The Long Shadow of Feudalism: Concentration of Land and Labor Market Power in India*

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Abstract

Land is power. Governments and revolutionaries have understood this for centuries, but the causal impacts of land concentration are notoriously difficult to study. We study how differences in village land concentration stemming from the granting of feudal titles hundreds of years ago affect service delivery and labor markets 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 not only on service delivery but also labor markets. 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 7% lower agricultural wages for women, but not men who are more able to travel and seek outside options. The main government scheme meant to provide an outside employment option is less well implemented in these areas with 71% fewer person-days offered during peak agricultural months and no difference the rest of the year. This work stresses the long lasting effects of land inequality and suggests that ensuring workers have more outside options can help reduce persistent rural inequities.

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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 that provided military assistance in the late 18th and early 19th centuries. 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, dissolving formerly feudal areas into surrounding districts, providing titles to tenant farmers and setting ceilings on land ownership levels. A survey of comparable villages on opposite sides of the former feudal borders in 1954 found small farmers were much less likely to get tenure in the formerly feudal areas Khusro, 1958. 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 village level effects. We use administrative data and data from our own survey to study a range of labor market and service delivery 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 labor market outcomes.

Feudal areas have lower wages for agricultural laborers in general, but the magnitudes of these difference are large enough to support statistical significance only among female agricultural laborers. Females working on relatively more "unskilled" tasks are paid 8% lower wages in feudal areas than non-feudal areas that are separated by short distances on either side of border. This is consistent with female workers having lower mobility and worse outside options than male counterparts, and thus being unable to exploit these wage differences over even very short distances. We find these effects on the wages while seeing no effects on the labor demand, supply, or yield in this setting. We find that employers typically hire the same number of workers, in total and specifically on the tasks on which we see wage effects. We also find that cultivation is equally productive in feudal and non-feudal areas. Together, these results reinforce that the difference in wages are not explained by differential productivity or differences in labor demand or supply; the patterns are a consequence of differential market power in land across feudal and non-feudal areas.

Importantly, we also 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. Feudal areas have 45% fewer person-days of NREGS work annually, with that difference increasing to 71% in peak agricultural months and disappearing entirely in lean agricultural months. These results are consistent with local elites and monopsonist landowners compromising the implementation of the workfare programs that serves as an outside option for agricultural laborers. A natural concern with our wage results is that feudal areas have systematically different labor markets, in terms of their demand and/or productivity. We elicit data on this in our surveys, and find that the yield, acreage and labor demand does not differ across feudal and non-feudal areas, even conditional on crop and season which we also control for in our wage specifications.

We also evaluate the effects of differential land concentration on a range of 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. We find that the share of population with primary educaiton in feudal areas is almost 2 percentage points lower, and the distance to government hospitals is 93% larger.

In our setting, it is likely that local landowning rural elites are able to exercise some monopoly power to set wages. As discussed above, we 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), with a specific focus on land ownership in the Indian context (Batra 2024, Banerjee and Iyer 2005).

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 early 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 *Sarf-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 *Sarf-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*, *Sarf-i-Khas* 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. Importantly, the formerly feudal areas including the *Sarf-i-Khas* lacked a modernized revenue system with local revenue bureaucrats. Survey evidence from 1953 suggests farmers in former feudal areas faced more barriers accessing the tenure they were entitled to by the land reforms.

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

[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.

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 July 2024 - September 2024 among over 2000 respondents across study villages in the state of Telangana, focusing primarily on wages in agricultural labor markets. We stratify our sample across line segmenets of 25 kilometers, which are also the level at which we include fixed effects in our main empirical specification listed below. Each survey is conducted with a member of the village elected body, and they are asked to report typical wages and other indicators summarizing labor market dynamics in their respective villages. The sample of villages covered in these phone surveys is shown in the map in figure A.2.

A novel aspect of our survey is that we collect wages separately 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.

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. 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.3.

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.

