.0426***	0.0399**	0.0297**	0.0375***	0.0311***	0.0399***
(N=813)	[.027,.083]	[.023,.072]	[.021,.064]	[.0033,.076]	[.0026,.057]	[.014,.061]	[.0094,.053]	[.011,.069]
Year = 1960	0.0530***	0.0445***	0.0409***	0.0249*	0.0319**	0.0377***	0.0315***	0.0330**
(N=813)	[.027,.079]	[.021,.068]	[.019,.062]	[-.0042,.054]	[.006,.058]	[.015,.06]	[.01,.052]	[.0034,.062]
Year = 1970	0.0399***	0.0352***	0.0317***	0.0234*	0.0293***	0.0317***	0.0265***	0.0280**
(N=817)	[.019,.061]	[.017,.054]	[.014,.049]	[-.0043,.051]	[.01,.048]	[.015,.048]	[.011,.042]	[.0033,.053]
Year = 1980	0.0444***	0.0368***	0.0336***	0.0222	0.0294***	0.0315***	0.0267***	0.0325**
(N=815)	[.023,.066]	[.018,.056]	[.016,.051]	[-.0094,.054]	[.0092,.05]	[.014,.049]	[.011,.043]	[.00047,.065]
Year = 1990	0.0345***	0.0278***	0.0255***	0.0190*	0.0212**	0.0266***	0.0238***	0.0209*
(N=816)	[.016,.053]	[.012,.044]	[.011,.04]	[-.0019,.04]	[.0038,.039]	[.012,.042]	[.01,.037]	[-.0026,.044]
Marginalization Index								
Year = 1970	-4.764***	-5.134***	-5.353***	-2.756**	-4.549***	-4.972***	-4.386***	-4.567***
(N=741)	[-7.7,-1.8]	[-7.7,-2.5]	[-7.8,-2.9]	[-5,-.47]	[-7.6,-1.5]	[-7.7,-2.2]	[-7,-1.8]	[-7.3,-1.8]
Year = 1980	-5.194***	-5.017***	-4.660***	-3.096**	-4.286***	-4.900***	-4.496***	-5.907***
(N=815)	[-8.3,-2.1]	[-7.8,-2.2]	[-7.2,-2.1]	[-5.8,-.39]	[-7.2,-1.4]	[-7.5,-2.3]	[-7,-2]	[-9.6,-2.3]
Year = 1990	-4.437***	-4.243***	-4.032***	-2.197**	-2.700**	-3.566***	-3.545***	-3.245**
(N=816)	[-6.8,-2.1]	[-6.4,-2.1]	[-6,-2]	[-4.1,-.27]	[-5.2,-.19]	[-5.8,-1.3]	[-5.7,-1.4]	[-5.9,-.59]

Notes: Average Treatment Effect on the Treated (ATT) with 95% CI over census year. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.9: Nearest Neighbor Matching by Closeness to Hacienda (Neighbors) for each year, 1900-1990

	Within 13km				Within 16km			
	NNM-1	NNM-2	NNM-3	PSM	NNM-1	NNM-2	NNM-3	PSM
Literacy								
Year = 1900	0.0057	0.0060	0.0071	0.0097	0.0176**	0.0155**	0.0127*	0.0117
(N=414)	[-.0086,.02]	[-.0073,.019]	[-.006,.02]	[-.011,.031]	[.0039,.031]	[.0026,.028]	[-.00021,.026]	[-.019,.042]
Year = 1930	0.0287***	0.0270***	0.0299***	0.0307**	0.0369***	0.0325***	0.0299***	0.0216**
(N=503)	[.011,.047]	[.011,.043]	[.014,.046]	[.004,.057]	[.02,.053]	[.018,.047]	[.015,.044]	[.0044,.039]
Year = 1940	0.0434***	0.0426***	0.0444***	0.0746***	0.0595***	0.0560***	0.0502***	0.0567***
(N=530)	[.02,.067]	[.023,.063]	[.025,.064]	[.048,.1]	[.038,.081]	[.036,.076]	[.031,.069]	[.034,.079]
Year = 1950	0.0396***	0.0437***	0.0460***	0.0568***	0.0519***	0.0513***	0.0476***	0.0320***
(N=541)	[.016,.063]	[.023,.064]	[.026,.066]	[.028,.086]	[.029,.075]	[.03,.073]	[.027,.068]	[.0088,.055]
Year = 1960	0.0402***	0.0391***	0.0387***	0.0526***	0.0458***	0.0425***	0.0397***	0.0203*
(N=545)	[.02,.061]	[.021,.057]	[.021,.057]	[.029,.076]	[.026,.066]	[.024,.061]	[.022,.058]	[-.0013,.042]
Year = 1970	0.0180**	0.0217***	0.0210***	0.0183*	0.0300***	0.0298***	0.0270***	0.0219**
(N=550)	[.00093,.035]	[.0061,.037]	[.0061,.036]	[-.0017,.038]	[.013,.047]	[.014,.046]	[.012,.042]	[.0037,.04]
Year = 1980	0.0296***	0.0317***	0.0313***	0.0323***	0.0383***	0.0356***	0.0316***	0.0133
(N=552)	[.015,.045]	[.018,.045]	[.019,.044]	[.013,.051]	[.021,.056]	[.02,.051]	[.017,.046]	[-.003,.029]
Year = 1990	0.0220***	0.0234***	0.0234***	0.0248***	0.0307***	0.0279***	0.0247***	0.0090
(N=552)	[.0098,.034]	[.012,.034]	[.013,.034]	[.0093,.04]	[.016,.045]	[.015,.04]	[.013,.036]	[-.005,.023]
Marginalization Index								
Year = 1970	-0.548	-1.098	-1.431	-1.925	-3.551***	-3.671***	-3.479***	-4.391***
(N=538)	[-4,2.9]	[-4.2,2]	[-4.3,1.5]	[-4.8,.94]	[-6.1,-1]	[-5.9,-1.4]	[-5.7,-1.2]	[-7.3,-1.5]
Year = 1980	-2.639*	-3.254***	-3.433***	-2.659*	-4.660***	-4.637***	-4.202***	-2.265*
(N=552)	[-5.4,.16]	[-5.7,-.84]	[-5.7,-1.2]	[-5.4,.1]	[-7.1,-2.2]	[-6.8,-2.5]	[-6.3,-2.1]	[-4.9,.34]
Year = 1990	-1.869*	-2.213**	-2.276**	-2.075*	-3.528***	-3.285***	-2.792***	-1.399
(N=552)	[-4,.3]	[-4.1,-.33]	[-4.1,-.5]	[-4.4,.25]	[-5.6,-1.5]	[-5.1,-1.5]	[-4.5,-1.1]	[-3.6,.84]

