# The Long Shadow of Feudalism: Concentration of Land and Power from Princely to Post-colonial India*

Steven Brownstone† Kartik Srivastava‡

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**Abstract**

How do large landowning families dominate rural areas across generations despite revolutions and reforms? One potential channel is that these elites subvert government efforts to empower the landless in their communities. We study how differences in village land concentration stemming from the granting of feudal titles hundreds of years ago affects the delivery of welfare schemes in the present day. A fertile literature evaluates the effects of land tenure systems on agricultural productivity and downstream economic outcomes. However, most of this literature focuses on colonial and post-colonial land tenure policies, and evaluates a narrow set of agricultural and policy outcomes. We exploit variation in pre-colonial land tenure systems at a vastly more granular level than is seen in the literature to evaluate the impacts on a comprehensive set of arterial welfare programs including food security and workfare. We implement a regression discontinuity along feudal borders that no longer correspond with modern administrative boundaries. Large discontinuities in land concentration persist across these boundaries. These differences are associated with persistently worse health and education outcomes in feudal areas, and worse implementation of the key workfare program. Importantly, we find that wages for agricultural laborers are significantly depressed in feudal areas, suggesting. Identifying where economic empowerment has been possible despite land inequality and where land inequality has hindered it will help guide future efforts to address India's long standing inequities.

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†University of California, San Diego

‡Harvard University

# 1 Introduction

Land ownership has historically been a tremendous source of political power and control over labor markets in agrarian economies. A vast literature finds that historical institutions have lasting and persistent impacts on a wide range of contemporary outcomes (Genicot and Ray 2017; Dell 2010). Long-run effects of historical institutions in India have received considerable academic attention, with a range of papers studying traditional rural institutions and instruments of land reform and redistribution. Importantly, these papers find that coarse district-level variation in types of land tenure systems in pre-colonial and colonial India is correlated with the quality of present-day service delivery, as land tenure systems affect the structure and performance of last-mile elected bodies and bureaucracies (Banerjee and Iyer 2005; Lee 2019). While we know that land tenure systems have persistent effects on contemporary land ownership given the stickiness of land markets, how the structure of these landholdings affects labor markets through and outside the quality of service delivery is relatively understudied. Variation in historical institutions that drives larger landholdings could in theory have ambiguous effects on service delivery and labor markets. Larger land sizes may allow cultivators to build economies of scale and increase productivity, stimulating local economic activity that translates to better developmental outcomes (Foster and Rosenzweig 2022; de Janvry, Emerick, Gonzalez-Navarro, and Sadoulet 2015). On the other hand, the possibility of concentration in land and labor markets suggests market failures that could lower wages and depress developmental outcomes.

In this paper, we study the Hyderabad presidency in pre-colonial India, where the erstwhile ruler (the *Nizam*) awarded some land parcels to local elites in the 1800s. These elites gained the ability to tax these lands, and systems of feudal control were established across these regions. In this period, the rest of the land in the presidency remained in control of the *Nizam*. After India gained independence from the British in 1947 and the Hyderabad presidency joined the Indian union in 1949, the state (imperfectly) implemented land reform legislation, providing titles to tenancy farmers in formerly feudal areas and setting ceilings on land ownership levels. We georeference detailed maps from the colonial period to link regions of differential land tenure systems with modern-day administrative maps. We then compare present-day villages on either side of these borders in a spatial regression discontinuity framework, keeping constant present-day administrative districts such that contemporary administrative quality such that we isolate the effect of the level of land concentration on our outcomes.

We first show that there are lasting and meaningful differences in the land structure across feudal and non-feudal areas. As of 2022, land parcels are larger in formerly feudal areas. In particular, the 10th percentile of landholdings in feudal areas is 16% larger than the 10th percentile of landholdings in non-feudal areas just across the border. However, there is no difference in landholdings at the right tail of the distribution: the 90th percentile across feudal and non-feudal areas holds similar amounts of land. We then proceed to test differences across a range of key public service delivery outcomes. We find that feudal areas are associated with lower use of inputs,

poorer educational attainment, and poorer health and education infrastructure. Importantly, we show that the implementation of the workfare program, a key feature of the landscape of the rural economy, is sluggish in feudal areas relative to non-feudal areas. Importantly, we find that the yields and production values across feudal and non-feudal areas are similar on average. We extend this analysis by analyzing primary data on present-day wages in our study area, and find that wages in agricultural labor are *substantially* lower in feudal areas. For the most unskilled type of work performed by females, we find that the wages in feudal areas are approximately 32% lower in feudal areas.

In our setting, it is likely that local landowning rural elites are able to exercise some monopoly power to set wages. We also find some evidence of elites compromising the implementation of key public welfare programs, which is consistent with the mechanisms posited in Hornbeck and Naidu 2014. They show that elites in the white landowners in the post-bellum US south may have compromised state-provided welfare programs to limit outside options for low-wage black workers. We also find evidence consistent with Anderson, Francois, and Kotwal 2015, who show that the workfare program is captured by elite landowning castes. Importantly, the workfare program provides direct competition to large landowners in absorbing labor supply in these settings. Muralidharan, Niehaus, and Sukhtankar 2023 show that exogenous improvements in the implementation of the workfare programs increase both wages and employment in the private labor market, consistent with the absence of perfect competition in these markets to begin with. Our work extends these lines of inquiries with a novel source of historical variation and a wide range of present-day outcomes.

Our work relates to several literatures. We contribute to a growing literature on monopsony power in labor markets (Felix 2024), with a particular focus on frictional land markets in agricultural settings (Deininger 2003). Our work pushes on finding historical roots for present-day market power, and pays special attention to specific sub-populations of worekrs who are most exposed to employer market power. In our setting, these happen to be unskilled female agricultural workers who have the worst outside options. We also relate to a literature on tenancy and land reforms in developing countries, discussing the tradeoffs involved between agricultural productivity and the efficiency of labor markets (Besley and Rao 2016; Banerjee and Ghatak 2002). In our setting, we do not see strong evidence of productivity or efficiency gains from larger average land parcels in feudal areas, but do see strong evidence of depressed wages for laborers. Lastly, we also contribute broadly to the literature on long-term effects of historical institutions (Smith 2020).

## 2 Institutional background

Within Hyderabad state a feudal land tenure and taxation system dating back to the 18th century was allowed to persist until 1949. While most of the land was directly administered and taxed by the *Nizam*, the leader of the Hyderabad presidency, a significant amount of agricultural land was controlled by nobles who were given land grants in exchange for aiding the *Nizam's*

ancestors in 18th century battles (Figure A.1). Even though Hyderabad state stopped fighting wars by the turn of the 19th century, these fiefs persisted. In general, the boundaries of these fiefs do not coincide with any modern administrative boundaries which allows for a sharper focus on village level variation in institutions. Even the Hyderabad Princely state itself was divided up between three modern Indian states: Maharashtra, Karnataka, and Telangana.

