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Land Redistribution and Coercive Violence

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Land-redistribution and coercive violence

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Abstract

In a post land reform environment, violence and redistribution are substitutes for an opportunistic incumbent attempting industrialization. We setup a theoretical model to explore this relationship for individual and group level violence across two types of policy driven post land-reform industrialization (PLRI) — small and large-scale, in the Indian state of West Bengal. We find strong evidence for our theoretical prediction of an inverse relationship between land redistribution and both types of violence during the period of small scale industrialization after an industrial policy was announced in 1994-95 by the incumbent. This relationship however breaks down for individual level violence during attempts at large-scale industrialization between 2006-2011, even though both types of violence increase in this phase.

Key words: post land-reform industrialization, individual-level violence, group-level violence, count data
JEL codes: D74,Q15,C25

1 Introduction

By the middle of the 20th century, with large parts of the world leaving the fold of European colonialism, a dominant stream of thought was that land redistribution and tenancy reforms would be a required trigger for feudal agricultural economies to transition into the modern world. Land reforms have been used to address inequality, prevalent in feudal societies, by improving the subsistence crisis of peasants (Mason, 1998*b*, Albertus, Brambor and Ceneviva, 2018*b*) and also revive growth and employment (Bardhan and Mookherjee, 2010, Boone, 2012). Sucessfull land reforms can also play a role in changing the political structure of society from autocracy to democracy or left to right (Bhattacharya, Mitra and Ulubaşoğlu, 2019).

However, attempts to enact land reforms to curb land inequality may not resolve conflicts surrounding land, more so in the long-run. Recent studies focusing on post-reform settings using sub-national data find a mixed relationship between land inequality and conflict. Albertus, Brambor and Ceneviva (2018*a*) find that in Brazil some of the least unequal municipal zones to be the most conflict-prone, showing that conflicts can be prevalent amidst land reforms. Hidalgo et al. (2010) also highlights the ambiguous relation between inequality and conflict. In addition, redistribution of land through land reforms can paradoxially weaken incentives of farmers to make adequate investments in their share of land Ghatak and Mookherjee (2014)[1]. This problem persists even in the unlikely event of a perfect implementation of land reforms (Mason, 1998*b*).

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[1]Fujita (2014) states such weakening of incentives as *Marshallian Inefficiency*

We consider the argument of Majumder (2012) who argues that in a post-land reform setting, new trade-offs emerge along social and political contours. Even if land is equally redistributed among farmers in an agrarian economy, the presence of diminishing returns for land creates an ever-rising demand for non-farm employment for mere subsistence. To provide such employment, the political incumbent which had previously redistributed land now acquires it back to pave way for an industry. We examine the trade-offs associated with such industrial reforms in presence and absence of political competition and judge the reforms' merit in curbing conflicts related to land.

We develop a theoretical and empirical study of what we term as *Post Land Reform Industrialization* (PLRI) using data from the Indian state of West Bengal. The nature of land and industrial reforms enacted in the state since 1978 offers an opportunity to assess their relationship with conflict.

West Bengal (WB) in India has long been the poster child for economic development as a direct result of successfully implemented land reforms (Banerjee, Gertler and Ghatak, 2002, Sarkar, 2006). But, over the decades succeeding the reforms, West Bengal has been overtaken by many Indian states in average income and levels of industrialization. In 1955-56, 24% of India's production was carried out in West Bengal with 27% of the jobs being in the state. In 2007-2008 these had reduced to 3.9% and 4.9% respectively (Ray, 2011). The slow economic decline aside, the state has also been beset with a high level of violence (Rogaly, 1998, Ray, 2017) with more recent cases of violence during *Panchayat* (village level governance institutions) elections [2] gathering national headlines. The state is also unique in having the longest uninterrupted regime of any democratically elected communist party in history. The Communist Party of India, Marxist CPI(M) conducted its Left-front (henceforth the Left or as the LF) rule for 34 continuous years between $1977-2011$. Table 1 presents a timeline of key policies and major events implemented during the Left rule. We focus on the period between 1994 and 2011 (highlighted in blue) after the LF government announced an industrial policy for the first time since successfully implementing evenly spread land reforms across WB, 16 years prior in 1978.

Table 1: A time line of Key policies and violent events in WB - 1977 to 2011

Time	Policy or Events	Purpose
	(1)	(2)
LEFT FRONT is elected in 1977		
1978	Operation Barga	Tenancy Registration and Redistribution
1979	Amendments to the LRA	Shifted the burden of proof on landlords
1979	Bengal Land holding Revenue Act	Legal Backing to Operation Barga
1980	Revenue Rules	More Legal Backing to Operation Barga
1994-95	WB Industrial Policy	To Promote industrialization
2006 -2008	Singur Violence	LF tries to acquire agricultural land
2007-2008	Nandigram Violence	LF tries to acquire agricultural land
2011	15th Legislative Assembly Elections	TMC comes to power

Notes: The table presents the time line of the important policies and events connected with land redistribution or violence in West Bengal.

This paper is an attempt to understand the patterns of violent conflict given the implementation of land reforms in context of PLRI-linked land acquisitions, political opportunism, and the Left's cadre-based decentralized rule which secured its electoral vote share over its years of dominance. Specifically, we study the patterns of violence in West Bengal between 1994 and 2011 after (i) land reforms have been implemented for two decades since 1978 and (ii) the Left government announced comprehensive plans to promote industrialization leading up to its electoral

[2] "Political violence in panchayat election was the highlight of West Bengal politics in 2023", The Hindu, 30 December 2023

defeat in 2011.

The existing literature on the decline in the agriculture surplus of West Bengal attributes it to under-investment in agricultural productivity due to tenancy contracts in the presence of moral hazard and limited liability (Banerjee, Gertler and Ghatak, 2002, Mookherjee, 1997). While stagnation in agriculture surplus is a critical part of the West Bengal story, it does not directly address why it has not been able to foster an industry that could have replaced agriculture as the primary economic activity at least in areas with less fertile land and lower productivity. In fact, preliminary attempts at encouraging small-scale industry with decentralized land allocation were stymied due to inefficiency, low productivity, and violence. The literature on PLRI in the villages of Singur and Nandigram in West Bengal between 2006-08 identifies the price or compensation for land as the key issue (Ghatak et al., 2013, Ghatak and Mookherjee, 2014). Even though their argument is relevant, compensation is a one-time event and the failure of compensation negotiations (or inadequate compensation) does not adequately explain the level and patterns of violence that have pervaded across almost all preceding attempts at bringing industry to West Bengal (Guha, 2007). Our empirical analysis shows that attempts towards large-scale industrialization has a significant effect towards increasing violence in West Bengal.

In our theoretical model, we posit a long-term explanation for the emergence of violence which complements the existing literature on inadequate compensation as a short-run trigger of violence in West Bengal. We model this structure as a political economy based on observations of policy choices made in West Bengal. In the period after land reforms, incumbent redistributes handouts (based on agricultural surplus) to farmers (or voters) to satisfy their subsistence utility in order to gain their vote. The incumbent needs at least $\alpha > 0$ share of votes to stay in power. Decay of surplus over time entails the incumbent cannot stay in power forever. This leads the incumbent to deploy instruments of alternate employment (small-scale and large-scale industrialization) to raise surplus or practice violence (by cadres or incumbent or both) to coerce a share of voters to vote in its favor. Cadre driven violence affects farmers at the individual level violence while under an incumbent-driven violence, all farmers suffer an average level of violence, hence termed as group-level violence. If both cadres and incumbent engage in violence, then violence becomes collective (*Figure 1*). These instruments nonetheless usher in new trade-offs like losing the support of farmers or even cadres.

This paper attempts to complement the existing arguments on inadequate compensation by seeking to understand why both the initial attempts at attracting small-scale industry, and the later attempt at getting large-scale industry to West Bengal ended in violence which gradually led to a change in the political dispensation. To address these two questions, we use our theoretical model to inform observations of policy choices made by West Bengal and formulate hypotheses on the type and the scale of violence across time. We then validate these hypotheses against data we have compiled on individual and group-level violence and land redistribution.

We test the model findings about the patterns of violence by constructing panel data for 18 districts in the state of West Bengal in India between 1996 and 2011. Our theoretical model yields three hypotheses which are empirically tested. First, during the entire time period there should be a statistically significant negative relationship between land redistribution and both types of violence. Second, an attempt at large-scale PLRI increases both types of violence. Third, the negative relationship between redistribution and group violence sustains during large-scale PLRI, but the one with individual-level violence does not.

The selected period corresponds to the Left's post-reform industrialization efforts involving land acquisition for industry. For our district-level measures on re-distributive benefits, we extract information on the area of land redistributed and divide it by the corresponding number of cultivators and beneficiaries from yearly statistical reports published by the Bureau of Applied Economics and Statistics (BAES), Government of West Bengal. This data provides our measures

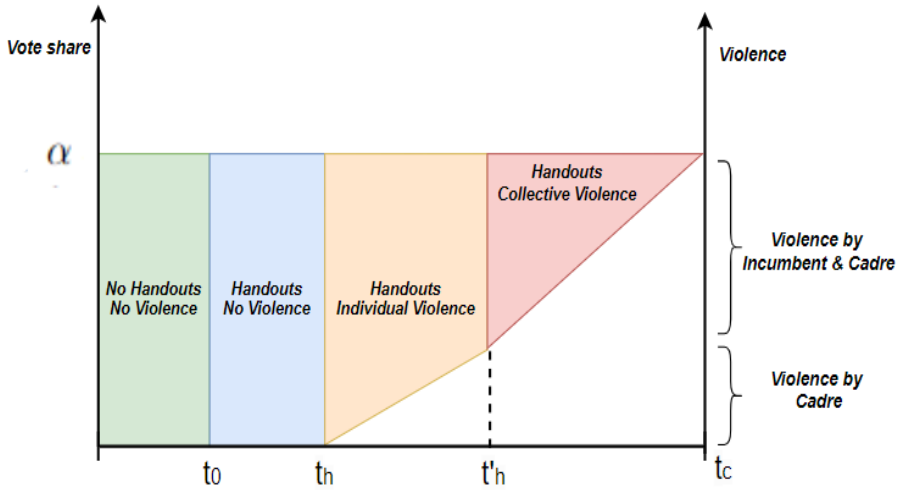


Figure 1: *With the addition of each of the following instruments, the incumbent is able to enjoy the threshold vote share of* α *for a longer period. The instruments include* (a) *handouts based on agrarian surplus,* (b) *handouts based on industrial surplus and* (c) *two types of violence, first at the individual level using cadres and then at the group level by the incumbent. We refer violence as collective when both cadre and incumbent are imposing it.*

of land redistribution at a broader per cultivator level and at a narrower per beneficiary level.[3] We measure conflict by extracting district-level measures on violence from the National Crime Records Bureau.[4] Descriptive analysis suggests while individual violence shows an increasing trend between 1996 and 2011, group-level violence follows more nonlinear changes across time.[5] Analysis of this data using pooled count regression models shows that there is sufficient evidence for our theoretical findings. We also show that the findings are robust to omitted variables, interaction with local political competition, and changes in specifications and models including linear trend with clustered standard errors and quantile regressions.