Notes: ATT with 95% CI over census year. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.10: Sensitivity Test to Covariates, Pooled Data Differences in Literacy by Distance to Hacienda, 1900-1990

	Literacy									
	(1) None	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) All
Year = 1990	0.558***	0.558***	0.558***	0.558***	0.558***	0.558***	0.558***	0.558***	0.557***	0.557***
	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0041)	(0.0041)
1990 × Distance	-0.014***	-0.014***	-0.014***	-0.014***	-0.013***	-0.016***	-0.014***	-0.013***	-0.010***	-0.009***
	(0.0014)	(0.0014)	(0.0014)	(0.0015)	(0.0016)	(0.0016)	(0.0014)	(0.0015)	(0.0013)	(0.0016)
Year = 1980	0.474***	0.474***	0.474***	0.473***	0.474***	0.474***	0.473***	0.474***	0.472***	0.472***
	(0.0045)	(0.0045)	(0.0046)	(0.0045)	(0.0045)	(0.0045)	(0.0046)	(0.0045)	(0.0045)	(0.0045)
1980 × Distance	-0.015***	-0.015***	-0.015***	-0.015***	-0.014***	-0.017***	-0.015***	-0.015***	-0.011***	-0.010***
	(0.0016)	(0.0016)	(0.0015)	(0.0016)	(0.0017)	(0.0017)	(0.0015)	(0.0016)	(0.0014)	(0.0017)
Year = 1970	0.323***	0.323***	0.323***	0.323***	0.323***	0.323***	0.322***	0.323***	0.322***	0.321***
	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0042)	(0.0042)	(0.0042)
1970 × Distance	-0.013***	-0.013***	-0.013***	-0.013***	-0.012***	-0.015***	-0.013***	-0.013***	-0.009***	-0.008***
	(0.0015)	(0.0015)	(0.0014)	(0.0015)	(0.0016)	(0.0016)	(0.0014)	(0.0015)	(0.0014)	(0.0017)
Year = 1960	0.299***	0.299***	0.299***	0.299***	0.299***	0.299***	0.299***	0.299***	0.298***	0.298***
	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)	(0.0050)
1960 × Distance	-0.017***	-0.017***	-0.017***	-0.017***	-0.016***	-0.019***	-0.017***	-0.016***	-0.013***	-0.012***
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0016)	(0.0017)	(0.0016)	(0.0018)
Year = 1950	0.262***	0.262***	0.262***	0.262***	0.262***	0.262***	0.261***	0.262***	0.260***	0.260***
	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0051)	(0.0051)	(0.0052)	(0.0051)	(0.0051)	(0.0051)
1950 × Distance	-0.018***	-0.018***	-0.018***	-0.018***	-0.017***	-0.020***	-0.018***	-0.017***	-0.014***	-0.013***
	(0.0017)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0019)	(0.0017)	(0.0017)	(0.0016)	(0.0018)
Year = 1940	0.152***	0.152***	0.152***	0.152***	0.152***	0.152***	0.152***	0.152***	0.151***	0.151***
	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)
1940 × Distance	-0.016***	-0.016***	-0.016***	-0.016***	-0.015***	-0.018***	-0.016***	-0.015***	-0.012***	-0.011***
	(0.0016)	(0.0016)	(0.0017)	(0.0017)	(0.0018)	(0.0018)	(0.0016)	(0.0017)	(0.0015)	(0.0018)
Year = 1930	0.086***	0.086***	0.086***	0.085***	0.086***	0.086***	0.085***	0.086***	0.086***	0.085***
	(0.0037)	(0.0037)	(0.0037)	(0.0038)	(0.0037)	(0.0038)	(0.0038)	(0.0037)	(0.0037)	(0.0037)
1930 × Distance	-0.010***	-0.010***	-0.010***	-0.010***	-0.009***	-0.012***	-0.010***	-0.010***	-0.007***	-0.005***
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0016)	(0.0016)	(0.0014)	(0.0014)	(0.0013)	(0.0016)
Year = 1900										
1900 × Distance	-0.006***	-0.006***	-0.006***	-0.006***	-0.005***	-0.008***	-0.006***	-0.005***	-0.002*	-0.001
	(0.0012)	(0.0012)	(0.0013)	(0.0013)	(0.0014)	(0.0014)	(0.0012)	(0.0013)	(0.0012)	(0.0015)
Nearest c.1800 mine (km)		-0.009								0.058
		(0.0684)								(0.0671)
Latitude			-0.002							-0.002
			(0.0049)							(0.0050)
Area (100 km^2)				-0.001						-0.001*
				(0.0006)						(0.0006)
Nearest colonial city (km)					-0.136					-0.063
					(0.1007)					(0.0979)
Median altitude (km)						-0.011*				0.001
						(0.0057)				(0.0052)
Pueblos de indios							-0.021***			-0.004
							(0.0072)			(0.0068)
Soil Suitability								-0.018***		0.001
								(0.0063)		(0.0060)
Average land gradient									-0.013***	-0.014***
									(0.0009)	(0.0010)
Constant	0.147***	0.148***	0.192**	0.149***	0.153***	0.171***	0.165***	0.149***	0.201***	0.248**
	(0.0045)	(0.0096)	(0.0963)	(0.0046)	(0.0064)	(0.0126)	(0.0072)	(0.0044)	(0.0053)	(0.1013)
R-squared	0.7837	0.7837	0.7837	0.7838	0.7840	0.7844	0.7849	0.7850	0.8169	0.8176
Municipalities	8,694	8,694	8,694	8,694	8,694	8,694	8,694	8,694	8,694	8,694
p-value, $H_0 : \beta = \beta_{none}$		1.0000	1.0000	0.9831	0.9848	0.8824	0.9129	0.5750	0.0000	0.0088