There were broadly four types of feudal estates in princely Hyderabad: *Jagir*, *Samasthans*, *Paigas*, and *Diwan-i-Khas*. *Samasthans* were ancient Hindu kingdoms pre-dating the *Nizam's* rise to power in the 1700s. These Hindu rulers were given a degree of feudal autonomy over many aspects of governance including taxation in exchange for helping the first *Nizams* consolidate power. The second type of feudal land was a *Jagir*. A *Jagir* was simply a tract of land whose public revenue was assigned to an individual in exchange for rendering some service to the state. In most cases this had to do with raising troops, but it was possible to be granted a *Jagir* for other services to the Nizam. These grants were often hereditary although sometimes an additional tax needed to be paid to maintain the *Jagir* across generations. The *Paiga* lands were hereditary lands given to a particular *Mughal* general in the early 1700s who was helpful in the first *Nizam's* military campaigns and later divided among his descendants. The final category of land was the *Nizam's* personal estates for the maintenances of his own family, the *Diwan-i-Khas*. These areas typically faced hire land rents and greater land concentration. One account suggests that the *Jagirs* had 1,000 of acres and charged tenants 10 times the rents of non-feudal areas. As of 1949, 36% of the area, 34% of the villages, and 29% of the population of the Hyderabad presidency belonged to one of the three types of feudal estates (Khusro 1958: 2). For the purpose of our paper, we pool together *Jagirs*, *Samasthans*, and *Paigas*, since each of these is associated with a degree of feudal control awarded to local elites in the historical record.

When India gained independence from the British in 1947, the Hyderabad presidency refused to join the Indian union and was invaded by the Indian army. At the same time the *Nizam* was facing an armed communist rebellion from peasants opposing domination by the feudal landed gentry. Thus, when Hyderabad state was finally integrated into India, the abolition of the *Jagirdars* and land reform was an early priority. Importantly, the historical record suggests the land was not distributed equability to tenant farmers and rather remained in control of rural elites.

As written, the laws placed ceilings on land ownership levels and established protections for tenant farmers, expecting land titles to be transferred to those who had cultivated these lands in feudal areas for a period of six years leading up to the legislation. In practice, this was not implemented in earnest. As we discuss below, large shares of tenant farmers were eased off of the land they were cultivating, with ownership reverting to local elites. In the *Diwan-i-Khas*, land was controlled directly by the *Nizam*, and reverted more naturally to the Indian state in 1949. The extent of land concentration in these areas was likely substantially lower than in feudal areas to begin with, and the implementation of land reform was likely better, thus resulting in more equitable landholding in steady state.

Importantly, the boundaries of these feudal areas do not correspond to modern district or

constituency boundaries, allowing us to isolate village level effects from other persistence channels that work through higher level institutions. This is a key difference in our setting relative to other work on colonial land tenure systems, wherein the variation resides primarily at the level of administrative districts, the borders of which are largely time-invariant. Instead, we look at fine village-level variation over very narrow geographic bandwidths of up to 20 kilometers on either side of the border.

# 3 Data

We procured land concentration data from a remote sensing company, who shared with us village-level indicators for our sample area across all three states.[1] We use a range of publicly available datasets to estimate treatment effects on service delivery outcomes, including the population censuses of 1991, 2001 and 2011; the economic censuses of 2005 and 2013, the socio-economic census of 2012; and a village-level report of basic infrastructure (called the Mission Antyodaya data set) from 2020.[2] In addition, we scraped data from the implementation monitoring portal of India's workfare program, the National Rural Employment Guarantee Scheme, detailing the take up and implementation quality in the villages in our sample area.

We also conducted a phone-based primary survey among village elected representatives and residents. This survey was conducted in February 2024 among 350 respondents across study villages in the state of Telangana, focusing primarily on wages in agricultural labor markets, with a specific focus on distinctions by task and gender. This disaggregated look at the agricultural labor market is novel relative to the vast literature on agriculture in India. This literature generally tends to consider agricultural laborers as a monolith, but in fact their reliance on these labor markets, what their outside options are, and what wages they are offered are all likely segmented by whether tasks are skilled and the gender of the workers.[3]

# 4 Empirical strategy

We georeferenced maps from the National Archives of India, drawn by the Superintendent of the Revenue Survey and Settlement of the Hyderabad Presidency in 1854. This georeferencing allows us to delineate territories that belonged to *Jagir*, *Samasthans*, and *Paigas* vs. *Diwan-i-Khas*, i.e. feudal and non-feudal areas respectively, at the time of Indian independence. Since georeferencing is inherently laden with some degree of measurement error, we employ a "donut-hole" design in our main specification, omitting all units of observation 2 kilometers on either side of the border.

[1] We never received access to land parcel or owner level data. Instead, they were able to run our analysis codes on their raw data to generate village-level aggregate indicators of land concentration, as well as simple central tendencies and some points along the distribution of landholdings.

[2] These data sets were procured from the SHRUG repository Asher, Lunt, Matsuura, and Novosad 2021.

[3] A larger-scale survey ($N \approx 3000$) with elected representatives in village local bodies across all states in our study is currently ongoing.

We present our georeferenced study areas in figure 1, with the original map in figure A.1 and the extent of our study area relative to the entire country in figure A.2.

We follow Dell 2010; Moscona, Nunn, and Robinson 2020 in implementing a spatial regression discontinuity design. Our preferred specification uses modern 2022 district fixed since we use them in the outcome regressions to isolate the effects of village level institutions. The pre-independence 1931 districts correspond much more closely to the feudal areas and thus shut down the variation as expected. The preferred specification also includes a distance control mirroring the standard RD specification. In particular, this is the specification used in Moscona et al. 2020 who follow Gelman and Imbens 2019. We test a wide variety of different definitions of land concentration.