In addition to drawing on and complementing the existing literature on land reforms and PLRI linked violence in West Bengal, this paper contributes to the broader literature on land reforms and violence, in particular to the nascent but growing literature on post-land reform conflict. The existing literature focuses on measuring the extent of uneven geographic implementation of land reforms as a driver of conflict through better collective action and coordination among landlords against the landless (Mason, 1998*a*, Alston, Libecap and Mueller, 2000, Hidalgo et al., 2010, Albertus and Kaplan, 2013, Albertus, Brambor and Ceneviva, 2018*a*). We add to this literature by identifying a new mechanism – limited surplus generation by PLRI creating the need for violence and conflict even after land reforms have been implemented evenly over long periods. Further, in assessing redistribution and violence as substitutes in post-land reform settings and focusing on the differences across types of PLRI (small scale vs large scale) and types of violence (individual vs group) we contribute to the theoretical strand which argues the relationship between inequality and redistributive conflict is nonmonotonic (Grossman and Kim, 1995, Esteban and Ray, 1999, 2001, Baland and Robinson, 2003, Acemoglu and Robinson, 2006).

The paper also contributes to the existing literature studying the relationship between land inequality and conflict with the source of conflict being pre-land reform contestation between

[3]The broad and narrow measures can be interpreted as how diffused is land redistributed among cultivators who may include indirect beneficiaries versus intensity of redistribution to direct beneficiaries, respectively.

[4]`https://ncrb.gov.in/en`

[5]Individual violence refers to targeted violence which leads to bodily harm, intimidation, and physical abuse. These include violent crime murder, offenses against women, and violent robbery. Group-level violence refers to unlawful gatherings of a few or more individuals who use violence or threaten to use violence similar to riots. These gatherings could be both organized or unorganized.

a few landlords and a mass of landless households – leading to land reforms as political outcomes or policy prescription (Binswanger, Deininger and Feder, 1995, Binswanger-Mkhize, Bourguignon and van den Brink, 2009, Sekeris, 2011, De Luca and Sekeris, 2012, Albertus, 2015).[6] We add to this literature by identifying the role of an opportunistic incumbent (in an electoral setting) and analyzing the pattern of violence that emerges after relatively successful land reforms have been carried out evenly over a long period.

The paper is divided into the following sections. Section 2 discusses the theoretical framework. Section 3 lays out our hypotheses and case selection to test them. Section 4 describes the data source, construction and the baseline specification. Section 5 provide the main results and their interpretation. Section 6 presents robustness checks to our main results. Section 7 discusses the relevance of our main findings beyond our illustrative case.

2 Theoretical Framework

2.0.1 Incumbent, Cadre and Farmers

Consider a society of $N > 1$ farmers (F), one incumbent (I) and one representative cadre member (C). Land $x \in [0,1]$ is equally distributed among N farmers following a land reform. Each F produces a surplus, part of which is expropriated by the C and I. I returns a proportion r_t of the appropriated surplus back to the F as handouts. Both I and C want I to stay in power as it helps extracts rents from land. However, being in power requires the support of at least $\alpha\%$ of F.

A representative F denoted as i has type $\theta_i \in [0,1]$. This type is perfectly known to C but not to I who only knows that θ_i is uniform over $[0,1]$. This asymmetry of information allows C to engage in targeted individual level violence of $V_t^c \in [0,1]$. On the contrary, I can only resort to violence $V_t^s \in [0,1]$ which affects all farmers as a group. [7] Any F will vote for I if their utility is above a subsistence level e_s or below 0.

2.0.2 Timeline of moves

The timing of how each agent moves captures the dynamics of an election such that the incumbent announces the values of its choice variables before the elections, farmers vote on the basis of the payoff they will get based on the announced values of these variables. If the incumbent loses the election, the alternative is presumed to be a state where farmers can keep their entire surplus, and I and C will get a payoff of 0.

2.0.3 Key Model Components

The production of surplus by F followed by expropriation I and C and the subsequent roll out of handouts are governed by the following sets of production technologies and rules.

Production: The production technology available to farmers depends on their type and the

[6] Under such settings either there is an increase in aggregate grievances triggering conflicts (Gurr, 1970, Brockett, 1992, Verwimp, 2005, Albertus, Brambor and Ceneviva, 2018*a*) or a rapacity motivation to rebel (Gates, 2002, Collier and Hoeffler, 2004, Albertus, 2020).

[7] The subscript t in the variable names is to show that players play a stage game over potentially infinite repetitions. But to ensure that the shadow of the future does not create an infinite set of folk theorem driven equilibrium outcomes, we make a strong assumption. We assume that players are myopic and so I and C are only concerned about if I continues to stay in power at the end of t. This allows each repetition to be evaluated in isolation conditional on the surplus being produced by farmers in a given t.

amount of land available to them. The surplus produced by a farmer of type θ_i at time t is

$$S_{i,t} = \theta_i(\frac{x_t}{N})^t \tag{1}$$

$S_{i,t}$ is increasing with type θ_i and land share $\frac{x_t}{N}$. However the effect of x_t grows concave with t.

Expropriation: The total amount of surplus generated by farmers in t is:

$$S_t = (\frac{x_t}{N})^t \sum_{\theta_i \in [0,1]} \theta_i \tag{2}$$

I expropriates $\gamma_I \in (0,1)$ proportion of S_t amounting to a total of $S_t^I = \gamma_I S_t$. C expropriates $\gamma_c \in (0,1)$ proportion of S_t amounting to $S_t^c = \gamma_c S_t$. Any F holds on to the remaining $(1-\gamma_I-\gamma_C)$.

Handouts: I can transfer a proportion $r_t \in (0,1)$ back to F. As I cannot distinguish between farmer types, r_t is equally distributed among all F at $\frac{r_t S_t^I}{N}$.

Cadre-driven individual level violence: C having perfect knowledge of θ_i can be used by I to impose violence or coercion on farmers, such that they vote for I. We will explain how coercion by C can turn into vote share for I in the next subsection. C can bear a total cost of violence at $S_t^c \in (0,1)$ which reflects constraints on their size or resources, considered exogenous to this setting. V_t^c captures the fixed proportion of farmers that C can target at a constant marginal cost of C_c. Then cadre can impose violence as long as $V_t^c C_c \leq S_t^c$.

Group level Violence: following cadre-driven violence, I can also impose an exogenously fixed level of violence, $V_t^s \in [0,1]$ which reduces the payoff of each F by $\frac{V_t^s}{N}$. However, it does affect the proportion of F supporting I.

Collective violence: Combined violence by both I and C.

2.0.4 Payoffs

- Farmer: $u_{i,t}^F(\theta_i, r_t, V_t^s, V_t^c; t; x_t; N) = (1-\gamma_I-\gamma_C)\theta_i(\frac{x_t}{N})^t + \mathbf{1}\frac{r_t S_t^I}{N} - \mathbf{1}\frac{V_t^s}{N} - \mathbf{1}\{V_t^c \leq \frac{S_t^c}{C_c}\}$, where indicator function, **1**, takes the value 1 if the farmer has been subjected to handouts, group-violence or cadre violence.
- Incumbent in power: $u_t^I(r_t, V_t^s, V_t^c; t; x_t; N) = (1-r_t)S_t^I$. Otherwise, $u^I = 0$.
- Cadre with incumbent in power: $u_t^c(r_t, V_t^s, V_t^c; t; x_t; N) = S_t^c - C_c V_t^c$.

Voting Rule: The payoff of any F does not depend on whether they support the I. Instead, the decision on whether to support the I is in response to current payoffs. To incorporate this and simplify the model further, we specify the voting decision rules:

1. I needs the support of at least $\alpha \in (0,1)$ share of farmers.
2. If $u_{i,t}^F$, is higher than a minimum level of subsistence $0 < e_s < 1$, then any farmer i votes for I.
3. If $u_{i,t}^F$, is lower than 0, then the farmer i votes for I at t. The intuition is that a destitute farmer is unlikely to be in a position to not support I.
4. If $u_{i,t}^F \in (0, e_s)$, then the farmer i does not vote for I at t.

If the share of farmers with utility in $(0, e_s)$ is higher than α, then I loses power [8].

2.1 Analysis

Given the voting rule, I can use handouts or seek the help of C or even engage in violence itself (collectively with C) to stay in power. Depending on each instrument used, we characterize the time until which I retains power (by assuring itself a vote share of at least α).

1a. **Non-violent with no handouts**: If no handouts are provided to farmers, nor are they subjected to any coercion, then the I can retain power with at least α vote share till the following time threshold:

$$t_0 < \frac{ln((1-\alpha)(1-\gamma_I-\gamma_C)) - ln(e^s)}{ln(N) - ln(x_t)} \tag{3}$$

The result is directly derived from the payoff function of the farmer. It must be noted that for $t_0 > 0$, $e^s < (1-\alpha)(1-\gamma_I-\gamma_C)$ must hold. This suggests the susbsistence utility of farmers must be below a threshold.

1b. **Non-violent with handouts**: If handouts are provided to farmers, but they are still not subjected to any coercion, then I can retain power with at least α vote share till the following time threshold:

$$t_h < \frac{ln((1-\alpha)(1-\gamma_I-\gamma_C)) - ln(e^s - \frac{r}{2})}{ln(N) - ln(x_t)} \tag{4}$$

The result is directly derived from the payoff function of the farmer. It is evident from 3 and 4 that $t_h > t_0$ given $0 < e_s - \frac{r}{2} < e_s < 1$. So handouts help buy power to the monopolist.

2a. **Individual-level violence afterhandouts**: After t_h the incumbent imposes individual-level violence through cadres to continue remaining in power. Since, cadres have knowledge of farmer types, they can impose violence at the individual level. However, the are constrained by cost of imposing violence and can coerce a maximum of $\frac{S_t^c}{C_c}$ share of farmers. This leads us to the following time threshold until which the incumbent retains power.

$$t'_h < \frac{ln((1-\alpha+\frac{S_t^c}{C_c})(1-\gamma_I-\gamma_C)) - ln(e^s - \frac{r}{2})}{ln(N) - ln(x_t)} \tag{5}$$

See appendix for the proof.

Proposition 1 *By imposing individual-level violence on farmers, the incumbent is able to retain power for a strictly additional length of time characterized by*

$$\frac{ln(1-\alpha+\frac{S_t^c}{C_c}) - ln(1-\alpha)}{ln(N) - ln(x_t)}$$

.

After handouts at t'_h, the incumbent loses support. In order to continue in power, the incumbent itself engages in violence as discussed below.

[8] This simplification allows us to abstract away from explicitly modelling the beliefs that an individual farmer has about all other farmers. It reduces farmers to automatons who do not make any strategic choices in the game. While this does reduce the richness of the model, it make is possible to isolate the possible strategies of incumbents and cadre in a relatively simple setting.