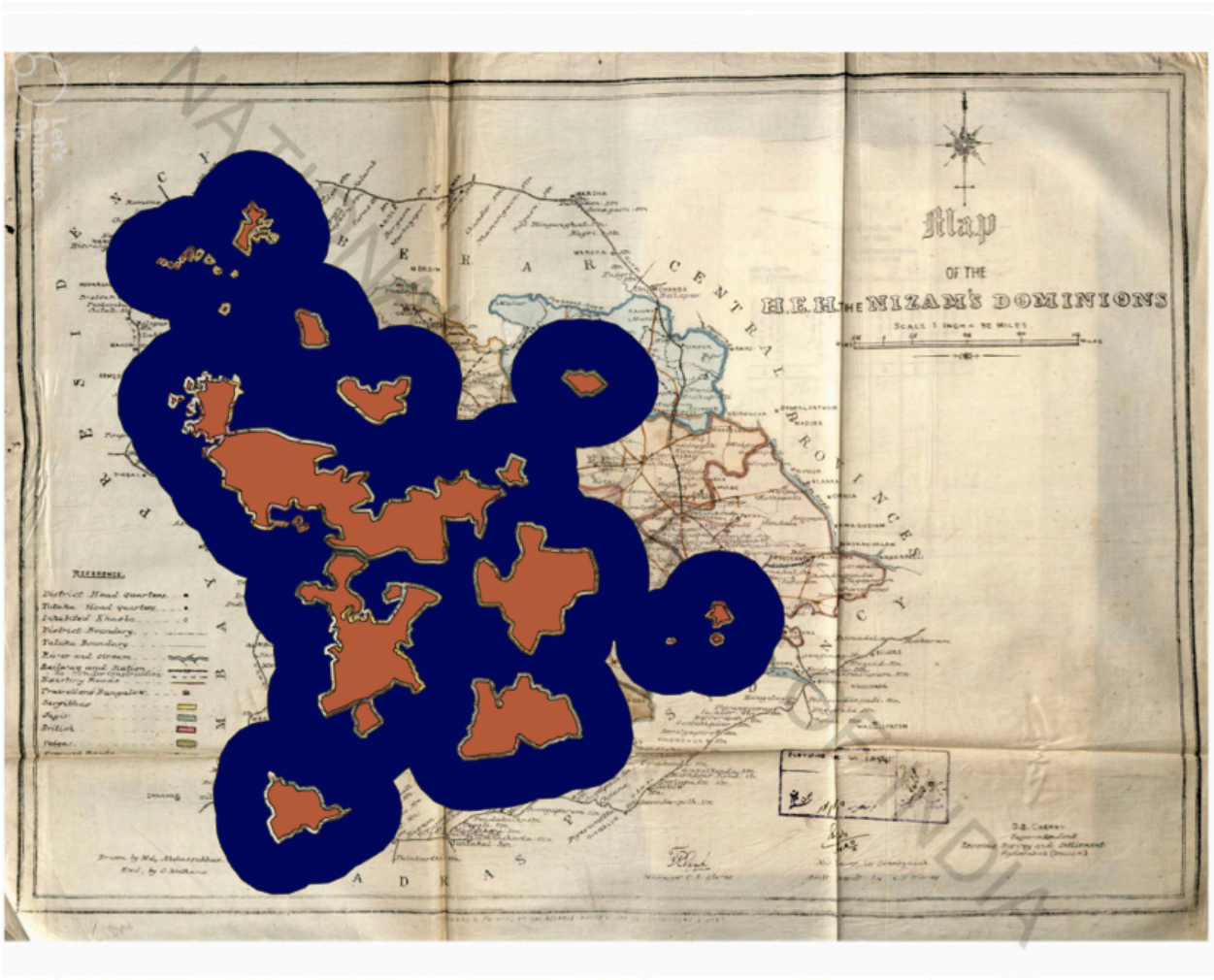
Our core specification is as follows:

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

where Y_i is a land concentration or outcome variable of interest; Feudal_{id} is an indicator for