Our core specification is as follows:

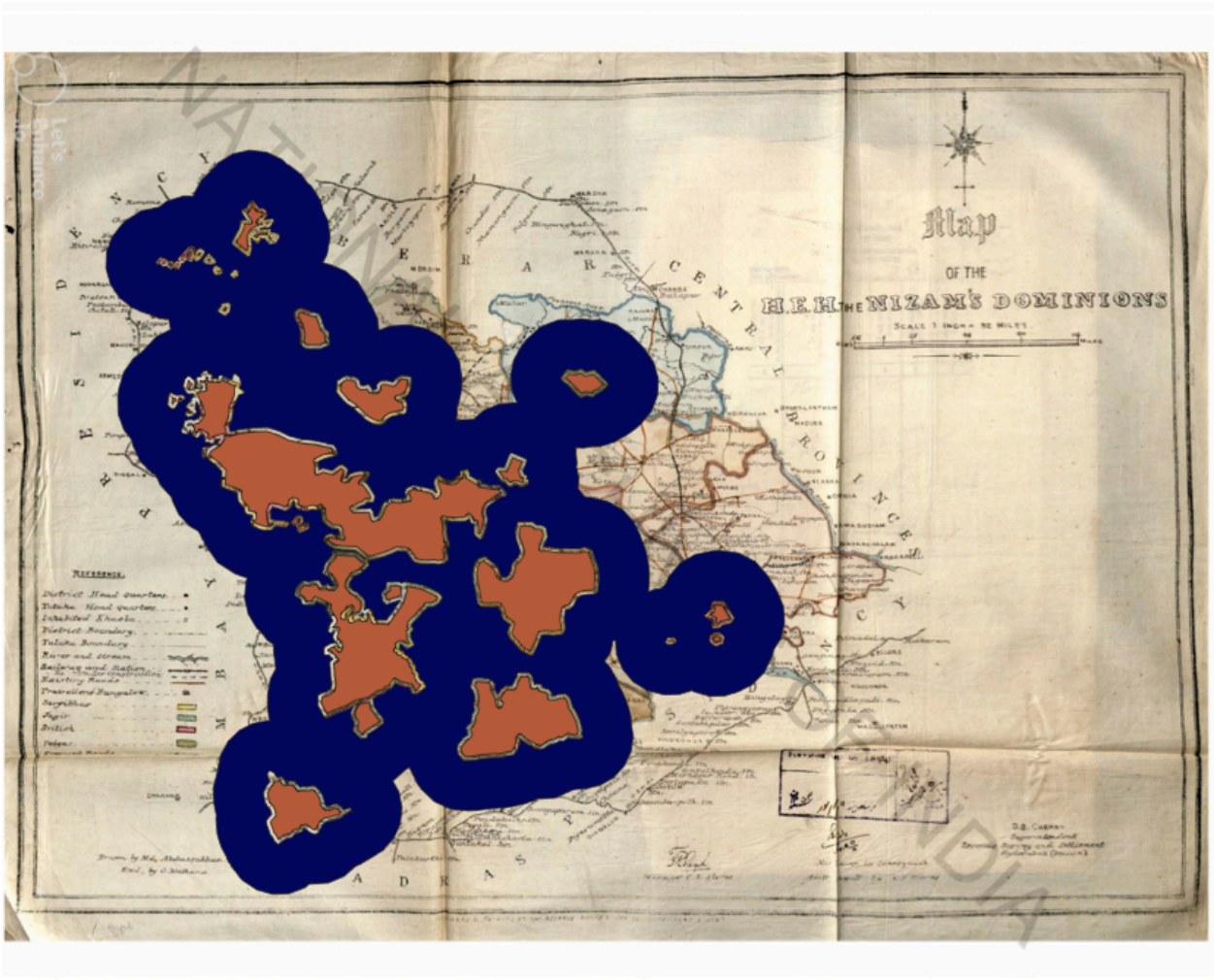
$$Y_{id} = \beta_1 \text{Feudal}_{id} + \beta_2 \text{Distance}_{id} + \beta_3 \text{Distance}_{id} * \mathbb{1}_{Feudal_{id}=1} + \beta_4 X_{id} + \gamma_i + \varepsilon_i$$

where $Y_i$ is a land concentration or outcome variable of interest; $\text{Feudal}_{id}$ is an indicator for whether a village $i$ in district $d$ was historically in a *jagir* or feudal area; $\text{Distance}_{id}$ is the distance for village $i$ in district $d$ to the historical border separating feudal and non-feudal areas, positive for feudal areas and negative for non-feudal areas; $\text{Distance}_{id} * \mathbb{1}_{Feudal_{id}=1}$ is $\text{Distance}_{id}$ censored at 0; $X$ is a vector of controls, including the soil and ruggedness variables that we find are also (weakly) discontinuous at the boundary; and $\gamma_i$ indicates fixed effects for the nearest line segment, where the border between feudal and non-feudal areas is split into segments of 25 kilometers each. We use robust standard errors.

For each unique data source (census, Mission Antyodaya, DHS, NREGS), we attempt to define geographic units separately and estimate distances from the border separating feudal and non-feudal areas, as well as identifying which line segment they are closest to and which present-day district they belong to. This process minimizes the need to create crosswalks across different data sources, as each strand of analysis is fully self-contained.

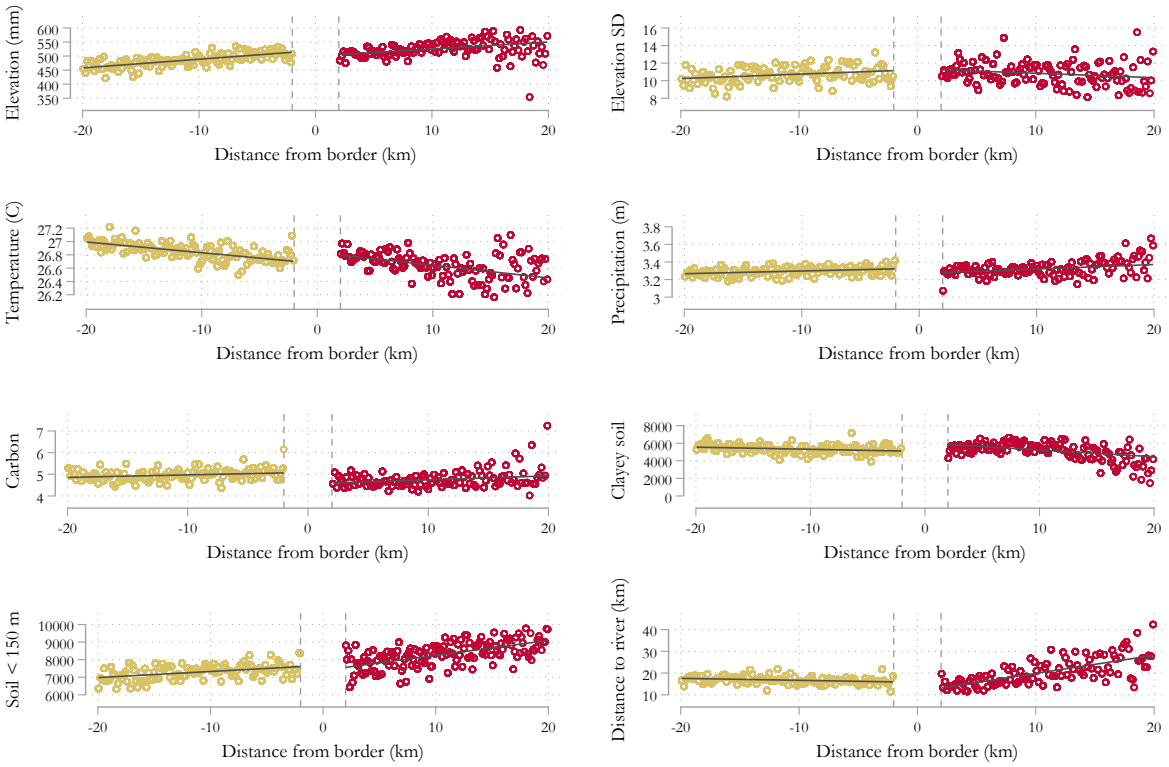
In figure 2, we present tests of continuity at the border for a range of variables to establish balance. This establishes broadly that most geographic features and time-invariant characteristics of feudal and non-feudal areas vary continuously across the threshold in our bandwidth of interest. Our results remain robust to the inclusion of these variables where appropriate.