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.11: Sensitivity Test to Covariates, Pooled Data Differences in Marginalization Index by Distance to Hacienda, 1970-1990

	Marginalization Index									
	(1) None	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) All
Year = 1990	-25.81***	-25.81***	-25.81***	-25.82***	-25.81***	-25.82***	-25.81***	-25.76***	-25.89***	-25.92***
	(0.411)	(0.411)	(0.411)	(0.412)	(0.411)	(0.410)	(0.411)	(0.412)	(0.405)	(0.407)
1990 × Distance	2.05***	2.03***	2.12***	2.06***	2.01***	1.77***	2.06***	1.92***	1.53***	1.09***
	(0.200)	(0.203)	(0.224)	(0.199)	(0.208)	(0.222)	(0.194)	(0.203)	(0.183)	(0.220)
Year = 1980	-16.98***	-16.98***	-16.98***	-16.99***	-16.98***	-16.99***	-16.97***	-16.94***	-17.03***	-17.05***
	(0.330)	(0.330)	(0.330)	(0.330)	(0.330)	(0.329)	(0.331)	(0.332)	(0.326)	(0.327)
1980 × Distance	2.39***	2.37***	2.46***	2.39***	2.35***	2.10***	2.39***	2.25***	1.85***	1.41***
	(0.223)	(0.226)	(0.247)	(0.222)	(0.230)	(0.240)	(0.218)	(0.225)	(0.202)	(0.239)
Year = 1970										
1970 × Distance	1.85***	1.83***	1.92***	1.85***	1.81***	1.56***	1.86***	1.73***	1.30***	0.84***
	(0.219)	(0.224)	(0.243)	(0.219)	(0.227)	(0.237)	(0.214)	(0.221)	(0.207)	(0.244)
Latitude		0.25								-0.06
		(0.708)								(0.735)
Median altitude (km)			0.44							-1.16*
			(0.725)							(0.675)
Nearest c.1800 mine (km)				-8.06						-19.91**
				(9.402)						(9.482)
Area (100 km^2)					0.09					0.10
					(0.091)					(0.087)
Nearest colonial city (km)						32.97**				22.52
						(14.773)				(14.563)
Pueblos de indios							3.33***			1.03
							(1.026)			(0.980)
Soil Suitability								3.30***		0.99
								(0.833)		(0.843)
Average land gradient									1.82***	1.80***
									(0.121)	(0.130)
Constant	63.19***	58.36***	62.23***	64.17***	63.00***	61.95***	60.47***	62.88***	56.35***	60.52***
	(0.764)	(13.867)	(1.735)	(1.365)	(0.767)	(1.022)	(1.031)	(0.754)	(0.780)	(15.088)
R-squared	0.5488	0.5488	0.5489	0.5491	0.5491	0.5510	0.5530	0.5547	0.6221	0.6269
Municipalities	3,345	3,345	3,345	3,345	3,345	3,345	3,345	3,345	3,345	3,345
p-value, $H_0 : \beta = \beta_{none}$		0.9888	0.9470	0.8779	0.7809	0.1702	0.5747	0.0064	0.0000	0.0000

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.12: Placebo Differences by Distance to Hacienda for each year, 1900-1990