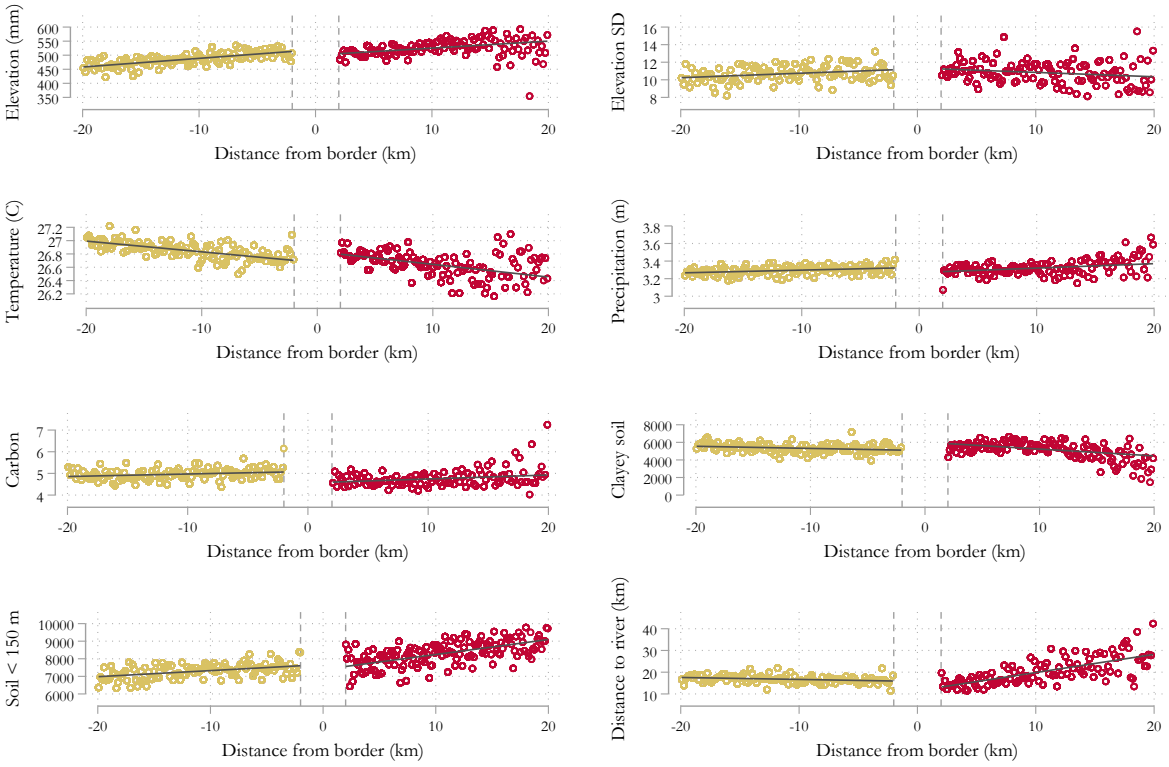
[2]These data sets were procured from the SHRUG repository Asher, Lunt, Matsuura, and Novosad 2021.

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.

whether a village i in district d was historically in a *jagir* or feudal area; 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 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 γ_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.

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	$\text{Ln}\frac{p90-p10}{p10}$
Feudal	-0.001	-0.010	0.018***	0.018***	-0.166***
	(0.002)	(0.007)	(0.005)	(0.005)	(0.040)
Non-feudal mean	0.015	0.149	0.452	0.599	2.575
F-stat	0.079	13.993	9.497	11.788	17.237
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. $*\quad p < 0.1$, $**\quad p < 0.05$, $***\quad p < 0.01$

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)
Non-feudal 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.

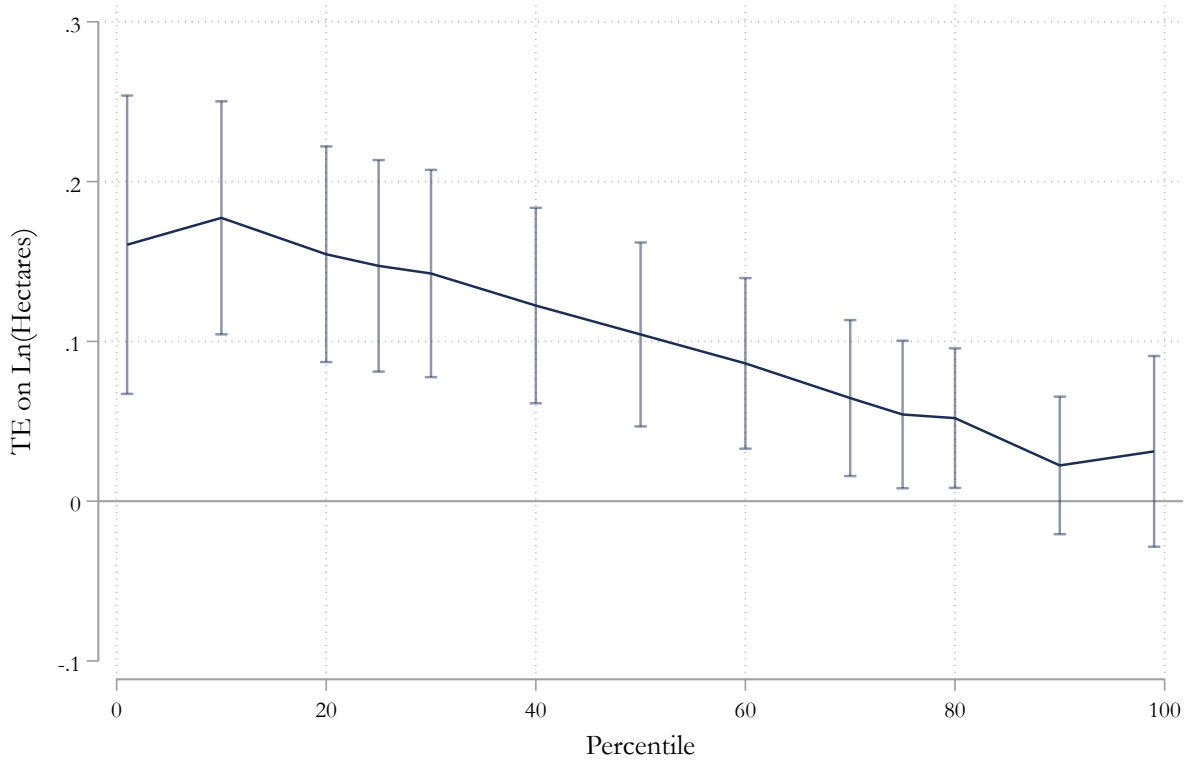


Figure 3: Treatment effects on logged landholdings across distribution

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.