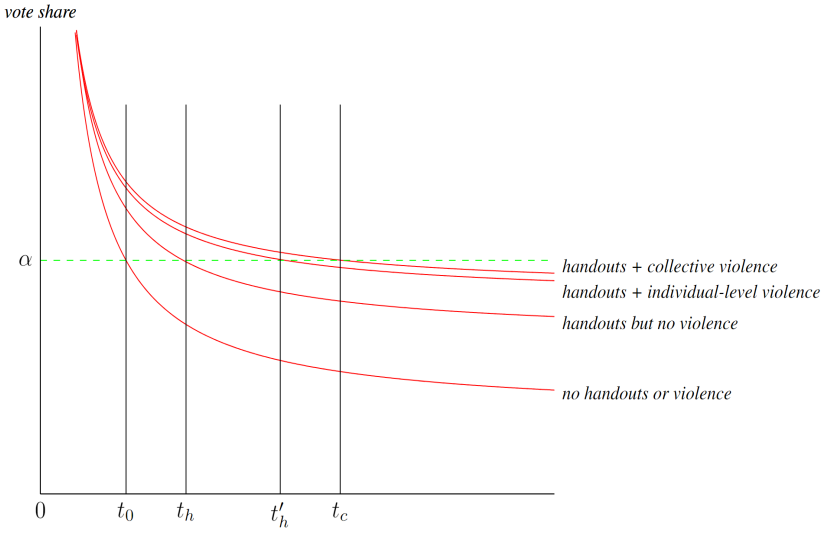


Figure 2: *Time thresholds until which the I retains power. The threshold increases with the imposition of handouts and violence or both.*

2b **Collective** [9] **violence with handouts:** To retain power for an even longer time period, the incumbent takes coercion in its own hands. Since incumbent lacks individual-level information, all farmers experience a general level of violence — $\frac{V_t^s}{N}$. Similar to the case above, introducing collective violence — violence by both incumbent and cadre — guarantees retainment of power by the incumbent not beyond the threshold shown below

$$t_c < \frac{ln(1-\alpha+\frac{S_t^c}{C_c}) - ln(e^s + \frac{V_t^s}{N} - \frac{r}{2})}{ln(N) - ln(x_t)} \tag{6}$$

See appendix for the proof.

Proposition 2 *By introducing collective violence by incumbent and cadre, the incumbent is able to retain power for an additional length of time (compared with only individual-level violence) characterized by*

$$\frac{ln(e^s - \frac{r}{2}) - ln(e^s + \frac{V_t^s}{N} - \frac{r}{2}) - ln(1-\alpha+\frac{S_t^c}{C_c})}{ln(N) - ln(x_t)}$$

.

The above is positive as long as V_t^s is large enough, holding all else fixed. In essence, the incumbent can extend its power for a longer period if its capacity of executing coercion is sufficiently high.

2.1.1 Initial steps towards PLRI

As evident from above, decreasing returns from agriculture does not allow the incumbent to retain power beyond a time threshold even with coercion. To offset this decay in surplus, incumbent introduces industrialization which will generate alternative employment and satisfy the subsistence utility of a positive share of farmers which is consistent with the argument of Sarkar (2007). We begin with a small-scale land acquisition to accommodate small-scale industrialization.

[9] Combination of group-level and cadre driven individual level violence

This initiates the first round of *PLRI* where some determined proportion of land, say y, will be taken away from farmers to be given to a representative industry. Farmers whose land is not taken away will continue to have the same x_t/N amount of land available to cultivate. We assume that land is taken away from lowest type farmer with $\theta_i \in [0, n]$. These farmers generate low surplus and are less likely to support the incumbent as t increases. The production technology available to the firm is:

$$Q = AyL^{\beta} \tag{7}$$

$A \in [0, 1]$, is drawn from a normal distribution and is only known to the firm. The firm pays wages w_t. The expropriation of surplus away from the industry happens at the cadre level, who then share a proportion with the incumbent. The cadre can expropriate $\gamma_C^f \in (0, 1]$ of the firm's profits, amounting to: $\pi^C = \gamma_C^f \pi$. They transfer $\gamma_I^f \in (0, 1]$ of the amount appropriated to the incumbent: $\pi^I = \gamma_I^f \gamma_C^f \pi$.

2.1.2 Land Allocation Decision

To maximize its profits for given land and wage rate, the labor hired by the firm will be the solution of the following optimization problem.

$$Max_L \pi = AyL^{\beta} - w_t L \tag{8}$$

$$FOC : \frac{d\pi}{dL} = A\beta y L^{\beta-1} - w_t = 0 \tag{9}$$

Rearranging terms in the FOC will give the proportion of farmers who will be hired by the firm: $L^* = (\frac{A\beta y}{w})^{\frac{1}{1-\beta}}$. The incumbent knows this and will therefore choose y so as to maximize the sum of agriculture surplus and firm profits. However, the incumbent does not know A at the time land acquisition, and assumes that it will get an average type firm where $\bar{A} = 0.5$. It is also important to point out that that the incumbent assumes that the firm will be able to hire all the labor they want to.

$$Max_y S_t + \pi; s.t. y_t \geq 0, y \leq x_t \tag{10}$$

where $S_t = (\frac{x_t}{N})^t \sum_{\theta_i \in [\frac{y_t}{x_t}, 1]} \theta_i$ and $\pi = 0.5y(\frac{0.5y}{w})^{\frac{1}{1-\beta}} - w_t(\frac{0.5y}{w})^{\frac{1}{1-\beta}}$.

The objective function is continuous over the interval $[0, x_t]$ and therefore must have a maximum in this interval. We assume that there will be an interior maxima for a given t. y from hereon will refer to this interior maxima. Once the land allocation is decided, players engage in a one shot game explained in 2.2 with a new additional stage where the firm first makes a labor hiring choice followed by the sequence of moves described in 2.2.

Farmers who have lost their land will always take up work at the firm, if available. Consequently, there can be three sub-sets of farmers based on the source of their income (all three can receive handouts): those earning wages, those generating agricultural surplus and the ones having no land or job. In this model, while the available jobs can be randomly assigned to types whose land has been taken away, we assume that higher types of share get jobs, implying that farmers within $[L^*, n]$ have jobs but no land while the ones in $[0, L^*)$ have neither land nor jobs.

2.1.3 Level of employment

The key difference initiated by industrialization comes in the form of jobs in the agrarian economy. However, in the present scenario, it is unlikely that very productive firms will be attracted to invest in this agrarian economy. The intuitive justification for this is:

1. The firm knows that part of the surplus will expropriated away by the cadres.
2. The firm has no control in determining which and how much land it gets.

Given these reasons, we assume the firm investing within these constraints are not very productive and therefore cannot produce a surplus high enough to employ the entire share of farmers n who have lost their land. So it is highly unlikely that $L^* > n$ will hold. Instead what seems viable is $L^* \leq n$. This possibility leads to two situations which requires our attention.

(a) **First-best** ($L^* = n$): where the industry absorbs all farmers losing their land. While this knife-edge outcome is highly unlikely, the presence of industry does not obviate the need for handouts or violence to ensure the required support for the incumbent. Combined with the decreasing returns in agriculture, we would likely see a similar pattern where beyond a new time threshold, the incumbent loses power.

(b) **Second-best** ($L^* < n$): here industry is unable to absorb all farmers losing their land. Then any farmer with type $\theta_i \in [0, L^*]$ receive no wages and has no land; those in $\theta_i \in (L^*, n]$ receive w_t at each time period; while those in $\theta_i \in (n, 1]$ have land and depend on agriculture.

Considering the second-best outcome is likely to prevail, we assume that the industry provides subsistence wage $w_t = e_s$ to all employed farmers which implies L^* proportion of farmers will support the incumbent. The incumbent further needs the support of $\alpha - L^*$ share to retain power, which again will require handouts and/or violence.

Nevertheless, as evident from the above case, the surplus from the small industry, though improves the incumbent's longevity in terms of being in power, cannot sustain so beyond a time point even when complemented by violence. The next step would be to initiate large scale industrialization, the second stage of *PLRI* to break away such barriers.

2.1.4 Large-scale industrialization

Large scale industries carries the capability to generate surplus high enough to escape the decreasing returns barrier in agricultural output. However, such industries operate in their own terms which might raise the trade-offs of the incumbent.

First, unlike a small industry, a large industry will not pay surplus to C, but only pay a portion of surplus back to the state or I. This totally curtails the rent-seeking by C, weakening the position of I when in need of coercing F. We can assume that I pays a portion of its surplus, procured from the industry, back to C.

Second, the industry's choice of land is likely to be independent. For instance, the industry can choose to acquire lands from the highest farmer types. The associated trade-offs are discussed below.

2.1.5 Type of land chosen by large-scale industrialization

A. The industry chooses a proportion y' of the land belonging to the **lowest type** farmers. If it employs labors $L^* \geq \alpha$ at $w = e_s$, then I can stay in power unaffected by the decline in agricultural surplus. If on the other hand, $L^* < \alpha$, the incumbent will have to give out handouts and/or engage in violence as in previous cases.

B. The industry chooses land belonging to the **highest type** farmers. Ricardian rents on such higher quality land may be reason for industry to make this choice. This mechanism is aligned with the findings of Ghatak and Mookherjee (2024) that show "collateral value of land is increasing in ability and wealth" of farmers. We focus on this case to evaluate whether the role of cadres become redundant which can push them towards taking sides with the opposition. If the large scale industry employs farmers of share less than α, then it is clear to the cadres that the incumbent will surely lose power after a time threshold. This weakening of incentives and the looming possibility of the incumbent losing power open up an alternative avenue of possibly greater surplus — joining a challenger party.

We focus on case B. Two cases emerge — $L^* > \alpha$ and $L^* < \alpha$ — the former is a first-best case and reinstates the incumbent in power forever. The second case is relatively more interesting.

Remark: *If the large-scale industry acquires land from the highest farmer types and hires farmers of share $L^* < \alpha$, then the incumbent cannot retain power without resorting to violence.*

The logic underscoring the above remark is straight-forward. The incumbent needs the support of $\alpha - L^*$ share of F to retain power, all of who depend partially on agrarian surplus. Then I needs to resort to violence and reducing the utility of farmers below 0 who are not employed by the industry.

Proposition 3 *When the large-scale industry acquires land from the highest farmer types and $L^* = \alpha' < \alpha$, then cadres impose violence iff the land acquired exceeds threshold $\underline{y}$ characterized by*

$$y' \geq \underline{y} = \frac{\alpha - \alpha'}{\gamma_I \gamma_C} \cdot \frac{C_c}{A(\alpha')^\beta}$$

Since group-level violence by the incumbent reduces the utility of all farmers by $\frac{V_t^s}{N}$, given $L^* < \alpha$, the incumbent's vote share will plummet more if a threshold wage is not provided by the industry. If the threshold condition is satisfied, then by imposing violence, the incumbent can gain the vote share of the lowest types and ensure the vote of α share of voters for a certain length of time.

In regard to employing cadres to coerce farmers, their participation constraint must be satisfied. In essence, the additional vote share $\alpha - \alpha'$ required to retain power must be weakly less than $\frac{S_t^c}{C_c}$ which implies that the surplus from industries must exceed a threshold to guarantee the threshold rent of the cadres. Alternatively, this means that a minimum share of land must be acquired in the first place to initiate large enough industrial surplus.