	Model 1									
	Literacy								Marginalization	
	1900	1930	1940	1950	1960	1970	1980	1990	1980	1990
Dist. hacienda	0.004*	0.003	0.003	0.007	-0.000	-0.000	0.001	-0.000	0.602	0.697*
(10km)	(0.002)	(0.002)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.397)	(0.375)
Pueblos de indios	-0.010	-0.002	-0.032	-0.031	-0.035*	-0.030*	-0.029**	-0.020	3.171**	1.619
	(0.012)	(0.011)	(0.020)	(0.021)	(0.021)	(0.017)	(0.015)	(0.015)	(1.591)	(1.402)
Nearest colonial	-0.120	-0.126	-0.428**	-1.193***	-0.902***	-0.882***	-1.129***	-0.904***	42.304*	3.169
city	(0.138)	(0.136)	(0.203)	(0.295)	(0.291)	(0.246)	(0.224)	(0.204)	(22.850)	(21.486)
Nearest c.1800	0.091**	0.166***	0.431***	0.830***	0.977***	0.821***	0.728***	0.693***	-74.140***	-66.742***
mine	(0.044)	(0.052)	(0.074)	(0.105)	(0.110)	(0.090)	(0.089)	(0.087)	(8.611)	(8.163)
Average land	-0.005***	-0.004***	-0.009***	-0.010***	-0.009***	-0.006***	-0.010***	-0.011***	0.986***	1.104***
gradient	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.160)	(0.156)
Median altitude	0.020***	0.009	0.012	0.020*	0.030**	0.010	-0.000	0.002	4.127***	1.312
	(0.005)	(0.006)	(0.009)	(0.012)	(0.013)	(0.010)	(0.010)	(0.009)	(0.903)	(0.891)
Latitude	0.021***	0.037***	0.076***	0.157***	0.177***	0.159***	0.129***	0.106***	-14.770***	-11.595***
	(0.006)	(0.009)	(0.012)	(0.017)	(0.018)	(0.015)	(0.014)	(0.012)	(1.269)	(1.191)
Soil Suitability	0.002	-0.010*	-0.015*	-0.013	-0.014	-0.010	0.001	-0.003	-0.538	0.782
	(0.004)	(0.006)	(0.008)	(0.011)	(0.012)	(0.010)	(0.010)	(0.009)	(0.943)	(0.816)
Area (100 km^2)	0.0010	0.0010	0.0017	0.0007	0.0015	0.0012	0.0013	-0.0002	0.1804	0.1536
	(0.0012)	(0.0016)	(0.0020)	(0.0031)	(0.0033)	(0.0026)	(0.0023)	(0.0021)	(0.2635)	(0.2254)
Constant	-0.33***	-0.54***	-1.19***	-2.52***	-2.89***	-2.47***	-1.74***	-1.27***	321.83***	260.66***
	(0.11)	(0.15)	(0.21)	(0.30)	(0.32)	(0.26)	(0.25)	(0.22)	(22.94)	(21.26)
R-squared	0.130	0.117	0.205	0.310	0.306	0.329	0.343	0.349	0.339	0.315
Municipalities	496	494	491	500	502	502	502	502	502	502
Mean dep. var.	0.06	0.13	0.15	0.30	0.33	0.39	0.53	0.61	67.11	55.59

	Model 2									
	Literacy								Marginalization	
	1900	1930	1940	1950	1960	1970	1980	1990	1980	1990
Dist. hacienda	0.004	0.003	0.003	0.007	0.000	0.001	0.002	0.001	0.308	0.406
× Without	(0.002)	(0.002)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.404)	(0.383)
Dist. hacienda	-0.015	-0.018	0.008	0.064	0.064	0.043	0.062*	0.051*	-7.289	-6.994
× Hacienda	(0.035)	(0.045)	(0.047)	(0.053)	(0.052)	(0.035)	(0.037)	(0.026)	(4.845)	(4.920)
Hacienda	0.006	0.016	0.004	-0.037	-0.027	-0.006	-0.020	0.003	-3.215	-3.228
	(0.021)	(0.026)	(0.030)	(0.030)	(0.029)	(0.024)	(0.024)	(0.017)	(2.940)	(3.117)
Pueblos de indios	-0.010	-0.002	-0.032	-0.030	-0.035*	-0.031*	-0.029**	-0.021	3.546**	1.990
	(0.012)	(0.011)	(0.020)	(0.021)	(0.021)	(0.017)	(0.015)	(0.015)	(1.570)	(1.384)
Nearest colonial	-0.110	-0.108	-0.428**	-1.237***	-0.943***	-0.902***	-1.164***	-0.922***	43.287*	4.070
city	(0.140)	(0.135)	(0.205)	(0.300)	(0.298)	(0.250)	(0.229)	(0.209)	(22.791)	(21.755)
Nearest c.1800	0.088*	0.160***	0.429***	0.845***	0.987***	0.823***	0.735***	0.691***	-72.755***	-65.354***
mine	(0.045)	(0.052)	(0.075)	(0.106)	(0.112)	(0.091)	(0.090)	(0.089)	(8.704)	(8.259)
Average land	-0.005***	-0.004***	-0.009***	-0.010***	-0.009***	-0.006***	-0.011***	-0.011***	0.977***	1.094***
gradient	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.159)	(0.157)
Median altitude	0.020***	0.009	0.012	0.019	0.029**	0.010	-0.001	0.002	4.050***	1.235
	(0.005)	(0.006)	(0.009)	(0.012)	(0.013)	(0.010)	(0.010)	(0.009)	(0.896)	(0.879)
Latitude	0.021***	0.037***	0.076***	0.157***	0.178***	0.159***	0.130***	0.106***	-14.537***	-11.364***
	(0.006)	(0.009)	(0.012)	(0.017)	(0.018)	(0.015)	(0.014)	(0.012)	(1.263)	(1.188)
Soil Suitability	0.002	-0.010*	-0.015*	-0.013	-0.015	-0.010	0.001	-0.003	-0.536	0.783
	(0.004)	(0.006)	(0.008)	(0.011)	(0.012)	(0.010)	(0.010)	(0.009)	(0.950)	(0.816)
Area (100 km^2)	0.0010	0.0010	0.0016	0.0005	0.0012	0.0009	0.0011	-0.0006	0.2495	0.2215
	(0.0012)	(0.0016)	(0.0021)	(0.0032)	(0.0034)	(0.0027)	(0.0023)	(0.0021)	(0.2623)	(0.2276)
Constant	-0.33***	-0.54***	-1.18***	-2.53***	-2.89***	-2.46***	-1.74***	-1.26***	318.50***	257.36***
	(0.11)	(0.15)	(0.21)	(0.30)	(0.32)	(0.26)	(0.25)	(0.22)	(22.84)	(21.22)
R-squared	0.130	0.118	0.205	0.311	0.306	0.329	0.344	0.352	0.354	0.331
Municipalities	496	494	491	500	502	502	502	502	502	502
Mean dep. var.	0.06	0.13	0.15	0.30	0.33	0.39	0.53	0.61	67.11	55.59