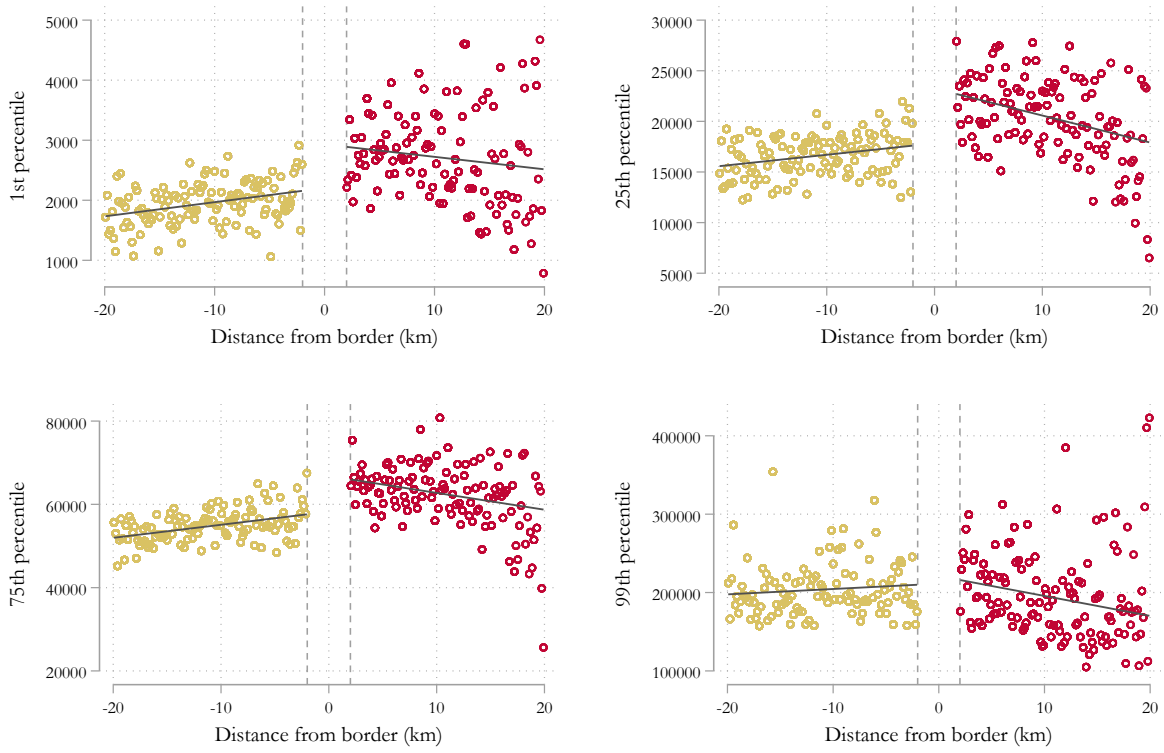


Figure 4: Regression discontinuity plots along landholding distribution

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

6 Effects on village labor markets

We conducted detailed wage surveys with village elected leaders in our sample, carefully distinguishing between task and gender combinations. Focusing on these differences in wages is crucial, since agricultural labor markets are not uniform. Wage levels across villages differ by the skill level involved, and we use the task and gender to distinguish between these. In table 3, we report results from outcomes at the village - crop - season level. Each survey respondent is asked to report both peak and typical wages for both male and female tasks, for the primary and secondary crops across the two most recent agricultural seasons. This allows us to apply fixed effects at the crop and season level in our main regression discontinuity specification. We find that while wages are lower in feudal areas across the board, the magnitudes of the differences are much larger and statistically significant among females: women in feudal areas earn an average of 8% lower for the same task on the same crop in the same season in feudal areas, relative to non-feudal areas.