Corollary 2 *If the land acquired by the large-scale industry is $y' < \underline{y}$, then cadres will no longer support the incumbent.*

This result implies that if sufficient land is acquired for industry from high type farmers then large scale industrialization can lead the incumbent to have access to sufficient surplus to retain power. However, if the land acquired is below a particular threshold, surplus generated is not enough to sustain cadre driven individual level violence as their participation constraint is not satisfied. This makes their alliance with the incumbent a redundant one creating the possibility that break away cadre members will form the locus of an opposition.

3 Case Selection and Hypotheses

West Bengal (WB) makes for an interesting case to understand the relationship between violence and redistribution during attempts at PLRI. First, WB witnessed a single-party electoral rule for more than three decades until 2011. This resulted in an authoritarian but decentralized governance structure. During this period WB witnessed virtually little to no political opposition challenging the Left's electoral rule until the rise of the All India Trinamool Congress (TMC) in 1998 as a new political challenger.[10] Second, West Bengal is a state where long-term politics, economic policy, and livelihood security are centered primarily around agrarian land reforms and related welfare benefits since the 1970s.[11] This has resulted in a large portion of the state's population being dependent on rural land holdings and farming. Third, West Bengal has seen violence related to land reforms since the 1970s. The first set of violence was a result of large-scale land redistribution from rich landlords to the poor landless between 1970 and 1990.[12] The second set of violence resulted from redistributing agricultural land away from reform beneficiaries beginning in the 1990s with the adoption of a new industrialization policy leading to highly publicized violent events in Nandigram-Singur between 2006-2008. The two decades starting in the 1990s until 2011 when the incumbent Left lost its electoral support for the first time in 34 years provides the necessary conditions conceptualized in our theoretical framework. Hence we shall focus on the period between 1990 and 2011 which witnessed PLRI-induced violent conflict to test the key hypotheses that emerge from the model.[13] As the theoretical model is based on observations of events in West Bengal, it allows for findings of two distinct types. The first type of results motivate the policy decisions made (initiating small or large-scale industrialization) or illustrate the conditions under which certain decisions are made leading to different types of violence. This type of results are not tested against data as they directly flow from the assumptions that are baked into the model. Even so, they serve as consistency checks for a model that is partly based on observations of policy choices and it is therefore useful to compile them:

1. The first result of this type is the one that drives this investigation into post-land reform industrialization (PLRI) — an incumbent attempts PLRI to boost falling agricultural surplus after land reforms to secure enough votes to maintain power.

[10] TMC's emergence as a new political challenger to the Left yielded electoral result only in 2011 when it won 184 out of 294 seats in the WB legislative assembly elections. Between 2001 and 2011, TMC garnered 60 and 30 seats in two assembly elections becoming the primary challenger to the Left's legislative dominance.

[11] See Appendix section B.1 for details on the political economy of land reform carried out by the Left between 1970 and 1990.

[12] See Appendix section B.1 for further details.

[13] See Appendix section B for details on the political economy of post-land reform industrialization pursued by the Left and the resulting violence between 1990 and 2011.

2. Attempts at PLRI can necessitate the use of violence as the incumbent redistributes land away from farmers to industry.
3. Targeted individual level violence should increase over time as land is redistributed away from beneficiaries towards small scale industry especially if firms being less productive hire less than the number of farmers who lose re-distributive land.
4. The low productivity of initial small-scale PLRI (and continued decline in agriculture surplus) may lead the incumbent to invite large-scale industry to generate higher surplus.
5. If large-scale PLRI does not acquire land above the threshold necessary to generate the required industrial surplus, the incumbent may have to resort to general group violence as cadres may switch sides due to the smaller surplus they can expropriate.

While these results will not be validated against data, they serve the important purpose of invalidating possible counterfactuals. For instance, consider the fifth result. It implies that if the incumbent does acquire land above the threshold, we are unlikely to observe violence. If it is observed, then the land acquired must have been below the threshold. Similarly, if small-scale industrialization (result) generated sufficient surplus to offset the losses in agriculture, large-scale industry might not have been invited especially as it might entail acquiring land away from higher-type farmers. Therefore, observing violence serves as an indicator of specific assumptions being met and particular results being meaningful to the data being analysed.

The second set of model results are hypotheses about the relationship between types of violence and handouts (redistribution) moderated by policy choices that can be tested against data.

Hypothesis 1: We expect a negative relationship between handouts or redistribution and both types of violence with both small-scale and large-scale PLRI.

This follows from the fact that handouts and violence have been modeled as substitutes. In addition, since the incumbent can only win farmer support through redistribution until a certain time threshold, the instrument of violence acts as a supplementary lever for the incumbent to secure farmer support for a longer period. The model assumption that the possibility for handouts is exhausted before violence is deployed requires that changes in handouts (independent variable) affect changes in violence (dependent variable). This possibility is bolstered by the observation that there is little to no variation in handouts (as measured by redistribution of land) across time. This suggests that the factors affecting handouts are independent of violence and more likely to be related to the resources available to the incumbent.

Hypothesis 2: We expect large-scale PLRI to increase both types of violence.

This follows from proposition 3 and corollary 2. Large-scale PLRI with inadequate land acquisition leads to cadre ending their alliance with the incumbent and engaging in individual-level violence as part of the opposition. The incumbent, with only group violence as an option, uses it to supplement its handouts. Some interaction between the two types of violence is very likely, potentially leading to escalation in both, but this is not modeled.

Hypothesis 3: We expect the negative relationship of handouts and group violence to be sustained under large-scale PLRI, but not the one with individual violence.

This is an indirect result of the cadre leaving the incumbent. If the cadre switches sides when the incumbent attempts large-scale PLRI, then the extent of individual-level violence carried out by the cadre (under PLRI) should be independent of the incumbent's

ability to redistribute. However, group-level violence that can be triggered and carried out by the incumbent should show a continued negative relationship with handouts. The empirical investigation in the next two sections is targeted at testing if data from West Bengal during their attempts at PLRI supports these hypotheses.

4 Empirical Strategy

4.1 Data Source

We construct a panel data for 18 districts in WB between 1996 and 2011.[14] We focus on the period after the Left pursued industrialization for first time in 1994 involving land redistribution to industry. The district data on area of land redistributed, total number of cultivators and total beneficiaries were obtained from the yearly statistical reports published by the Bureau of Applied Economics and Statistics (BAES), Government of West Bengal and ICRISAT. All control variables used in our baseline specification were obtained from BAES, except for the measure on state wide political opposition. This control variable was constructed using assembly election data in West Bengal put together by the Trivedi Center for Political Data (Bhogale et al., 2019). We obtain our violence measures from the National Crime Records Bureau.[15]

4.2 Data Construction

Violence Measures: Our dependent variables are two count measures of violent conflict available for the years 1996-2012. The first is the number of incidents defined as riots (TR) as a measure of group level violence. The Indian penal code under section 146 defined rioting as "*whenever force or violence is used by an unlawful assembly, or by any member thereof, in prosecution of the common object of such assembly, every member of such assembly is guilty of the offense of rioting*". Hence riots loosely includes both organized or unorganized unlawful gathering of few or more individuals who use violence or threaten to use violence in groups.[16] The second is violent crimes (VC) as a sum of all recorded events for murder, dacoity, robbery and offences against women as a measure of individual level violence. [17] The violent crime measure should include violence targeted at individuals either

[14] A district forms the tier of local government immediately below an Indian sub-national state or union territory. Each district includes one or two cities (or large towns), a few smaller towns and dozens of villages. A district is headed by a Deputy Commissioner/Collector, who is responsible for the overall administration and the maintenance of law and order. The districts are Burdwan, Birbhum, Bankura, Midnapore, Howrah, Hooghly, 24 Parganas(South), 24 Parganas(North), Kolkata, Nadia, Murshidabad, Uttar Dinajpur, Dakhshin Dinajpur, Malda, Jalpaiguri, Darjeeling, Coochbehar, Purulia. In order to maintain consistency across years we combine West and East Midnapore into one district called Midnapore. This should have no effect on our analysis.

[15] `https://ncrb.gov.in/en`

[16] As described in appendix section B we expect the Left to utilize the police and the law with a heavy hand on political rivals who instigated violence or threatened its area dominance. This becomes more probable with the decentralized governance structure of the Left. Hence riots as a measure should include group violence instigated by any political contestation between the Left and its rivals. It should also include events where violence or threat of violence were perpetrated by groups not directly organized through political mobilization but as a consequence of it.

[17] Dacoity refers to when five or more persons conjointly commit or attempt to commit a violent robbery or aiding such a robbery under section 391 of the Indian Penal Code. Crime against women include rape, kidnapping and abduction for different purposes, homicide for dowry, torture, molestation, sexual harassment, importation of girls up to 21 years of age under the Indian penal code.

as a direct or indirect consequence of PLRI by the Left party machinery after it announced the 1994 industrial policy.

Land Redistribution: We construct a broad and narrow measure of land redistribution per capita. Our broad measure *ldpc* is generated by dividing total area redistributed in acres in a given year by the total number of cultivators in a given year.[18] While the yearly data on area redistributed in acres is available as a continuous series from 1996-2008, the yearly data on total number of cultivators is generated using linearly interpolation for three available census years 1991,2001 and 2011. This allows us to generate a continuous series for *ldpc* for 1996-2008. This measure captures the broad diffusion of land redistributed per cultivator who may or may not be a direct beneficiary.

In order to address any concerns on our broad measure as a result of including all cultivators who may not be direct beneficiaries and using interpolation, we construct a narrow measure of land redistribution,*pcld*, by dividing total area redistributed with total number of beneficiaries in a given year. The data is available as a continuous series for the years 1996-2008. This measure captures the intensity of redistribution to direct beneficiaries on average.

Control Variables: We include the following control variables as part of the baseline analysis. The data for all control variables are available for the years 1996-2008. First we include police force per thousand population (*pol1000*) measuring deterrence on both TR and VC. Second we include the natural log of total district population (*lnpop*) and per capita income (*lnpci*). While *lnpop* accounts for any effects on TR or VC as a result of increasing population density, *lnpci* accounts for any effects from increasing income per capita . Third, we include TR or VC in adjacent districts with a shared border to account for effects from neighborhood spill-overs. Fourth, we include an aggregate infrastructure index (*infraindex*) for each district-year pair.[19] It is an indicator for controlling effects from investments made into infrastructure. Fifth, we include the total number of students within each district divided by the total number of educational institutions within each district (*students*). It gives per institution student enrollment as a measure of effects from human capital.[20] Sixth, we include *votesharediff* as a measure of state wide political opposition in our baseline specification. Specifically, *votesharediff* calculates the difference between the incumbent Left's average district vote share and opposition TMC's average district vote share during the state assembly elections. Hence larger the value of *votesharediff* lesser is the presence of state wide political opposition to the Left and vice-versa. [21] Table 2 provides descriptive statistics for the key dependent and independent variables

4.3 Preliminary Observations

How does violent conflict and land redistribution evolve over time? The left and right panels of figure 3 depicts the yearly trend in our riots and violent crime measures averaged

[18]The data on area redistributed is from BAES, the cultivator data is acquired from ICRISAT `https://www.icrisat.org/`

[19]The variable is generated by reducing eight infrastructure measures into an aggregate index. Following (Raychaudhuri and Haldar, 2009) we use a weighted principal component analysis (PCA) to construct the index. See appendix section C.1 for more details.