Figure 1: Georeferencing




This figure shows our georeferencing of a historical map depicting different land tenure systems in princely Hyderabad.

Figure 2: Balance tests on RD specification




This figure shows RD plots from our key specification for a range of geographic and demographic variables to establish balance.

## 5 Effects on land concentration

We focus first on the effects on land concentration. In table 1, we show the treatment effects on a range of land concentration measures, following our primary specification. In columns 1 and 2, we show that treated areas do not have significantly different normalized Herfindahl-Hirschmann Index or GINI indicators for landholdings. In columns 3 and 4, we report that the pareto shape parameters for the (80-20) and (90-10) splits are both 4% and 3% higher respectively in treated areas. In column 5, we report a novel indicator, the logged difference between the 10th and 90th percentiles as a multiple of the 10th percentile. We find that this indicator is 7% smaller in treated areas, suggesting that the distribution of landholdings is more compressed in treated areas. Overall, we do not see consistent effects on *aggregate* measures of land concentration, though we have suggestive evidence of a more compressed distribution of landholdings in treated areas. Importantly, however, these measures mask differential impacts *across* the distribution of landholdings in both treatment and control areas.

| | Land concentration measures | | | | |
|---|---|---|---|---|---|
| | Norm HHI | GINI | Pareto 80 : 20 | Pareto 90 : 10 | Ln$\frac{p90-p10}{p10}$ |
| Feudal | -0.001 | -0.010 | 0.018*** | 0.018*** | -0.166*** |
| | (0.002) | (0.007) | (0.005) | (0.005) | (0.040) |
| Dep var mean | 0.015 | 0.149 | 0.452 | 0.599 | 2.575 |
| $R^2$ | 0.13 | 0.94 | 0.37 | 0.33 | 0.31 |
| Observations | 9276 | 9281 | 9281 | 9281 | 9274 |

Table 1: Aggregate land concentration

This table shows results from our primary specification on a range of land concentration measures. In column (1), we show the effects on a normalized Herfindahl-Hirschmann index for land ownership. In column (2), we show the effects on the GINI index. In columns (3) and (4), we show the Pareto shape parameters for 90-10 and 80-20 splits. And in column (5) we show an intuitive measure of the spread between the 10th and 90th percentile as a share of the 10th percentile. All indicators are created using raw land parcel level data procured from a remote sensing company. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

In table 2, we show the treatment effect on key points of the (logged) landholdings distribution in our sample. The first percentile of landholdings in treatment villages is 23% higher than control villages. This effect dampens to being only about 5% for the 75th percentile, but attenuates fully at the very top of the distribution such that the 90th and 99th percentiles across treatment and control villages are not statistically significantly different in magnitude. We also show this dampening in the treatment effect over the distribution of (logged) landholdings in figure 3, and the RD plot on four points of the distribution in figure 4.

Feudal areas see larger land parcels at the left tail of their distribution: the smallest land parcel in feudal areas is approximately 15% larger than the smallest land parcel in non-feudal areas (figure 3). In figure 4, we validate our basic regression discontinuity specification. While there is a sharp

| | Percentiles | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1st | 10th | 25th | 50th | 75th | 90th | 99th |
| Feudal | 0.169*** | 0.161*** | 0.137*** | 0.092*** | 0.042* | 0.009 | 0.013 |
| | (0.050) | (0.039) | (0.035) | (0.030) | (0.024) | (0.022) | (0.031) |
| Dep var mean | 6.883 | 8.504 | 9.346 | 10.121 | 10.724 | 11.176 | 11.921 |
| $R^2$ | 0.41 | 0.43 | 0.45 | 0.47 | 0.44 | 0.30 | 0.15 |
| Observations | 9188 | 9182 | 9184 | 9192 | 9202 | 9199 | 9203 |

Table 2: Differences in the distribution of landholdings

This table shows results from our primary specification on percentiles across the distribution of logged landholdings in our study regions. All indicators are created using raw land parcel level data procured from a remote sensing company. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

discontinuity at the border when comparing the 1st percentile, the effect dampens somewhat for the 25th percentile, and diminishes markedly for the 75th percentile while disappearing at the right tail of the distribution. This pattern is consistent with the history of this period. The abolition of the *jagirdari* system was implemented imperfectly at best, and seemed to lead to the easing out of smaller tenants disproportionately in feudal areas:

> "A significant degree of evasion is noticeable with respect to tenancy legislation and the law regarding ceilings on land. ... The tendency is for the smaller tenants to be more readily evicted than the larger ones and purchases of land have been undertaken more by the larger tenants than the smaller ones." (Khusro 1958: 167)

These patterns of landownership have evidently persisted for more than 80 years. In the next section, we test how these differences translate to key development outcomes, the implementation quality of arterial public programs, and local labor markets.