Table 3: Wages for agricultural labor

	Peak male fertilizer		Peak female weeding		Avg male fertilizer		Avg female weeding	
		Ln		Ln		Ln		Ln
Feudal	-14.059	-0.022	-26.104***	-0.067***	-7.444	-0.010	-16.741**	-0.054**
	(10.816)	(0.022)	(9.935)	(0.025)	(9.880)	(0.022)	(7.387)	(0.024)
Non-feudal mean	523.176	6.232	369.737	5.850	473.680	6.124	293.252	5.627
R^2	0.40	0.33	0.53	0.51	0.52	0.46	0.54	0.53
Observations	6787	6787	7141	7141	7417	7417	7595	7595

This table shows results from our main specification on wage data that we collected in our phone survey with a sample of 2000 respondents in our study area. Within each outcome, the first column reports the absolute wages in INR and the second column reports logged wages. Each regression is at the level of a village-crop-season combination, with crop and season fixed effects and standard errors clustered at the village level. The surveys ask both the peak and typical wages for each task-gender combination listed. $*\quad p < 0.1$, $**\quad p < 0.05$, $***\quad p < 0.01$

Women in these settings tend to have limited mobility. These mobility constraints may have discontinuous impacts along the village or neighborhood border Cheema, Khwaja, Naseer, and Shapiro 2024[3]. These mobility constraints faced by women may allow them to be disproportionately more exposed to local monopsony power in these labor markets. While the incidence of this monopsony may have reflected in lower wages even for male workers in contexts where male workers also faced constraints on mobility and migration, either due to travel costs or credit frictions Jayachandran 2006[4].

A natural concern following these results is that feudal and non-feudal areas have different labor demand levels and/or different productivity. In the survey, we asked representatives to detail

[3]Cheema et al. 2024 show that rural women in Pakistan are four times as likely to visit a training center when they are based in their own village, with over half the penalty incurred upon crossing the village border. Field and Vyborny 2022 increased women's job search in Pakistan by providing a women-only transport service to and from work.

[4]We currently lack historical data on male wages to evaluate these effects.

the labor demand (in person-days) across all tasks for the primary and secondary crops in the most recent agricultural season for a typical 10 acre plot in their villages. We find no effects on the total labor demand, or the demand specifically for the tasks that we find the wage effects on. We similarly elicit the yields per acre for the primary and secondary crops across the two most recent seasons, as well as the acreage in the entire village dedicated to planting the crops. Across all of these outcomes, we find no significant differences across feudal and non-feudal areas despite deploying the same specification as in the wage result.

Table 4: Labor demand

	Total	Task-specific	
		Fertilizers	Weeding
Feudal	-26.108	2.417	-4.158
	(25.557)	(4.396)	(9.719)
Non-feudal mean	214.448	28.026	70.779
R^2	0.17	0.16	0.12
Observations	2324	1984	1984

Table 5: Productivity

	Yield		Planting acres	
		Ln		Ln
Feudal	-7.062	-0.065	-85.078	0.097
	(6.324)	(0.059)	(137.632)	(0.111)
Non-feudal mean	106.265	4.413	776.005	5.891
R^2	0.56	0.49	0.24	0.47
Observations	4422	4375	6824	6765

We additionally collect information on a range of variables characterizing the aggregate labor markets in rural areas, including the total number of households, the number of employers, workers, and migrants. We find no systematic differences across feudal and non-feudal areas in the size of thickness of the labor markets, as reported in table A.1, reinforcing the explanation that any differences in wages are likely downstream of differential monopsony power. We also do not find differences in the number of land transactions in feudal areas, reflecting the stickiness in land markets in this setting.

A key determinant of rural labor market dynamics in this setting is the availability of outside options for workers. In table 6 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 6, 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.

Table 6: NREGS implementation: registration

	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)
Non-feudal 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. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

[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.

Table 7: NREGS implementation: person days

	Annual		Peak ag months		Lean ag months	
Feudal	-0.452	-0.448	-0.684*	-0.713**	-0.178	-0.177
	(0.285)	(0.286)	(0.351)	(0.357)	(0.256)	(0.255)
Non-feudal mean	7.285	7.285	7.241	7.241	7.328	7.328
Year FE		✓		✓		✓
R^2	0.47	0.48	0.43	0.45	0.57	0.59
Observations	86113	86113	42980	42980	43042	43042

This table shows results from our main specification on (logged) NREGS person-days in the period 2016 - 2023, using data scraped by us from the NREGS portal. Columns (1) and (2) depict the total number of person-days at the monthly level. Columns (3) and (4) depict the number of person-days in peak agricultural months. Columns (5) and (6) depict the total person-days of work provided in lean agricultural months. Regressions have year fixed effects when indicated, and standard errors are clustered at the village level. $*\quad p < 0.1$, $**\quad p < 0.05$, $***\quad p < 0.01$

7 Effects on village services

We find that feudal areas have weakly lower investments in agricultural equipment and irrigation. Using data from the 2012 SECC, we find that feudal areas have 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 8). 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 10). 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. In our surveys, we elicit from GP heads information on how many households in their GPs own tractors and have made investments greater than INR 1 lakh (USD 1200) on their land. We do not see any systematic or statistically significant differences across feudal and non-feudal areas (table 9).