Notes: Cross-section OLS with robust SE. Municipalities within 100km of an hacienda. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.13: Placebo Pooled Data Differences by Distance to Hacienda, 1900-1990

	Literacy				Marginalization Index			
	Model 1		Model 2		Model 1		Model 2	
Year = 1990	0.611***	(0.008)	0.605***	(0.009)	-11.877***	(0.485)	-11.992***	(0.558)
1990× Distance	-0.003	(0.003)			0.703*	(0.377)		
1990× Dist × Hacienda			0.032	(0.025)			-7.894	(4.900)
1990× Dist × Without			-0.002	(0.003)			0.422	(0.386)
1990× Hacienda			0.013	(0.016)			-2.678	(3.037)
Year = 1980	0.532***	(0.009)	0.529***	(0.010)				
1980× Distance	-0.003	(0.003)			0.597	(0.363)		
1980× Dist × Hacienda			0.034	(0.036)			-6.389	(4.778)
1980× Dist × Without			-0.003	(0.003)			0.292	(0.370)
1980× Hacienda			-0.007	(0.023)			-3.764	(2.974)
Year = 1970	0.384***	(0.010)	0.381***	(0.012)				
1970× Distance	-0.001	(0.003)						
1970× Dist × Hacienda			0.033	(0.035)				
1970× Dist × Without			-0.001	(0.004)				
1970× Hacienda			-0.002	(0.025)				
Year = 1960	0.333***	(0.012)	0.331***	(0.014)				
1960× Distance	-0.004	(0.004)						
1960× Dist × Hacienda			0.040	(0.049)				
1960× Dist × Without			-0.004	(0.004)				
1960× Hacienda			-0.016	(0.030)				
Year = 1950	0.284***	(0.011)	0.285***	(0.013)				
1950× Distance	-0.001	(0.004)						
1950× Dist × Hacienda			0.024	(0.050)				
1950× Dist × Without			-0.001	(0.004)				
1950× Hacienda			-0.024	(0.031)				
Year = 1940	0.118***	(0.007)	0.115***	(0.009)				
1940× Distance	0.006	(0.003)						
1940× Dist × Hacienda			0.023	(0.046)				
1940× Dist × Without			0.006*	(0.004)				
1940× Hacienda			-0.002	(0.029)				
Year = 1930	0.072***	(0.006)	0.071***	(0.006)				
1930× Distance	0.011***	(0.003)						
1930× Dist × Hacienda			0.035	(0.043)				
1930× Dist × Without			0.012***	(0.003)				
1930× Hacienda			-0.007	(0.026)				
Year = 1900								
1900× Distance	0.013***	(0.003)						
1900× Dist × Hacienda			0.040	(0.036)				
1900× Dist × Without			0.013***	(0.003)				
1900× Hacienda			-0.017	(0.021)				
Pueblos de indios	-0.024*	(0.013)	-0.024*	(0.014)	2.395*	(1.414)	2.768**	(1.393)
Nearest colonial city	-0.712***	(0.183)	-0.728***	(0.187)	22.736	(20.870)	23.679	(20.924)
Nearest c.1800 mine	0.596***	(0.068)	0.599***	(0.069)	-70.441***	(8.028)	-69.054***	(8.115)
Average land gradient	-0.008***	(0.001)	-0.008***	(0.001)	1.045***	(0.149)	1.036***	(0.149)
Median altitude	0.013*	(0.007)	0.013*	(0.007)	2.719***	(0.830)	2.642***	(0.819)
Latitude	0.108***	(0.011)	0.108***	(0.011)	-13.182***	(1.151)	-12.951***	(1.145)
Soil Suitability	-0.008	(0.007)	-0.008	(0.007)	0.122	(0.829)	0.123	(0.833)
Area (100 km^2)	0.001	(0.002)	0.001	(0.002)	0.167	(0.237)	0.235	(0.237)
Constant	-1.918***	(0.190)	-1.914***	(0.191)	297.187***	(20.728)	293.929***	(20.651)
R-squared	0.752		0.752		0.448		0.460	
Municipalities	3,989		3,989		1,004		1,004	

Notes: Pooled OLS with SE clustered by municipality. Municipalities within 100km of an hacienda. Includes state fixed effects. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.14: First stage estimations of mediation model by mediator

β: Dist. Hacienda < 13km	By Census Year				
	1950	1960^b	1970	1980	1990
Urban localities (prop)	0.0506*	0.0494*	0.0598**	0.1063***	0.1231***
	(0.0282)	(0.0249)	(0.0216)	(0.0305)	(0.0307)
Workers in agriculture (prop)	-0.0349	-0.0710	-0.0577	-0.0605	-0.0603**
	(0.0211)	(0.0420)	(0.0335)	(0.0354)	(0.0277)
Workers in manufacture (prop)	0.0169	0.0338**	0.0220	0.0248	0.0320***
	(0.0100)	(0.0158)	(0.0172)	(0.0143)	(0.0097)
Workers in trade (prop)	0.0067	0.0096	0.0086**	0.0060	0.0090*
	(0.0040)	(0.0076)	(0.0040)	(0.0057)	(0.0049)
Railway station (binary)		-0.0108			
		(0.0274)			
Granted land (%)		0.0193			
		(0.0222)			