[20]The data for both students and institutions account for school education (primary, secondary and high school), general college education, general university education, open university education, professional /technical education and all nonformal/special/vocational education.

[21]We construct *votesharediff* for the state assembly years 1996, 2001, 2008 and 2011. The value of *votesharediff* for a given election year is taken forward until the next election year.

Table 2: Descriptive Statistics - Baseline Specification

Variables	Obs	Mean	Overall	Between	Within	Min	Max
Total Riots	272	274.985	324.469	257.909	205.884	9	2154
Violent Crimes	272	993.471	1124.818	695.948	898.903	31	8058
Area Redistributed (acres)	221	58633.05	56815.38	58048.74	6490.739	0	283068.7
Total Beneficiaries	221	150802.3	170053.5	173696.7	19832.56	0	895935
Total Cultivators	34	257641	156316	157598.3	18711.5	5796	764520
Total Cultivators (Interpolation)	337	264536	158791.3	161273.3	27927.1	3949	916364
ldpc	221	0.203	0.136	0.136	0.032	0	0.548
pcld	221	0.388	0.214	0.216	0.038	0	0.842
Log Population	187	15.206	0.497	0.506	0.067	14.175	16.13
Police force per thousand population	169	0.828	1.234	1.323	0.093	0.245	6.266
Riots in Adjacent Districts	204	1049.164	887.177	754.543	498.597	31	4237
Violent Crime in Adjacent Districts	207	2596.063	2197.044	1422.664	1703.413	167	15795
Log Per Capita Income	187	9.153	0.282	0.23	0.172	8.645	10.287
Infrastructure Index	221	0.211	0.153	0.102	0.117	0	0.804
Students per Institute	186	173.228	64.805	49.072	44.913	89.217	420.012
votesharediff index	337	21.939	25.217	11.403	22.634	-13.22	56.996

Note: *pcld* refers to the per capita land redistributed.
ldpc refers to the per cultivator land redistributed.
Overall, Between and Within variation indicated in
columns 3,4 and 5. *votesharediff* is the difference between
the average Left vote share in a district and average TMC vote share in a district during state assembly election.
TMC is the primary opposition party between 1996-2011.

across districts - TR and VC, respectively. We observe a non linear evolution of TR. Specifically, TR increases initially from 1996-1998 after which TR sharply declines until 2002. It then remains stable at relatively low levels until it increases from 2006 before sharply increasing between 2007 and 2011. This suggests while the initial uptick in TR between 1996-1998 coincides with the rise of TMC as a political challenger, the sharp increase between 2006-2011 coincides with the Nandigram-Singur events where the Left attempted large scale PLRI which resulted in statewide contestation between the TMC and the Left. Unlike TR, VC shows a relatively stable increase between 1996-2011. However starting in 2007 and coinciding with Nandigram-Singur events, we observe a sharper rate of increase in VC until 2011.

Figure4 gives the yearly trend in *ldpc* and *pcld*. Unlike our violence measures,the broad and narrow measures of land redistribution remain relatively stable.[22]

We also check the distribution of our dependent variables. Figure 5 presents the kernel distribution of TR and VC. We clearly observe a skewed and over-dispersed distribution for both violence measures.[23]

[22]We also check the trend in agricultural land holdings for census years 1990, 1995, 2000 and 2005 obtained from ICRISAT (`http://data.icrisat.org/dld/`). Similar to *ldpc* and *pcld*, appendix figure C2 depicts relatively stable per capita agricultural land holdings classified as marginal, small or medium. Only large land holdings (> 10 hectares) shows an increasing trend.

[23]The fact that the overall variations in TR and VC is greater than their mean confirms the over-dispersion in violence (see table 2).

Figure 3: Yearly Trend in Violence Measures - Riots and Violent Crimes

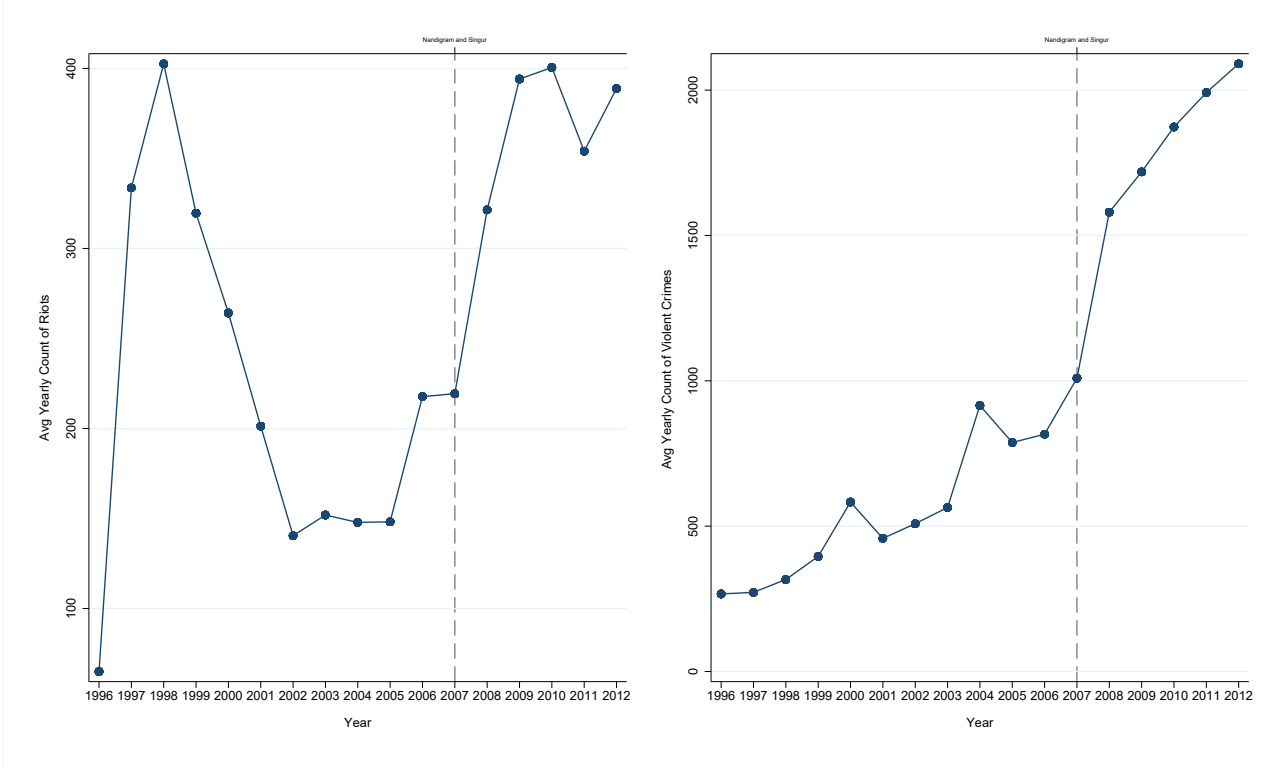


Figure 4: Yearly Trend in Land Redistribution per cultivator and per beneficiary in acres

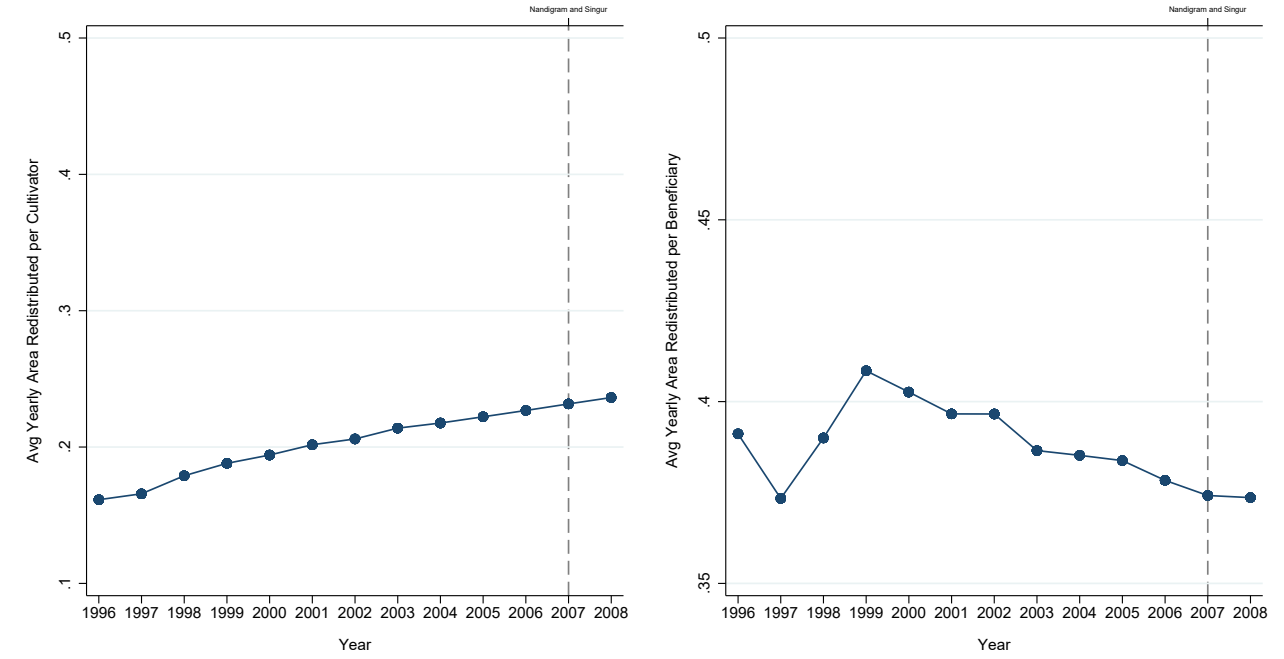
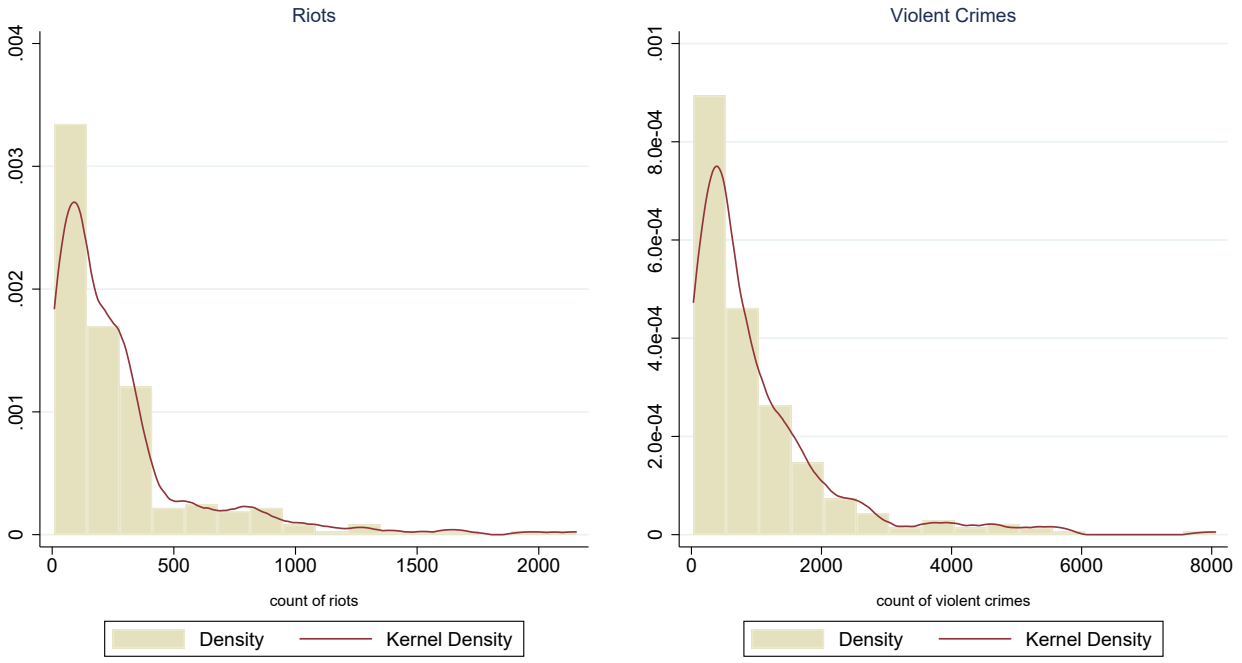