These differences in inputs and the quality of agricultural investments have modest impacts on yields themselves, as discussed previously in table 5. 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 8: 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)
Non-feudal 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 9: Investments in agriculture

	Households with tractors	Households with investments $\geq$ INR 1 lakh
Feudal	1.547	-2.284
	(3.200)	(3.298)
Non-feudal mean	25.280	19.024
R^2	0.10	0.15
Observations	2281	2265

This table shows results from our main specification on the number of households that own tractors and the number of households that have made investments of greater than INR 100,000. $*\quad p < 0.1$, $**\quad p < 0.05$, $***\quad p < 0.01$

Table 10: Agriculture infrastructure

	Ag infrastructure			Water infrastructure		Other
	Seed centre	Fertilizer shop	Soil testing	Watershed	Rainwater harvesting	Ag coop society
Feudal	-0.298*	-0.381*	-0.102	0.024	-0.328	-0.219
	(0.158)	(0.203)	(0.067)	(0.178)	(0.308)	(0.311)
Non-feudal mean	0.125	0.274	0.056	0.301	0.508	0.385
R^2	0.22	0.25	0.23	0.26	0.33	0.31
Observations	5098	5098	5098	5098	5098	5098

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. $*\quad p < 0.1, **\quad p < 0.05, ***\quad p < 0.01$

Beyond cultivation, we find a number of systematic differences in village infrastructure and development indicators across feudal and non-feudal areas. In table 11, we find that children in feudal areas have lower weight by 6% and are 6% shorter than children in non-fuedal areas.[6] There are also notable differences in educational attainment. In table 12, 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 13, we report that feudal areas are 88% less likely to have middle schools, and are 91% farther away from primary and community health centers.

[6]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 11: 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)
Non-feudal 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 12: 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)
Non-feudal 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 13: Health and education infrastructure

	Availability of ___ school				Distance to ___ (km)	
	Primary	Middle	High	SSC	PHC/CHC	Hospital
Feudal	-0.001	-0.448**	-0.146	-0.224**	3.933**	2.265
	(0.024)	(0.210)	(0.102)	(0.096)	(1.963)	(2.882)
Non-feudal mean	0.973	0.518	0.375	0.165	4.301	6.816
R^2	0.18	0.23	0.24	0.19	0.22	0.26
Observations	5098	5098	5098	5098	5098	5098

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. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

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.4, and trends specifically for working age population in figure A.5. 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.

8 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

Table A.1: Treatment effects on village composition

	# HHs			# workers	# land txns	# migrant HHs	
	Current	Recent exits	Employers			Cyclical	Permanent
Feudal	8.080	1.933	47.075	303.504	-5.562	-10.908	-13.497
	(92.789)	(4.190)	(39.130)	(351.892)	(10.629)	(18.964)	(16.678)
Non-feudal mean	1015.516	23.073	143.690	1137.009	68.171	141.669	82.420
R^2	0.49	0.11	0.18	0.09	0.07	0.41	0.18
Observations	2297	2271	2262	2256	2143	2277	2287

This table shows results from our primary specification on the composition of village populations in feudal and non-feudal areas. $*$ $p < 0.1$, $**$ $p < 0.05$, $***$ $p < 0.01$