Notes: ^{b}Baseline year for Railway station (binary) and Granted land (%). Treatment defined as municipalities within 13km distance to closest hacienda. Cross-section OLS regression with robust SE. Includes all controls and state fixed effects. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors within 100km of an hacienda. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A.15: OLS Mediation Analysis by Mediator

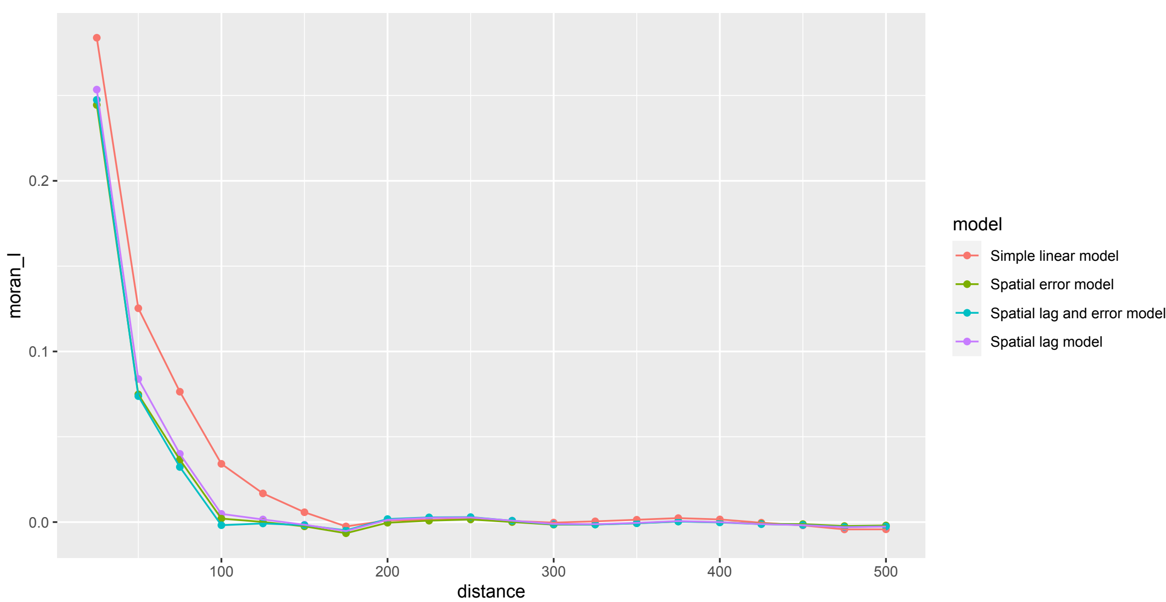
	Literacy					Marginalization Index		
	1950	1960	1970	1980	1990	1970	1980	1990
i. Urban localities	0.070***	0.066***	0.060***	0.084***	0.075***	-25.888***	-28.685***	-23.762***
	(0.018)	(0.015)	(0.012)	(0.010)	(0.008)	(1.844)	(1.398)	(1.017)
Dist. hacienda (10km)	-0.016***	-0.013***	-0.011***	-0.009***	-0.007***	1.086***	1.172***	0.623**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.392)	(0.349)	(0.267)
ii. Workers in agriculture	-0.287***	-0.238***	-0.163***	-0.170***	-0.129***	51.296***	46.988***	34.669***
	(0.022)	(0.023)	(0.014)	(0.012)	(0.012)	(1.803)	(1.653)	(1.600)
Dist. hacienda (10km)	-0.014***	-0.011**	-0.010***	-0.008***	-0.008***	0.852***	1.273***	0.891***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.321)	(0.319)	(0.292)
iii. Workers in manufacture	0.297***	0.290***	0.188***	0.247***	0.133***	-63.304***	-64.442***	-35.214***
	(0.059)	(0.049)	(0.027)	(0.031)	(0.024)	(5.957)	(6.203)	(4.268)
Dist. hacienda (10km)	-0.016***	-0.012**	-0.012***	-0.010***	-0.009***	1.315***	1.664***	1.198***
	(0.004)	(0.005)	(0.003)	(0.003)	(0.002)	(0.472)	(0.463)	(0.390)
iv. Workers in trade	1.320***	1.121***	0.808***	0.575***	0.337***	-249.114***	-178.245***	-104.911***
	(0.101)	(0.100)	(0.085)	(0.077)	(0.072)	(17.816)	(14.034)	(14.068)
Dist. hacienda (10km)	-0.014***	-0.012***	-0.010***	-0.011***	-0.009***	1.092***	1.912***	1.289***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.360)	(0.357)	(0.322)
v. Railway station	0.081***	0.062***	0.053***	0.060***	0.040***	-17.614***	-14.961***	-10.261***
	(0.017)	(0.015)	(0.011)	(0.011)	(0.009)	(2.326)	(2.014)	(1.549)
Dist. hacienda (10km)	-0.018***	-0.014***	-0.013***	-0.012***	-0.011***	1.936***	2.346***	1.757***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.497)	(0.496)	(0.392)
vi. Granted land (binary)	0.057***	0.044**	0.050***	0.044**	0.040**	-4.303**	-4.672**	-3.706**
	(0.020)	(0.020)	(0.016)	(0.018)	(0.015)	(1.777)	(1.831)	(1.544)
Dist. hacienda (10km)	-0.016***	-0.013***	-0.012***	-0.011***	-0.009***	1.754***	2.143***	1.602***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.551)	(0.538)	(0.418)