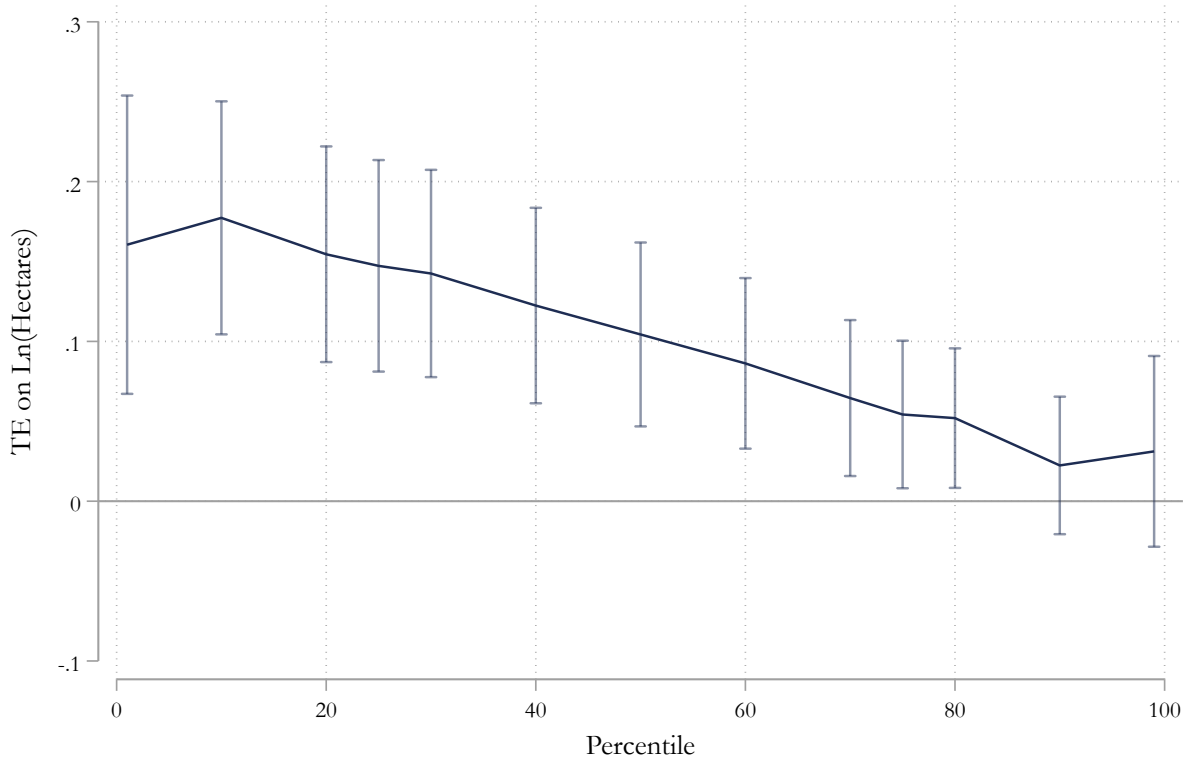



Figure 3: Treatment effects on logged landholdings across distribution

This figure plots the point estimates and 95% confidence intervals from our main regression specification, showing how the differences in landholdings across feudal and non-feudal areas are most pronounced at the left tail of the distribution and taper towards zero towards the right tail.

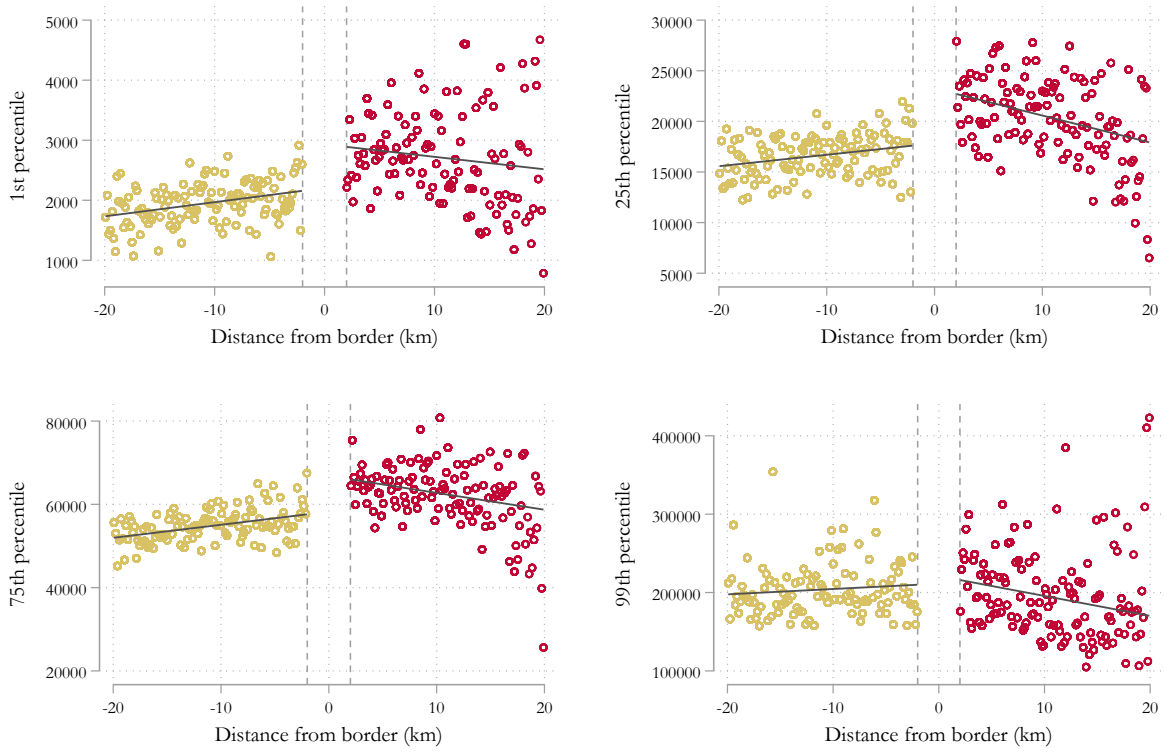



Figure 4: Regression discontinuity plots along landholding distribution

This figure shows RD plots from our key specification for four points along the landholding distribution.

## 6 Effects on village services and labor markets

We find that feudal areas have smaller investments in agricultural equipment and irrigation, with a 2 percentage points smaller share of households reporting that their agricultural fields are using any mechanized inputs, and a 2 percentage points smaller share of land irrigated overall (table 3). We also find that feudal areas are less likely to have seed centres and fertilizer shops, which are fundamental sources of support for farmers, aiding them with subsidized inputs as well as information on agricultural best practices (table 4). Feudal areas are also directionally less likely to have soil testing programs and agricultural cooperative societies, though these effects are not significant by conventional standards of statistical significance. These differences in inputs and the quality of agricultural investments have modest impacts on yields themselves. In table 5, we show that feudal areas dedicate a slightly smaller (2 percentage points) share of their land for cultivation, but have similar yields and slightly smaller production values. While we lack the ability to establish mechanisms for these results conclusively with individual level landholding-linked data on agricultural inputs or yields, we contend that these aggregate effects on agricultural outcomes mask substantive distributional differences that are downstream of land concentration. Larger landowners have the ability to drive higher mechanization in their own fields given economies of scale (Foster and Rosenzweig 2022). At the same time, smaller landowners in these areas may be less able to invest in mechanization if they are closer to subsistence, and public goods that are meant to support cultivation may be weaker in these areas as a result of elite capture.