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

Figure A.2: Phone survey sample

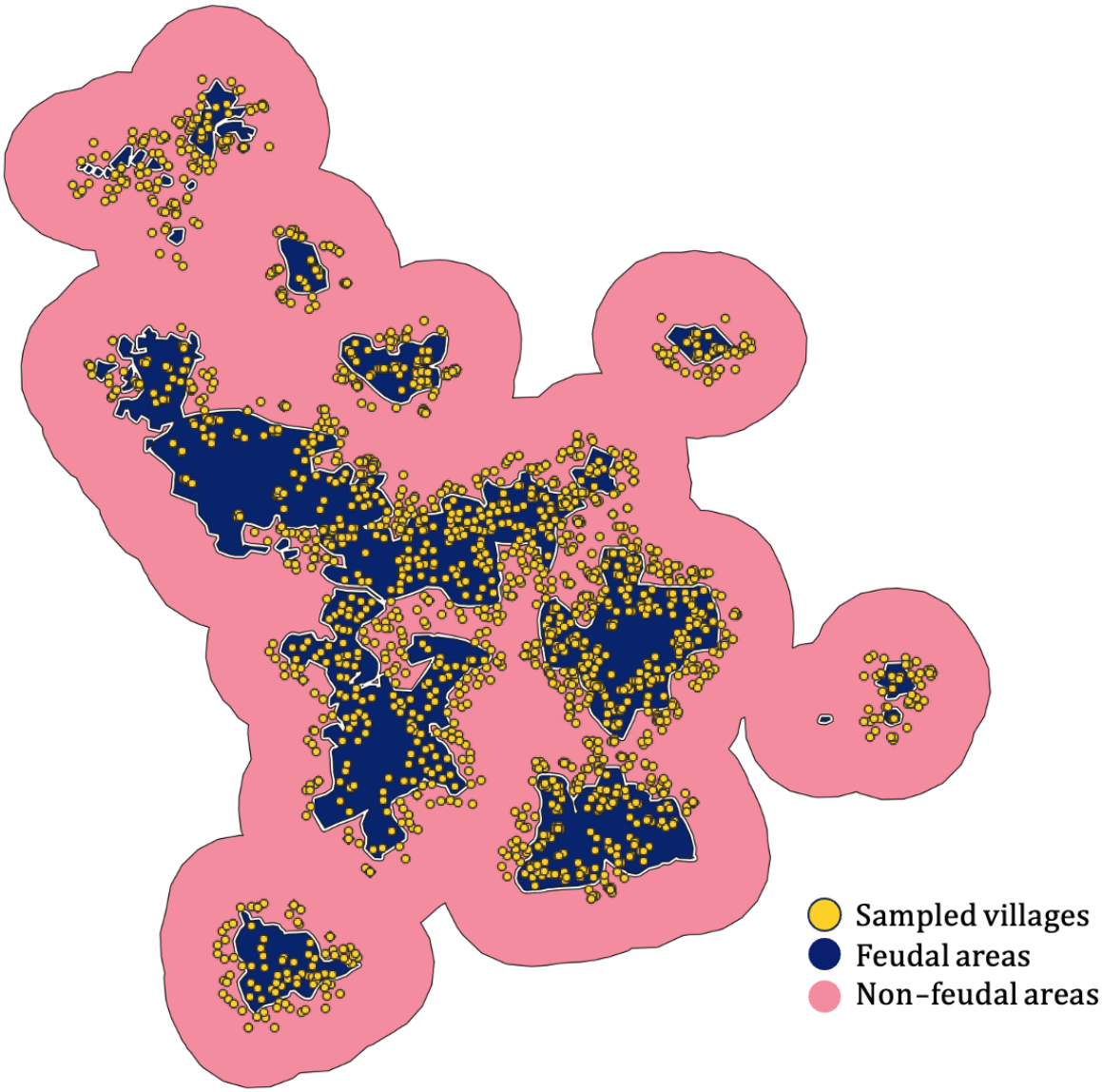

Figure A.3: Jagirs within India