Figure 5: Distribution of Violence Measures



4.4 Baseline Specification

In order to to account for over-dispersion we employ pooled count models (conditional Poisson and negative binomial (NB2)) to estimate the following baseline specification:[24]

$$y_{dt} = \alpha_0 + \alpha_1 Z_{dt} + \beta X_{dt} + \delta_d + \gamma_t + \epsilon_{dt} \tag{11}$$

where, y_{dt} refers to TR or VC in district d and year t, δ_d refers to district specific effects, γ_t refers to the year dummies, ϵ_{dt} is the error term. Z represent either *ldpc* or *pcld* as the main independent variable which represents the broad per cultivator or narrow per beneficiary land redistribution. The vector X consist of the following control variables namely, a) log per capita income (or *lnpci*), b) police force per thousand population (*pol1000*), c) riots or violent crimes in adjacent districts (*adjriots* or *adjvc*), d) log population (or *lnpop*), f) students per institute (*students*), g) infrastructure index (*infraindex*), and i) state wide political opposition (*votesharediff*).

5 Main Results

Hypothesis 1: To assess the relationship between redistribution and violence, Table 3 presents the baseline effect of *ldpc* on violence variables (TR, VC). Columns (1) and (3) give the poisson estimates for TR and VC, respectively. Columns (2) and (4) give the negative binomial (NB2) estimates for TR and VC, respectively. We observe a significant negative effect of *ldpc* for both TR and VC. Given the exponential conditional mean in both poisson and NB2 models, the coefficients can be interpreted as a semielasticity(Cameron and

[24] See online appendix section C.2 for more details on the estimation strategy and interpretation.

Trivedi, 2005). Specifically, a unit increase in area redistributed per cultivator decreases TR by 939% - 1204% on average. Similarly, a unit increase in area redistributed per cultivator decreases VC by 767% - 950% on average.

We next estimate the effect of the narrow measure of redistribution, *pcld* on TR and VC in table 4. Similar to the broad measure we observe a significant negative effect on both TR and VC. However, the magnitude of these effects is smaller compared to *ldpc*. Specifically, a unit increase in area redistributed per beneficiary decreases TR by 457% - 503% on average for Poisson and NB2 models. Similarly, a unit increase in area redistributed per beneficiary decreases VC by 114% - 143% on average.

Table 3: Main Results (*ldpc*): Baseline Pooled Poisson and Negative Binomial (NB2)

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
ldpc	-9.39691***	-12.04534***	-9.50131***	-7.67182***
	(1.85732)	(2.34457)	(2.27448)	(2.16681)
lnpci	-1.00421	-0.30431	0.30416	-0.22019
	(0.73036)	(0.65421)	(0.51696)	(0.61200)
lnpop	-1.96731**	-1.42715	-0.35916	-1.49461*
	(0.85492)	(0.95095)	(0.87311)	(0.84495)
pol1000	0.99303***	0.42774	0.49775	0.17312
	(0.26872)	(0.26677)	(0.39773)	(0.31729)
adjriots	-0.00010	-0.00007		
	(0.00008)	(0.00007)		
adjvc			-0.00021***	-0.00019***
			(0.00005)	(0.00005)
infraindex	-0.24424	0.09374	-1.66096	-2.38652**
	(0.91228)	(0.86529)	(1.13566)	(1.19659)
students	0.00042	0.00028	-0.00267***	-0.00229***
	(0.00038)	(0.00063)	(0.00078)	(0.00077)
votesharediff	0.00231	0.00167	0.00624**	0.00853***
	(0.00278)	(0.00228)	(0.00288)	(0.00272)
Constant	42.72013**	29.38146	10.06302	31.24496*
	(18.65720)	(19.39872)	(17.06222)	(17.28976)
lnalpha		-2.47355***		-2.21318***
		(0.19921)		(0.19921)
N	152	152	152	152
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Robust Standard errors in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
ldpc refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Table 4: Main Results (*pcld*): Baseline Pooled Poisson and Negative Binomial (NB2)

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
pcld	-4.56830***	-5.03230***	-1.43313**	-1.14222*
	(1.39457)	(1.36328)	(0.72433)	(0.63973)
lnpci	-0.76082	0.58049	0.13203	0.16820
	(0.75187)	(0.67689)	(0.53647)	(0.59484)
lnpop	-1.49743*	-0.44467	-0.45356	-0.96647
	(0.88114)	(0.91372)	(0.91265)	(0.80414)
pol1000	1.35159***	0.58374**	0.86262*	0.30901
	(0.30644)	(0.29466)	(0.44548)	(0.26383)
adjriots	-0.00009	0.00001		
	(0.00008)	(0.00008)		
adjvc			-0.00019***	-0.00017***
			(0.00005)	(0.00004)
infraindex	-1.73113*	-1.60193*	-2.97842**	-3.30436***
	(0.99413)	(0.86441)	(1.28662)	(1.22846)
students	0.00057	0.00084	-0.00248***	-0.00154**
	(0.00052)	(0.00071)	(0.00076)	(0.00079)
votesharediff	0.00135	-0.00230	0.00487	0.00564**
	(0.00294)	(0.00250)	(0.00310)	(0.00285)
Constant	34.08458*	7.34835	11.92144	19.11426
	(19.08811)	(18.81300)	(17.79576)	(16.44066)
lnalpha		-2.38104***		-2.12600***
		(0.16733)		(0.15527)
N	152	152	152	152
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Robust Standard errors in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
pcld refers to per beneficiary redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Hypotheses 2 and 3: To assess the relationship between redistribution and violence during large-scale PLRI we construct an indicator variable (*lplridummy*) which takes the value 1 for years starting in 2006 and interact it with our land redistribution measures. This is because in 2006 the the Left attempted large-scale industrialization leading to violent events in Nandigram and Singur. [25] The indicator variable captures the effect of large-scale PLRI (hypothesis 2) and the interaction term captures the effect of land redistribution on violent conflict during and after attempts at large-scale PLRI.

Table 5 presents the estimates after including the interaction between *lplridummy* with *ldpc* for both TR and VC. The interaction term *ldpc*lplridummy* while showing a mostly negative impact on both TR and VC is not statistically significant. However we observe a significant positive effect of the indicator, *lplridummy* where once large-scale PLRI is attempted from 2006, TR increases by 79%-112% relative to years that do not witness such attempts. Similarly, once large-scale PLRI is attempted from 2006, VC increases by 89%-107% relative to prior years which did not witness such attempts. Further we observe significant negative effect of *ldpc* on both TR and VC with the magnitude of the effect similar to our baseline results.

Table 6 presents the estimates after including the interaction between *lplridummy* with

[25] See appendix section B for further details.

pcld for both TR and VC. Unlike the broader measure, we observe a significant negative impact of the interaction, *pcld*lplridummy* on TR while remaining statistically insignificant for VC. Specifically, a unit change in *pcld* during large-scale PLRI increases TR by 143%-199% on average relative to years prior to such attempts. Similar to the broad measure, the coefficient on the indicator, *lplridummy*, remains positive and statistically significant for TR and VC. Further we observe significant negative effect of *pcld* on both TR and VC with the magnitude of the effect similar to our baseline results.

Table 5: Main Results (*ldpc*): Pooled Poisson and Negative Binomial (NB2) with large scale PLRI

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
ldpc	-8.39589***	-11.22261***	-10.06769***	-7.15053***
	(2.59819)	(2.77792)	(2.64198)	(2.49877)
lnpci	-0.99824	-0.28579	0.29023	-0.19733
	(0.72823)	(0.65277)	(0.51891)	(0.60939)
lnpop	-2.19611**	-1.56805	-0.29966	-1.55464*
	(1.01809)	(0.98421)	(0.85501)	(0.83869)
pol1000	1.08878***	0.51070	0.45589	0.21996
	(0.33446)	(0.31150)	(0.40873)	(0.33151)
adjriots	-0.00010	-0.00007		
	(0.00008)	(0.00007)		
adjvc			-0.00021***	-0.00019***
			(0.00005)	(0.00005)
infraindex	-0.41464	-0.12381	-1.57304	-2.51924**
	(1.03957)	(0.97164)	(1.14072)	(1.21233)
students	0.00040	0.00028	-0.00269***	-0.00228***
	(0.00039)	(0.00063)	(0.00078)	(0.00077)
votesharediff	0.00269	0.00190	0.00615**	0.00860***
	(0.00270)	(0.00232)	(0.00289)	(0.00271)
*ldpc*lplridummy*	-0.82467	-0.74015	0.3795	-0.41266
	(1.34857)	(0.83891)	(0.46985)	(0.53378)
lplridummy	1.12653**	0.78831***	0.88617***	1.07202***
	(0.44150)	(0.29681)	(0.16387)	(0.20839)
Constant	45.80651**	31.11835	9.43370	31.81897*
	(20.57796)	(19.67926)	(16.81459)	(17.12976)
lnalpha		-2.48240***		-2.21539***
		(0.20368)		(0.16027)
N	152	152	152	152
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Robust Standard errors in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
ldpc refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
lplridummy is 1 for years starting in 2006 where WB witnessed attempts at largescale PLRI, 0 otherwise
*ldpc*lplridummy* refers to the interaction between *ldpc* and *lplridummy*.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Table 6: Main Results (*pcld*): Pooled Poisson and Negative Binomial (NB2) with large scale PLRI