Table 3: Investments in agriculture

| | Agricultural equipment | | | Share of total land that is | | |
|---|---|---|---|---|---|---|
| | Any | Mechanized | Irrigation | Irrigated | Irrigated for 2 crops | Unirrigated |
| Feudal | -0.024* | -0.013 | -0.019 | -0.020** | -0.140* | -0.513 |
| | (0.013) | (0.018) | (0.017) | (0.010) | (0.085) | (0.498) |
| Dep var mean | 0.938 | 0.854 | 0.884 | 0.409 | 1.468 | 2.795 |
| $R^2$ | 0.06 | 0.18 | 0.08 | 0.23 | 0.06 | 0.03 |
| Observations | 9281 | 9281 | 9281 | 9079 | 9145 | 9145 |

This table shows results from our main specification on a range of outcomes denoting the use of agricultural inputs as reported in the SECC (2012). In columns (2) and (3) we use binaries for whether the village uses mechanized or irrigation equipment respectively, and column (1) equals 1 if they use either. Column (4) reports the share of land that is irrigated, while column (5) reports the share irrigated for 2 crops and column (5) denotes the share of unirrigated land. Standard errors are robust. $*\quad p < 0.1, **\quad p < 0.05, ***\quad p < 0.01$

Table 4: Agriculture infrastructure

| | Ag infrastructure | | | Water infrastructure | | Other |
|---|---|---|---|---|---|---|
| | Seed centre | Fertilizer shop | Soil testing | Watershed | Rainwater harvesting | Ag coop society |
| Feudal | -0.286* | -0.386* | -0.091 | -0.022 | -0.363 | -0.203 |
| | (0.158) | (0.203) | (0.071) | (0.192) | (0.309) | (0.319) |
| Control mean | 0.126 | 0.276 | 0.055 | 0.293 | 0.498 | 0.372 |
| $R^2$ | 0.23 | 0.26 | 0.23 | 0.26 | 0.33 | 0.31 |
| Observations | 5095 | 5095 | 5095 | 5095 | 5095 | 5095 |

This table shows results from our main specification on a range of outcomes denoting infrastructure supporting agricultural practices as reported in the 2011 population census. Columns (1), (2) and (3) report binaries for the presence of a center to buy subsidized seeds, a shop for subsidized fertilizers, and a soil testing center respectively. Columns (4) and (5) denote whether there is a watershed or rainwater harvesting infrastructure available. Column (6) denotes whether the village has an agricultural cooperative society. Standard errors are robust. $*\quad p < 0.1, **\quad p < 0.05, ***\quad p < 0.01$

Table 5: Agricultural yield

| | Village area | | Yield (2010) | Production value (2010) |
|---|---|---|---|---|
| | Total (acres) | Share agricultural | | |
| Treatment | 63.241 | -0.021** | -0.039 | -59.563* |
| | (46.411) | (0.009) | (0.075) | (35.157) |
| Dep var mean | 1112.979 | 0.741 | 4.336 | 3645.961 |
| $R^2$ | 0.12 | 0.53 | 0.73 | 0.71 |
| Observations | 8340 | 8326 | 9667 | 9667 |

This table shows results from our main specification on agricultural productivty outcomes. Columns (1) and (2) report the total area in the village and the share of that area that is used in cultivation respectively, as reported in the 2011 population census. Columns (3) and (4) denote the logged yield and the production value in INR respectively, estimated for our villages using FAO rasters. Standard errors are robust. $*\quad p < 0.1, **\quad p < 0.05, ***\quad p < 0.01$

Importantly, these differences extend to non-agricultural outcomes. In table 6, we find that children in feudal areas have lower weight by 6% and are 6% shorter than children in non-fuedal areas.[4] There are also notable differences in educational attainment. In table 7, we report using census data that those in feudal areas are 3% less likely to have attained primary and middle school. Among both adults and children, feudal areas demonstrate long-run differences in health and education outcomes. These are also reflected in present-day access to health and education infrastructure. In table 8, we report that feudal areas are 88% less likely to have middle schools, and are 91% farther away from primary and community health centers.

[4]This analysis relies on a simple OLS comparison between treatment and control areas as defined by DHS clusters from the 2019-20 round. Please see the table notes for a discussion on differences in this analysis relative to our main specification.

Table 6: Aggregate health levels

| | Weight (kg) | Height (cm) | WAZ | WHZ | HAZ |
|---|---|---|---|---|---|
| Feudal | -0.669* | -5.333*** | -0.302 | -0.012 | 0.273 |
| | (0.354) | (0.926) | (0.484) | (0.158) | (0.216) |
| Dep var mean | 10.479 | 83.789 | -1.313 | -1.654 | -1.076 |
| $R^2$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Observations | 2186 | 2172 | 2016 | 2016 | 2019 |

This table shows results from an OLS regression on children's weight, height, weight-for-age z-scores, weight-for-height z-scores, and height-for-age z-scores respectively. All indicators use data from geocoded DHS clusters in the 2019-20 round of data collection. Our sample overlaps with approximately 3000 DHS clusters, and there is minimal variation in the geographic spread of these clusters, precluding us from using district or line segment fixed effects. As a result, our only source of leverage is the coarse indicator capturing whether a unit falls in a feudal or non-feudal area, reducing us to using an OLS specification without these fixed effects. Standard errors are robust. $*\quad p < 0.1$, $**\quad p < 0.05$, $***\quad p < 0.01$

Table 7: Aggregate education levels

| | Share of population with ... or above | | |
|---|---|---|---|
| | Sec school | middle school | primary school |
| Feudal | -0.004 | -0.009* | -0.016** |
| | (0.004) | (0.005) | (0.006) |
| Dep var mean | 0.187 | 0.294 | 0.491 |
| $R^2$ | 0.46 | 0.47 | 0.38 |
| Observations | 9153 | 9153 | 9153 |

This table shows results from our main specification on educational attainment outcomes, as reported in the 2011 population census. Standard errors are robust. $*\quad p < 0.1$, $**\quad p < 0.05$, $***\quad p < 0.01$

Table 8: Health and education infrastructure

| | Availability of ___ school | | | | Distance to ___ (km) | |
|---|---|---|---|---|---|---|
| | Primary | Middle | High | SSC | PHC/CHC | Hospital |
| Feudal | 0.005 | -0.455** | -0.154 | -0.236** | 3.983* | 2.151 |
| | (0.026) | (0.211) | (0.102) | (0.100) | (2.036) | (2.872) |
| Control mean | 0.973 | 0.510 | 0.368 | 0.162 | 4.284 | 6.833 |
| $R^2$ | 0.18 | 0.23 | 0.25 | 0.20 | 0.22 | 0.26 |
| Observations | 5095 | 5095 | 5095 | 5095 | 5095 | 5095 |