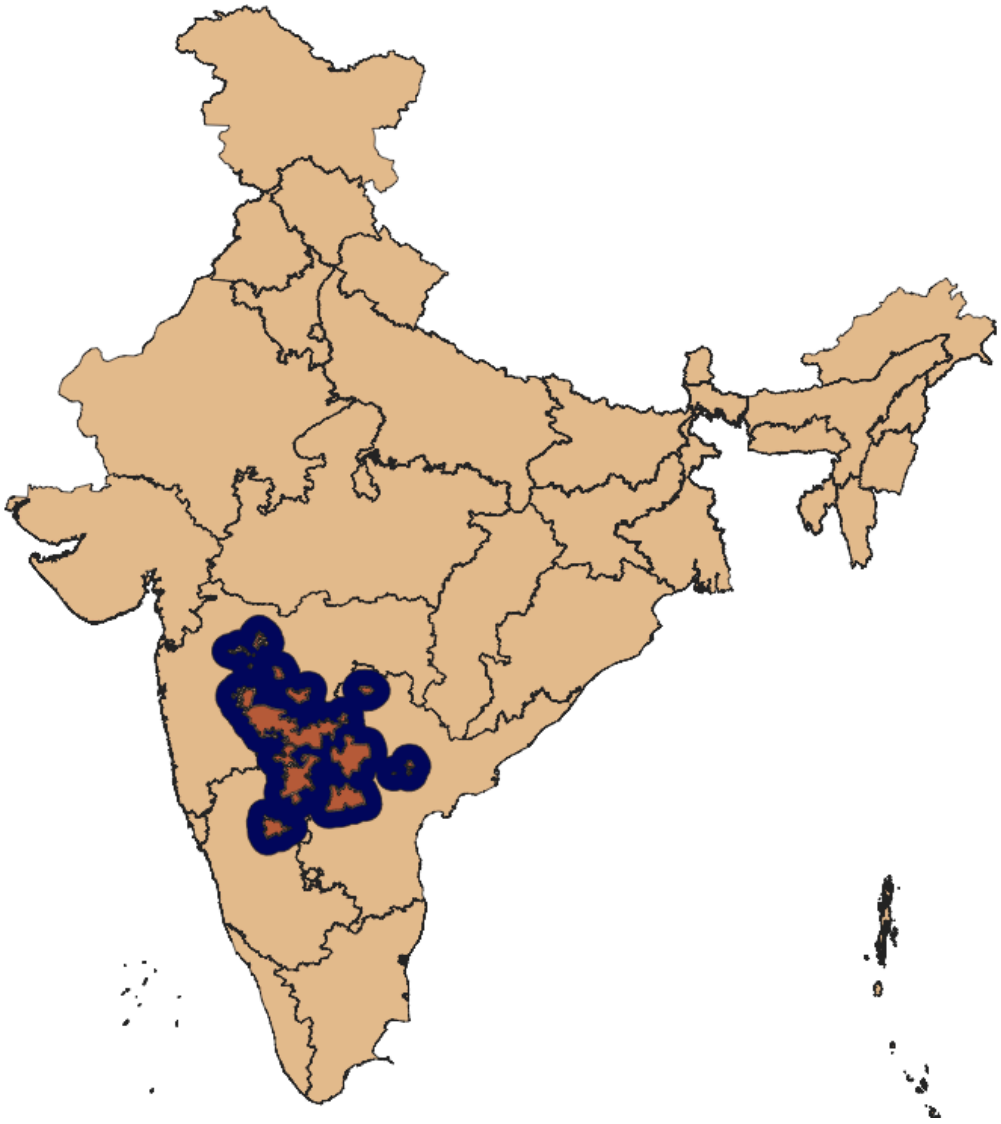

Figure A.4: Population dynamics

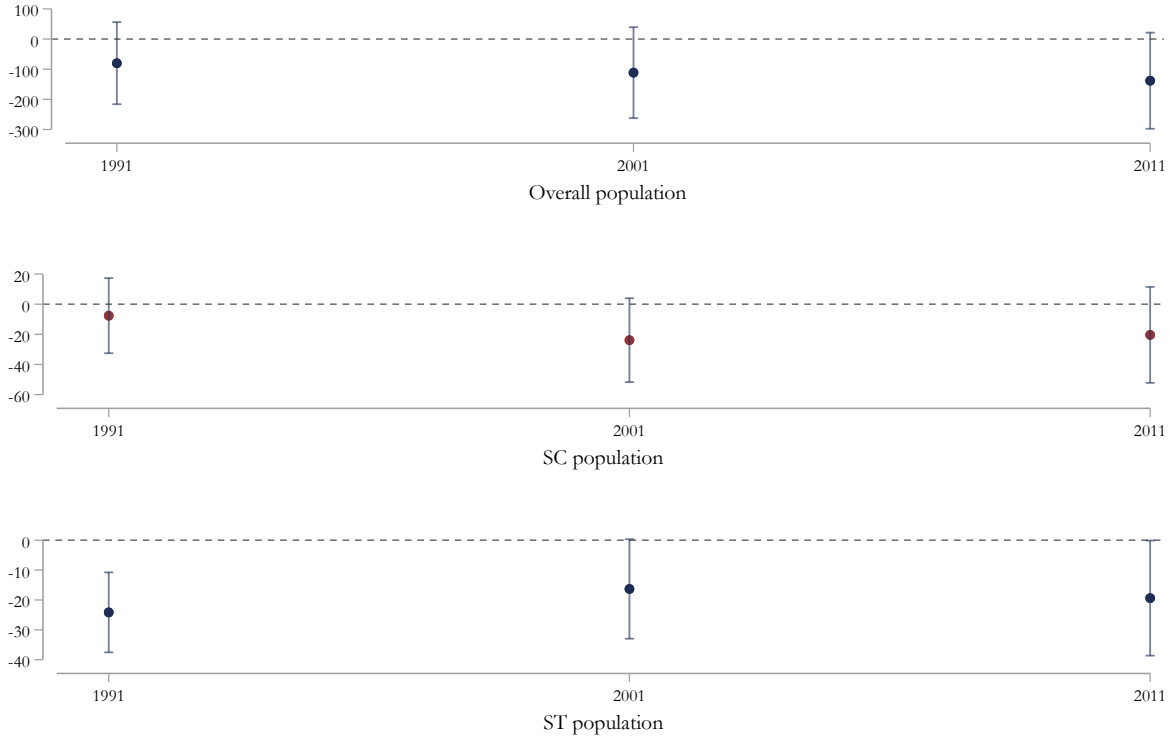

Figure A.5: Working population dynamics