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
pcld	-4.61980***	-5.16205***	-1.43373**	-1.17955*
	(1.45288)	(1.31986)	(0.72725)	(0.64384)
lnpci	-0.85492	0.31325	0.12315	0.09950
	(0.72471)	(0.66611)	(0.53563)	(0.60207)
lnpop	-1.71745**	-0.72171	-0.44825	-1.03695
	(0.81065)	(0.85541)	(0.91247)	(0.81037)
pol1000	1.50973***	0.84231***	0.86785**	0.38736
	(0.26924)	(0.29564)	(0.44214)	(0.28777)
adjriots	-0.00009	-0.00001		
	(0.00008)	(0.00008)		
adjvc			-0.00019***	-0.00018***
			(0.00004)	(0.00004)
infraindex	-1.91291**	-2.17775**	-2.98598**	-3.50746***
	(0.94885)	(0.88534)	(1.28264)	(1.26118)
students	0.00044	0.00075	-0.00247***	-0.00158**
	(0.00045)	(0.00067)	(0.00076)	(0.00080)
votesharediff	0.00264	-0.00115	0.00494	0.00579**
	(0.00275)	(0.00239)	(0.00314)	(0.00286)
*pcld*lplridummy*	-1.99734***	-1.42767***	-0.15395	-0.46998
	(0.65376)	(0.42988)	(0.35279)	(0.37241)
lplridummy	1.36771***	0.74209**	0.80905***	0.91635***
	(0.37370)	(0.29160)	(0.21445)	(0.25698)
Constant	38.18538**	13.89287	11.92265	20.80678
	(17.82687)	(17.91826)	(17.77981)	(16.61884)
lnalpha		-2.45867***		-2.13222***
		(0.16996)		(0.15754)
N	152	152	152	152
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Robust Standard errors in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
pcld refers to per beneficiary redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
lplridummy is 1 for years starting in 2006 where WB witnessed attempts at largescale PLRI, 0 otherwise
*pcld*lplridummy* refers to the interaction between *pcld* and *lplridummy*.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

6 Robustness Checks

In this section we conduct checks on our baseline results in order to ensure that inferences drawn on our hypothesis remain robust. The descriptive statistics for variables utilized in the robustness checks below is given in table 9

Omitted Variables: There may exist potential bias in our baseline estimates as a result of omitted variables. We consider two potential channels. First are shocks from climate variations. Specifically climate induced shocks at the district level could lead to changes in both *ldpc* and *pcld*. For example positive weather shocks could increase agricultural productivity leading to less land redistribution in a given year. Conversely, if there are negative weather shocks, then land redistribution in a given year might increase due to decline in productivity and incomes. In order to control for any bias induced from climate variations on the estimated impact of both *ldpc* and *pcld*, we additionally include the mean rainfall and mean maximum temperature for each district year pair. Second is the bias induced

from shocks to food price. For example positive price shocks could lead to a reduction in land redistribution while a negative shock could lead to an increase in land redistribution. In order to control for any price induced bias on the estimated impact of both *ldpc* and *pcld*, we additionally include the mean harvest price of rice per quintal for each district-year pair. We consider rice as it is the principal food crop of West Bengal. The data on district level prices obtained from ICRISAT is available as continuous series for the years 1996 to 2002 and 2006-2011.[26] We therefore employ linearly interpolated series of the mean harvest price of rice per quintal for the period of our analysis, 1996-2012. Note that the results discussed below does not change if we use the original price data with gaps.[27] Tables 7 and 8 give the pooled estimates for TR and VC, respectively after controlling for climate and price variables. Similar to our baseline results, we find significant negative effects of *ldpc* and *pcld* on TR and VC.

[26] `https://www.icrisat.org/`

[27] Results to be presented on request.

Table 7: Robust 1 (*ldpc*): Pooled Poisson and Negative Binomial (NB2) with Climate and Price Measures

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
ldpc	-4.30798*	-5.45950***	-7.83272***	-5.37049**
	(2.23927)	(1.69146)	(1.88317)	(2.15548)
lnpci	-0.85988	-0.52987	1.32561**	1.21452*
	(0.92830)	(0.83548)	(0.62894)	(0.67071)
lnpop	-1.51919	-1.02473	0.68581	0.27852
	(1.15643)	(1.22110)	(1.07555)	(1.04941)
pol1000	2.74292***	2.16946***	1.42020***	1.01688*
	(0.34829)	(0.39490)	(0.48752)	(0.55521)
adjriots	-0.00007	-0.00008		
	(0.00009)	(0.00007)		
adjvc			-0.00022***	-0.00021***
			(0.00004)	(0.00005)
infraindex	-0.89856	-0.07612	-2.79543**	-2.92508**
	(1.20259)	(1.12837)	(1.27359)	(1.39916)
students	0.00001	0.00004	-0.00297***	-0.00299***
	(0.00042)	(0.00055)	(0.00064)	(0.00074)
votesharediff	0.00035	0.00192	0.01115***	0.01160***
	(0.00289)	(0.00223)	(0.00224)	(0.00233)
avgrainfall	-0.00442**	-0.00481***	-0.00107	-0.00118
	(0.00183)	(0.00110)	(0.00115)	(0.00152)
avgtempannual	0.30196	0.18649	-0.46012	0.02936
	(0.44073)	(0.35772)	(0.44851)	(0.39937)
avgpriceperquintrice	-0.00014	-0.00005	-0.00329***	-0.00307***
	(0.00052)	(0.00043)	(0.00053)	(0.00043)
Constant	25.11609	18.64160	1.81644	-6.32012
	(27.45642)	(26.16734)	(25.84277)	(21.84271)
lnalpha		-2.85287***		-2.58728***
		(0.17025)		(0.22974)
N	120	120	120	120
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Robust Standard errors in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
ldpc refers to per cultivator redistribution .
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
avgrainfall refers to the mean rainfall in cm.
avgtempannual refers to the mean maximum temperature in celsius.
avgpriceperquintrice is mean harvest price of rice per quintal.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Table 8: Robust 1 (*pcld*): Pooled Poisson and Negative Binomial (NB2) with Climate and Price Measures

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
pcld	-2.67178***	-2.85906***	-2.22610***	-1.41735**
	(1.02315)	(0.44309)	(0.77028)	(0.66530)
lnpci	-0.87011	-0.17819	1.08906	1.46476**
	(0.90829)	(0.78245)	(0.67163)	(0.63001)
lnpop	-1.57648	-0.94584	0.35872	0.35688
	(1.14483)	(1.15874)	(1.18066)	(1.06092)
pol1000	2.98015***	2.57375***	1.84661***	1.35938**
	(0.31169)	(0.38791)	(0.49185)	(0.53585)
adjriots	-0.00006	-0.00002		
	(0.00009)	(0.00007)		
adjvc			-0.00021***	-0.00022***
			(0.00004)	(0.00005)
infraindex	-1.89086*	-1.79698*	-4.28793***	-4.30679***
	(1.06482)	(0.97372)	(1.37356)	(1.35612)
students	-0.00010	-0.00002	-0.00324***	-0.00278***
	(0.00044)	(0.00054)	(0.00067)	(0.00073)
votesharediff	0.00043	0.00084	0.01101***	0.01015***
	(0.00298)	(0.00209)	(0.00236)	(0.00236)
avgrainfall	-0.00564***	-0.00546***	-0.00191	-0.00195
	(0.00180)	(0.00103)	(0.00118)	(0.00123)
avgtempannual	0.37878	0.18657	-0.28655	0.08935
	(0.45273)	(0.35259)	(0.44323)	(0.36880)
avgpriceperquintrice	-0.00012	-0.00036	-0.00365***	-0.00322***
	(0.00052)	(0.00042)	(0.00058)	(0.00044)
Constant	24.49021	15.28191	3.75079	-11.44185
	(28.32806)	(24.77641)	(27.74612)	(22.18191)
lnalpha		-2.86999***		-2.54960***
		(0.17282)		(0.22277)
N	120	120	120	120
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Robust Standard errors in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
pcld refers to per beneficiary redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
avgrainfall refers to the mean rainfall in cm.
avgtempannual refers to the mean maximum temperature in celsius.
avgpriceperquintrice is mean harvest price of rice per quintal.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Table 9: Descriptive Statistics - Robustness Checks

Variables	Obs	Mean	Overall	Between	Within	Min	Max
GL index	221	2.086	0.838	0.72	0.46	0	3.825
prop of Left seats	211	0.449	0.196	0.178	0.086	0	1
prop of TMC seats	211	0.106	0.119	0.078	0.093	0	0.404
prop of INC seats	211	0.306	0.188	0.155	0.12	0	0.72
prop of BJP seats	211	0.023	0.038	0.035	0.016	0	0.19
prop of independent seats	211	0.116	0.196	0.188	0.06	0	1
Average Rainfall (cm)	231	145.731	52.73	42.838	31.545	70.517	348.51
Average Max Temperature (celsius)	320	31.075	1.593	1.572	0.462	24.592	33.143
Average Price per quintal of Rice (INR)	194	1202.259	433.0589	46.237	430.746	623	2261
Average Price per quintal Rice (Interpolation)	300	1370.207	632.966	101.139	625.353	623	3666

GL index refers to Golosov's Fractionalization Index
Overall, Between and Within variation indicated in
in columns 3,4 and 5. The prop of Left, TMC, INC, BJP and independent
seats refer to the proportion of seats won by the Left, TMC, INC, BJP
and Independents in municipal elections held from 1996-2008.

Linear Trend and Clustering of Standard Errors: We re-estimate our baseline results after including a linear time trend and clustering our standarad errors at the district level. Similar to our baseline results, tables 10 and 11 show the estimated coefficients for *ldpc* and *pcld*, respectively remain negative and statistically significant for both TR and VC.

Table 10: Robust 2 (*ldpc*): Pooled Poisson and Negative Binomial (NB2) with time trend and clustered errors

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
ldpc	-9.39691***	-12.04534***	-9.50131***	-7.67182**
	(1.75349)	(2.48974)	(3.13746)	(3.83369)
lnpci	-1.00421	-0.30431	0.30416	-0.22019
	(0.68415)	(0.61817)	(0.44849)	(0.48094)
lnpop	-1.96731***	-1.42715	-0.35916	-1.49461*
	(0.70810)	(0.99120)	(0.76422)	(0.80138)
pol1000	0.99303**	0.42774	0.49775	0.17312
	(0.45689)	(0.40938)	(0.31696)	(0.33179)
adjriots	-0.00010	-0.00007		
	(0.00011)	(0.00009)		
adjvc			-0.00021***	-0.00019***
			(0.00004)	(0.00006)
infraindex	-0.24424	0.09374	-1.66096	-2.38652*
	(0.94356)	(1.07983)	(1.18521)	(1.44081)
students	0.00042	0.00028	-0.00267***	-0.00229***
	(0.00055)	(0.00091)	(0.00069)	(0.00089)
votesharediff	0.00231	0.00167	0.00624**	0.00853**
	(0.00243)	(0.00235)	(0.00301)	(0.00336)
trend	0.24631***	0.15991***	0.23916***	0.24609***
	(0.08981)	(0.05999)	(0.03654)	(0.05104)
Constant	-450.38325***	-290.75548***	-468.73152***	-461.43280***
	(170.08801)	(109.02697)	(68.33392)	(98.03575)
lnalpha		-2.47355***		-2.21318***
		(0.29301)		(0.19835)
N	152	152	152	152
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Clustered Standard errors at the district level in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
ldpc refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
trend refers to linear time trend
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Table 11: Robust 2 (*pcld*): Pooled Poisson and Negative Binomial (NB2) with time trend and clustered errors