Notes: Treatment defined as municipalities within 13km distance to nearest hacienda. Cross-section OLS regression with robust SE. Includes all controls and state fixed effects. Sample restricted to municipalities with at least one hacienda and their contiguous neighbors within 100km of an hacienda. See the text for a description of the variables and data sources. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

We performed the Moran's I test for spatial autocorrelation for all years and for various specifications of the spatial weights matrix. In general, we found a positive and statistically significant Moran's I, which indicates that there is clustering of like values in our data: locations with higher literacy rates are have typically locations with higher literacy rates nearby; and the same for low literacy rates.

We estimated a neighborhood contiguity matrix by distance (using dnearneigh in R) and estimated the Moran's I statistic for various values of distance. Figure A.9 shows the results for the year 1950. Spatial autocorrelation starts high and decreases, reaching values close to zero at around 100 km distance. We omit the rest of the years for space considerations; the results are very similar across years.

Figure A.9: Moran's I sensitivity to distance in spatial weights



The Moran's I statistic does not provide information about the type of spatial dependence, which is necessary in order to choose among different spatial regression models that account for the spatial autocorrelation. Figure A.9 also compares the Moran's I statistic among different spatial models, and includes a linear model for comparison. We can see that the spatial error model is the one that gives a Moran's I closest to 0 at a distance of 100km. Tables A.16 and A.17 show the results for spatial error models using a neighborhood contiguity matrix by distance using 100km.

Table A.16: Differences in Literacy by hacienda for each year with Spatial Autoregressive Errors, 1900-1990

	Model 1							
	1900	1930	1940	1950	1960	1970	1980	1990
Hacienda	0.00788	0.01113	0.02147**	0.01964**	0.02011**	0.01941***	0.02311***	0.01686***
	(0.00582)	(0.00709)	(0.00867)	(0.00937)	(0.00879)	(0.00741)	(0.00737)	(0.00636)
Pueblos de indios	-0.0009	-0.0027	-0.0028	-0.009	-0.0117	-0.0148**	-0.0166**	-0.015***
	(0.0061)	(0.0069)	(0.0084)	(0.0089)	(0.0081)	(0.0067)	(0.0067)	(0.0058)
Nearest colonial city (km)	-0.1891**	-0.5259***	-0.7704***	-0.8849***	-0.8144***	-0.6049***	-0.5373***	-0.5068***
	(0.0874)	(0.1174)	(0.144)	(0.1546)	(0.1445)	(0.1211)	(0.1206)	(0.1034)
Nearest c.1800 mine (km)	-0.0052	-0.2191	-0.18	-0.2901	-0.228	-0.1192	-0.1832	-0.0985
	(0.0704)	(0.1114)	(0.1383)	(0.1494)	(0.1395)	(0.1164)	(0.1157)	(0.0989)
Average land gradient	-0.006***	-0.0096***	-0.0128***	-0.0149***	-0.0145***	-0.0128***	-0.0164***	-0.0154***
	(0.0008)	(0.001)	(0.0012)	(0.0013)	(0.0012)	(0.001)	(0.001)	(0.0008)
Median altitude (km)	-0.001	-0.0082	-0.0078	-0.0008	0.001	0.009	0.0006	0.0046
	(0.0042)	(0.0053)	(0.0064)	(0.0069)	(0.0065)	(0.0054)	(0.0054)	(0.0047)
Latitude	-0.0003	-0.0055	0.0049	-0.0059	-0.0043	-0.0049	-0.0076	-0.0041
	(0.0061)	(0.0121)	(0.0156)	(0.0169)	(0.0158)	(0.0129)	(0.0127)	(0.0107)
Soil Suitability	0.0036	0.0029	0.0028	0.0136*	0.0124*	0.0071*	0.0086	0.01*
	(0.0047)	(0.0058)	(0.007)	(0.0076)	(0.0071)	(0.006)	(0.006)	(0.0051)
Constant	0.1554	0.4516*	0.3465	0.7022*	0.6881**	0.6894**	0.9167***	0.9007***
	(0.1354)	(0.2543)	(0.3305)	(0.3594)	(0.3345)	(0.2703)	(0.2673)	(0.2242)
Log Likelihood	1,304.80	1,235.30	1,054.02	985.36	1,068.40	1,271.26	1,278.90	1,450.93
Mean dep. var.	0.128	0.203	0.253	0.356	0.397	0.431	0.576	0.664
Municipalities	900	1,043	1,088	1,114	1,128	1,137	1,141	1,143

Notes: Spatial error model with robust standard errors for municipalities within 100km of closest hacienda headquarters. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A.17: Differences in Marginalization Index by hacienda for each year with Spatial Autoregressive Errors, 1970-1990