This table shows results from our main specification on educational attainment outcomes, as reported in the 2020 Mission Antyodaya dataset. Column titles explain the construction of variables. SSC stands for senior secondary school. PHC and CHC stand for primary health center and community health center respectively. Standard errors are robust. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

Next, we turn towards outcomes pertaining to local labor markets. In table 9 we present a range of outcomes related to NREGS, the rural workfare program that provides a statutory guarantee of 100 days of paid work every financial year to at least one member of any household who seeks it. A vast literature on NREGS shows that demand for this work is high across rural areas and implementation varies substantially (Imbert and Papp 2015). In our setting, NREGS implementation quality serves as a test of how healthy agricultural laborers' outside options are. Muralidharan et al. 2023 show that improving the quality of NREGS implementation drives up households' earnings by 14%, but that 86% of these gains come from increases in real wages *and* employment in the private agricultural labor market. This is reflected in increases in workers' reservation wages. In their setting, these effects on the private agricultural labor market are accentuated in villages where land ownership is more concentrated, suggesting that these labor markets are operating under monopoly power in the status quo prior to the improvement in NREGS implementation quality.[5] In column (2) of table 9, we show that feudal areas, where landownership is more concentrated, has 42% fewer active NREGS job cards, even thought the number of registered job cards is (noisily) similar. In column (3), we show that the number of households employed in NREGS on the extensive margin is 58% lower, and the total person-days employed in feudal areas is 67% lower. These effects point to depressed NREGS implementation quality in feudal areas overall. These results could plausibly be explained by those with monopoly power in agricultural labor markets being able to exert influence on local elected bodies to constrain workers' outside options. We do not have a direct test for this, but this mechanism is consistent with Anderson et al. 2015, who evaluate a workfare scheme in Maharashtra which was a precursor to the nationwide NREGS.

[5] Muralidharan et al. 2023 is based on a large-scale RCT in the undivided state of Andhra Pradesh, which neighbors (and minimally overlaps with) our study sample.

We substantiate these NREGS results with a primary survey among agricultural workers from a subset of villages in our study area. In these surveys, we ask workers to recall agricultural wages over both the previous cropping cycles, across a range of tasks and for both genders separately.[6] In table 10, we show that wages are consistently and significantly lower in treatment villages.

Table 9: NREGS implementation

| | Job cards | | Households employed | | Person-days |
|---|---|---|---|---|---|
| | Registered | Active | at all | for 100 days | |
| Feudal | -218.180 | -118.219** | -120.821** | -11.615 | -5.9e+03** |
| | (239.159) | (54.492) | (52.126) | (8.800) | (2959.633) |
| Dep var mean | 1306.193 | 278.755 | 205.538 | 4.782 | 8766.499 |
| $R^2$ | 0.65 | 0.81 | 0.80 | 0.33 | 0.75 |
| Observations | 4796 | 4796 | 4796 | 4796 | 4796 |

This table shows results from our main specification on NREGS implementation outcomes in 2023, using data scraped by us from the NREGS portal. Columns (1) and (2) depict the total number of registered and active NREGS job cards respectively. Columns (3) and (4) depict the number of households that received any work through NREGS and the number that received the statutory guarantee of 100 days of work, respectively. Column (5) depicts the total person-days of work provided. Regressions control for the total number of households as reported in the Mission Antyodaya 2020 data. Standard errors are robust. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

[6] In the current version of this analysis, we report results from approximately 300 surveys from a subset of villages in Telangana that overlap with a different ongoing project that one of the authors is working on. We have an ongoing survey from a randomly sampled set of villages across all three states, where we are administering a larger survey covering both agricultural wages and additional questions attempting to discern the structure of labor markets and overall prosperity.

Table 10: (Logged) wages for agricultural labor

| | Female transplanting wages | | Female cotton picking wages | Male fertilizer wages |
|---|---|---|---|---|
| | Average | Peak | | |
| Treatment | -0.323** | -0.354** | -0.415** | -0.274* |
| | (0.139) | (0.166) | (0.196) | (0.164) |
| Control mean | 5.741 | 5.908 | 5.545 | 6.214 |
| $R^2$ | 0.59 | 0.62 | 0.63 | 0.56 |
| Observations | 265 | 264 | 197 | 276 |

This table shows results from our main specification on (logged) wage survey data that we collected in Februray 2024 through a phone survey with a sample of 300 respondents (agricultural laborers) in our study area. Columns (1) and (2) depict the average and peak wages for female rice transplanting work. Column (3) depicts the average female cotton picking wage. Column (4) depicts the average male fertilizer application wage. Standard errors are robust. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

One concern with our results is that changes in the composition of the population and differential migration may be linked to the quality of service delivery. If differential land concentration and agricultural labor market activity pushes certain types of households out of feudal areas, we might expect lower demand for key government programs, affecting the quantity and quality of their delivery. There is some evidence of differential migration in the early years of the reform:

> "There has been a marked tendency for families to leave ex-*jagir* villages and such an exodus has accounted for a reduction in families by 8.6% in these villages" (Khusro 1958: 170)

We address this concern in two ways. First, we normalize indicators by population (either in per capita terms or in terms of the total number of households) where appropriate. Second, we evaluate long-term population trajectories in our study areas, comparing inflows and outflows in feudal and non-feudal villages. We show trends for the overall population in figure A.3, and trends specifically for working age population in figure A.4. These results suggest that differences by population, both overall and working age, are relatively stable over the course of 1991 and 2011 as reported in three rounds of the population census. The historical literature suggests that the period immediately following the land reform legislation saw movement out of feudal areas, but there has not been meaningful *additional* movement in the last four decades. This is consistent with a broader literature that finds frictions in agricultural labor markets constraining worker mobility across space and sectors Emerick and Dar 2022.

# 7 Conclusion

In this paper, we evaluate the long-run effects of historical differences in land tenure systems in princely Hyderabad, and the flawed application of land reform legislation in this region in the

post-colonial period, on a range of rural service delivery outcomes as well as agricultural labor markets. We show that land concentration levels remain persistently elevated more than 100 years later in regions where land parcels were gifted to local elites. These areas also demonstrate poorer service delivery outcomes on a range of health and education variables.

Moreover, we find significant evidence of elite capture and monopsony power in rural labor markets. We find that these regions have worse implementation of the arterial workfare program, meant to provide an outside option for primarily landless agricultural laborers. Scuttling the implementation of this workfare program allows large landowners in feudal areas to sustain dramatically lower wages for agricultural workers in their own lands. The wage markdowns are significantly worse for workers with even poorer outside options owing to constraints on their mobility: in our setting, these are women working on unskilled tasks.

Our work extends recent advances in our understanding of monopsony as well as elite capture in rural labor markets, and highlights the importance of considering the structure of market competition in any such assessment.