	Model 1		
	1970	1980	1990
Hacienda	-4.17789***	-4.5796***	-3.61007***
	(1.09568)	(1.05557)	(0.85162)
Pueblos de indios	1.0004	0.9049	1.3781*
	(1.0376)	(0.9614)	(0.7735)
Nearest colonial city (km)	84.0102***	89.0656***	67.837***
	(17.6219)	(17.0000)	(13.8170)
Nearest c.1800 mine (km)	1.9882	6.7853	1.937
	(16.9334)	(15.9669)	(13.1746)
Average land gradient	1.4293***	1.8288***	1.7668
	(0.1553)	(0.1409)	(0.1136)
Median altitude (km)	-0.5848	-0.7017	-1.4681**
	(0.8218)	(0.7695)	(0.6229)
Latitude	-0.4436	0.8512	1.1389
	(1.6613)	(1.6607)	(1.4137)
Soil Suitability	0.4831	0.9919	0.4183
	(0.9428)	(0.8513)	(0.6873)
Constant	58.0505*	9.6299	4.1182
	(34.9203)	(34.7299)	(29.5540)
Log Likelihood	-4,109.01	-4,383.43	-4,146.69
Mean dep. var.	67.94	53.56	43.74
Municipalities	1,061	1,141	1,143

Notes: Spatial error model with robust standard errors for municipalities within 100km of closest hacienda headquarters. Includes all controls and state fixed effects. See the text for a description of the variables and data sources. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

3.4 Mexican Population Census Data

For cleaning the census data we mainly use the "Historical Archive of Geostatistical Localities" (AHL for its acronym in Spanish), combined with maps and GIS data. The AHL tracks the evolution of all localities within municipalities in Mexico with their geographic coordinates. If available, it also provides data on total population that allows us to compare with the Census data. (https://www.inegi.org.mx/app/geo2/ahl).

Example for 1900

1. The raw 1900 census has 2,975 observations (municipalities) from 29 states. Baja California and Baja California Sur are omitted because these territories only have state-level data available in 1900. The state of Sinaloa is unaccounted for.[1]

2. Of the 2,975 municipalities, across 15 states there are 290 municipalities with the same name, but they are located in different districts. Therefore, for merging with the municipal code we match each municipality using name, state and district. A preliminary merge before cleaning any municipal name is able to match 1,050 with 2010 municipal and state names; 1,925 municipalities from 1900 are unmatched, and 1,408 municipalities from 2010 are unmatched (the 2010 data has 2,458 municipalities).

3. For our analysis, we restrict the sample to only 21 states: Aguascalientes, Coahuila, Colima, Chihuahua, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Estado de México, Michoacán, Morelos, Nayarit, Oaxaca, Puebla, Querétaro, San Luis Potosí, Sonora, Tlaxcala, Veracruz, Zacatecas and Mexico City; which account for 2,321 municipalities. After cleaning the names of these municipalities to match the name they have in 2010 (some are simple spelling changes or typos, while other municipalities changed names

[1]In 1900 Baja California and Baja California Sur were considered territories and did not have municipalities. Sinaloa was a state but we do not have data for it.

completely), 2,297 of the 2,321 municipalities from 1900 are matched with counterparts in 2010.

- This leaves 24 municipalities, all in Oaxaca, which got lost from 1900 to 2010. These "lost" municipalities could be the consequence of municipalities that disappeared all together from 1900 to 2010, or that we simply could not track.
- This leaves 352 municipalities in 2010 that do not have a counterpart in 1900. These municipalities may be the result of splits from 1900 municipal definitions, municipalities that did not exist at all in 1900, or municipalities that did exist in 1900 but that were left out of the census. For those municipalities that split into 2-4 municipalities by 2010, we were not able to disaggregate the data by 2010 political division. Instead, we merge the 1900 municipality with the 2010 municipality that maintains the same name as in 1900, or in the case that none of the split municipalities share the name, we take the municipality that is larger in 2010.

4. Of the 2,321 municipalities that are matched from 1900, 672 consolidated into groupings of two or more municipalities by 2010. We collapse these municipalities into one and match them with their 2010 division counterpart. This leaves us with 1,649 unique municipal codes.

Census Data Comparison by Year

We sought to maintain the different variables comparable across censuses. However, this was not always possible because measurements sometimes change between censuses. The following definitions are constrained by the available information in each census: see Table A.18. All outcomes reported are proportions of target population.

Table A.18: Comparison of variables by Population Census in Mexico 1900-1990

Variable	1900	1930	1940	1950	1960	1970	1980	1990
Literates	Pop. able to read and write (age not specified)	Pop. able to read and write (age not specified)	Pop. 10 years or older able to read and write	Pop. 6 years or older able to read and write	Pop. 6 years or older able to read and write	Pop. 10 years or older able to read and write	Pop. 6 years or older able to read and write	Pop. 6 years or older able to read and write
Urban localities	NA	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more	Localities with 2,500 inhabitants or more
Workforce	ND	ND	ND	ND	Economically active population over 12 years old by main economic activity	Economically active population over 12 years old by main economic activity	Economically active population over 12 years old by main economic activity	Economically active population over 12 years old by main economic activity
Income reported	NA	NA	NA	NA	NA	8 income groups ($MX)	17 income groups ($MX)	9 categories by perceived minimum wages
Housing conditions	NA	NA	NA	NA	NA	Houses or occupants: number of rooms, bathroom, type of floor, electricity, piped water, drainage	Houses or occupants: number of rooms, bathroom, type of floor, electricity, piped water, drainage	Houses or occupants: number of rooms, bathroom, type of floor, electricity, piped water, drainage

NA: Information not available for this year. ND: Information not digitized.

Marginalization index

The marginalization index is the mean average of 7 indicators expressed as rates with respect to the total population: iliteracy, incomplete primary schooling, low income (workers earning less than 2 minimum wages), population with no firm floor, population without electricity, population without drainage, population living in overcrowded houses (more than 2.5 persons per room).

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