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# A Appendix

Figure A.1: Map of Hyderabad Princely State Showing Different Tenure Systems

Figure A.2: Jagirs within India

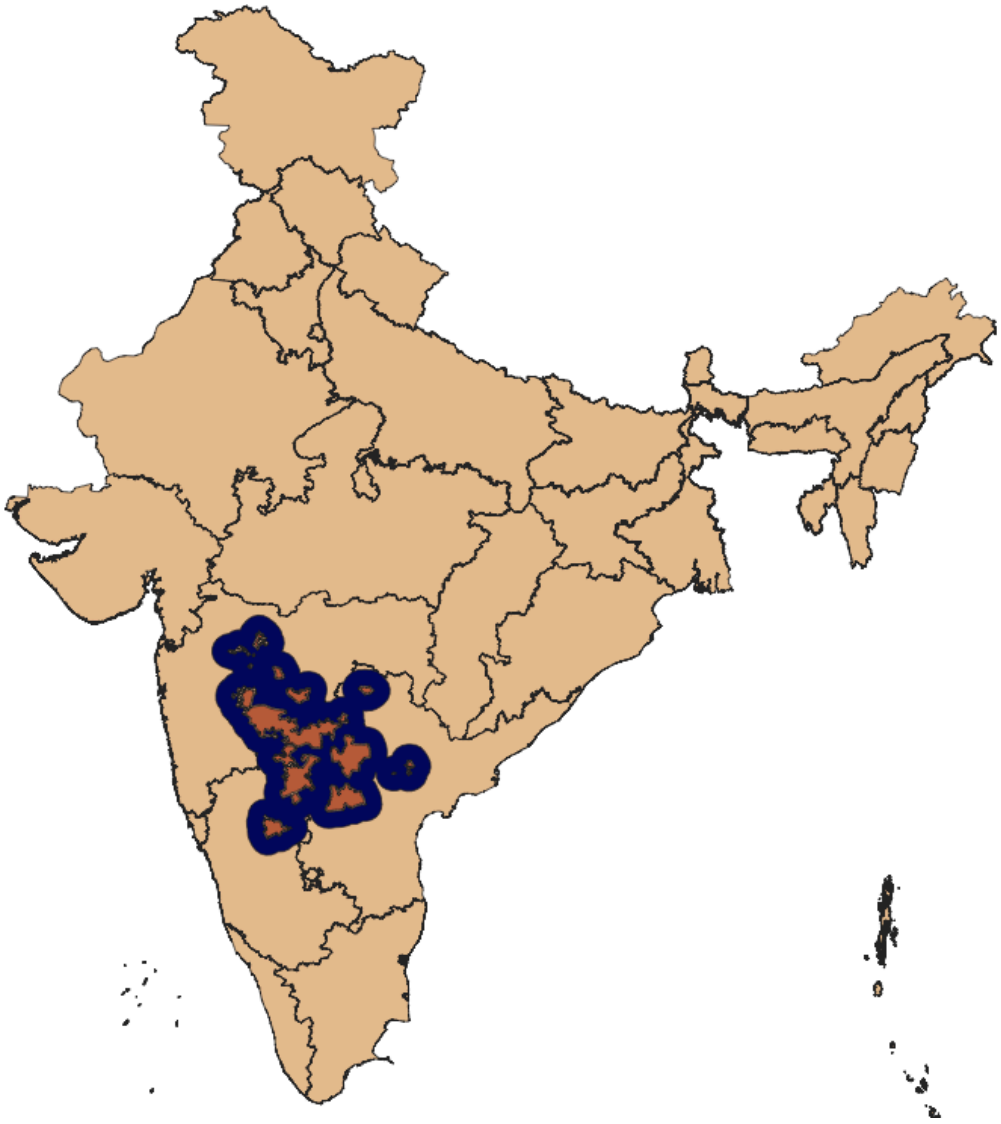

Figure A.3: Population dynamics

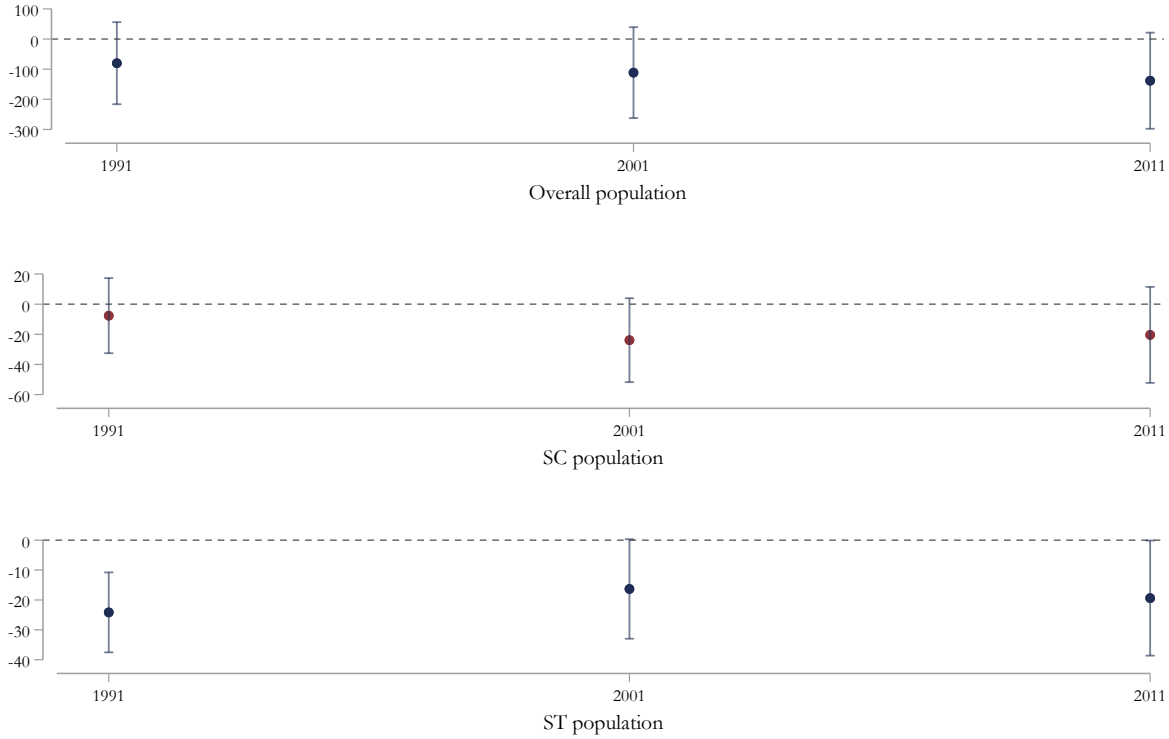

Figure A.4: Working population dynamics