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
pcld	-4.56830***	-5.03230***	-1.43313	-1.14222**
	(1.02868)	(0.34823)	(0.97137)	(0.48414)
lnpci	-0.76082	0.58049	0.13203	0.16820
	(0.80376)	(0.83381)	(0.43723)	(0.52209)
lnpop	-1.49743*	-0.44467	-0.45356	-0.96647
	(0.83476)	(1.09167)	(0.77271)	(0.75282)
pol1000	1.35159**	0.58374	0.86262**	0.30901
	(0.60482)	(0.63602)	(0.35416)	(0.23449)
adjriots	-0.00009	0.00001		
	(0.00012)	(0.00010)		
adjvc			-0.00019***	-0.00017***
			(0.00005)	(0.00006)
infraindex	-1.73113*	-1.60193*	-2.97842**	-3.30436**
	(1.01713)	(0.85398)	(1.42716)	(1.61557)
students	0.00057	0.00084	-0.00248***	-0.00154
	(0.00066)	(0.00103)	(0.00075)	(0.00118)
votesharediff	0.00135	-0.00230	0.00487	0.00564
	(0.00352)	(0.00357)	(0.00345)	(0.00409)
trend	0.18992**	0.03912	0.18797***	0.17858***
	(0.09524)	(0.07148)	(0.03396)	(0.05510)
Constant	-346.13867*	-70.96671	-364.38671***	-338.40696***
	(176.95736)	(127.18083)	(64.44080)	(109.45100)
lnalpha		-2.38104***		-2.12600***
		(0.24778)		(0.20643)
N	152	152	152	152
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Clustered Standard errors at the district level in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes.
pcld refers to per beneficiary redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.
trend refers to linear time trend
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Large scale PLRI and Political Competition in Local Elections: The results in tables 5 and 6 on the interaction effects between land redistribution measures and large scale PLRI on violence is conditional on the difference in vote share between the Left and the principal oppostion, TMC during state wide elections. We check the robustness of these results after including a more local measure of political fractionalization or effective number of parties as a proxy for competition in each district (Golosov index or *GL*). We measure Golosov index or *GL* at the district level after aggregating seat shares won by a party for each local ward during municipal elections between 1996 and 2008. Unlike in state assembly elections where all districts participate in a given year, municipal elections occur in different years. This variation in the timing of elections for each district allows us to better capture changes in political competition to the Left during large scale PLRI.[28] When including *GL*, we also control for the corresponding proportion of seats won by the Left (*prop Left*) Trinamool Congress (TMC) (*prop TMC*), Congress (INC) (*prop INC*), Bhartiya Janta Party (BJP) (*prop BJP*) and independents (*prop ind*). This avoids any bias in the *GL* estimates. *GL* controls for any correlation between political competition and violence.

[28]See appendix section C.1 for details on the construction of the fractionalization index.

Tables 12 and tables 13 presents the results for the broad (*ldpc*) and narrow (*pcld*) measure, respectively after controlling for local political competition instead of state wide political opposition. For our broad measure, the indicator for large scale PLRI (*lplridummy*) has a positive and significant effect on TR and VC. The interaction term *ldpc*lplridummy* is not statistically significant. Table 13 show results for the narrow measure *pcld*. The interaction term *pcld*lplridummy* has a negative and a significant effect on TR, while the indicator variable has a positive and significant effect on both TR and VC. Hence replacing the measure of political opposition using state election data with local political competition in municipalities do not change our main results in5 and 6.

Table 12: Robust 3 (*ldpc*): Pooled Poisson and Negative Binomial (NB2) with local political competition and large scale PLRI

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
ldpc	-8.02776***	-7.52229***	-11.90369***	-8.19459***
	(2.60834)	(2.10702)	(3.10913)	(2.96559)
lnpci	-0.99891	-0.39283	0.42133	-0.06789
	(0.69185)	(0.62401)	(0.62702)	(0.62503)
lnpop	-2.08381**	-1.77185*	0.05874	-1.13208
	(0.97018)	(0.93509)	(1.00534)	(0.90109)
pol1000	1.09848***	0.62118**	0.44547	-0.08671
	(0.34194)	(0.27955)	(0.44557)	(0.35520)
adjriots	-0.00011	-0.00007		
	(0.00008)	(0.00006)		
adjvc			-0.00024***	-0.00026***
			(0.00005)	(0.00005)
infraindex	-0.07569	-0.73553	-0.99687	-1.95008
	(1.04789)	(0.87671)	(1.19126)	(1.36948)
students	0.00010	-0.00007	-0.00195***	-0.00203***
	(0.00037)	(0.00057)	(0.00074)	(0.00071)
prop Left	-0.00015	-0.03561	0.47332	1.08221**
	(0.65075)	(0.45965)	(0.62317)	(0.45693)
prop TMC	-1.44624**	-1.18174**	1.23170	1.09425
	(0.68825)	(0.57235)	(0.97674)	(0.86610)
prop INC	-0.86633	-0.75731	-0.05022	0.04562
	(0.73698)	(0.50686)	(0.76217)	(0.64793)
prop BJP	-1.30946	-0.90427	1.52469	4.72501*
	(2.01525)	(1.53146)	(3.00266)	(2.60183)
GL	-0.01782	-0.01971	-0.06984	-0.12162
	(0.07833)	(0.07093)	(0.12126)	(0.10252)
*ldpc*lplridummy*	-0.69327	-0.94542	0.70684	0.40038
	(1.29208)	(0.71871)	(0.50203)	(0.51098)
lplridummy	0.95491**	0.68134**	0.90073***	0.90692***
	(0.40809)	(0.27667)	(0.20896)	(0.21538)
Constant	44.59514**	34.92925*	3.13226	24.52343
	(19.52872)	(18.85029)	(20.34709)	(18.23119)
lnalpha		-2.81345***		-2.31475***
		(0.14545)		(0.16945)
N	144	144	144	144
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Cluster Robust Standard errors at the district level in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes. *pcld* refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
Variables prop Left, prop TMC, prop BJP, prop INC are the proportion of municipal seats won by Left, TMC, BJP, INC, respectively.
The proportion of seats won by independents (*prop ind*) is the reference category and hence dropped. *GL* refers to the Golosov's fractionalization index.
lplridummy is 1 for years starting in 2006 where WB witnessed attempts at largescale PLRI, 0 otherwise
*ldpc*lplridummy* refers to the interaction between *ldpc* and *lplridummy*.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Table 13: Robust 3 (*pcld*): Pooled Poisson and Negative Binomial (NB2) with local political competition and large scale PLRI

Outcome Variable :	TR	TR	VC	VC
	(1)	(2)	(3)	(4)
Model	Poisson	NB2	Poisson	NB2
pcld	-2.37222	-0.89015	-18.02273**	-11.44796*
	(5.45697)	(5.28143)	(7.60401)	(6.59468)
lnpci	-0.97202	-0.15956	0.70675	0.41532
	(0.69709)	(0.61331)	(0.58259)	(0.56840)
lnpop	-1.70571**	-1.13570	0.32337	-0.52530
	(0.80482)	(0.85425)	(1.00477)	(0.89221)
pol1000	1.54186***	0.90891***	0.83652*	0.15256
	(0.27142)	(0.27454)	(0.43952)	(0.29868)
adjriots	-0.00012	-0.00008		(0.00007)
	(0.00009)	(0.00007)		
adjvc			-0.00021***	-0.00022***
			(0.00005)	(0.00004)
infraindex	-1.30376	-1.71761**	-2.56429*	-2.75187**
	(0.99624)	(0.81673)	(1.31417)	(1.26829)
students	0.00023	0.00002	-0.00161**	-0.00165**
	(0.00044)	(0.00068)	(0.00071)	(0.00067)
prop Left	0.28518	0.73718*	1.20326*	1.83938***
	(0.63677)	(0.41480)	(0.69087)	(0.35360)
prop TMC	-0.46717	-0.03788	2.58163***	2.27100***
	(0.71188)	(0.61079)	(1.00180)	(0.78180)
prop INC	-0.09709	0.07271	1.12428	0.89022
	(0.76190)	(0.54502)	(0.80371)	(0.67647)
prop BJP	-0.44859	0.29394	2.49238	6.17148**
	(2.22773)	(1.55365)	(3.06547)	(2.57636)
GL	-0.06882	-0.05583	-0.09648	-0.14537
	(0.08467)	(0.07338)	(0.11608)	(0.10184)
*pcld*lplridummy*	-1.81902***	-1.29064***	-0.08008	-0.11449
	(0.62201)	(0.39411)	(0.35860)	(0.33873)
lplridummy	1.25848***	0.75991***	0.82884***	0.77776***
	(0.35265)	(0.27803)	(0.25528)	(0.25459)
Constant	37.98475**	21.71551	2.41081	14.51387
	(17.25318)	(17.28997)	(20.13162)	(17.20446)
lnalpha		-2.71561***		-2.27536***
		(0.13730)		(0.17137)
N				
District Dummies	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes

Note: Cluster Robust Standard errors at the district level in parenthesis.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
TR refers to riots and VC refers to Violent Crimes. *pcld* refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
Variables prop Left, prop TMC, prop BJP, prop INC are the proportion of municipal seats won by Left, TMC, BJP, INC, respectively.
The proportion of seats won by independents (*prop ind*) is the reference category and hence dropped. *GL* refers to the Golosov's fractionalization index.
lplridummy is 1 for years starting in 2006 where WB witnessed attempts at largescale PLRI, 0 otherwise
*pcld*lplridummy* refers to the interaction between *pcld* and *lplridummy*.
lnalpha gives the log-transformed over-dispersion parameter estimated for NB2 model

Quantile Estimations: We measure violence both at the individual and group level utilizing data on all violent crimes and riots, respectively. Therefore our violence measures while including those incidents related to land redistribution is also likely to capture incidents of violent conflict from reasons unrelated to land redistribution. Hence there may exist unobserved heterogeneity driving the baseline relationship between land redistribution and violence along the violence distribution. We therefore employ quantile regressions to check if our baseline results in tables 3 and 4 hold for 9 deciles of TR and Vc. Tables 14 and 15 give baseline results for *ldpc* and *pcld*, respectively for 9 deciles of TR. While we

observe a negative effect of *ldpc* on TR across all deciles it is relatively more significant for higher deciles of TR (5th decile and above). We observe significant negative effect of *pcld* for both lower and upper deciles of TR. Tables 16 and 17 give baseline results for *ldpc* and *pcld*, respectively for 9 deciles of VC. We observe a significant negative effect of *ldpc* on VC for both lower and upper deciles of VC. We observe similar results for *pcld* with significant effects observed for both lower and higher deciles of VC.

The quantile estimates taken together suggests a significant negative effect of both measures of land redistribution across lower and higher levels of TR and VC. Hence our baseline results in tables 3 and 4 are robust to unobserved heterogeneity in TR and VC.

Table 14: Robust 4: Quantile Results (*ldpc*) - Riots

Outcome Variable :	TR	TR	TR	TR	TR	TR	TR	TR	TR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
α **quantile:**	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
ldpc	-4.162**	-4.969	-6.865	-8.748	-11.454*	-11.819**	-11.296***	-9.996***	-13.627***
	(1.639)	(9.093)	(11.059)	(10.060)	(6.180)	(5.532)	(1.488)	(2.925)	(0.768)
lnpci	-0.528	0.032	-0.113	-0.396	0.079	0.231	-0.708	-0.978	0.596*
	(0.654)	(2.642)	(1.155)	(3.623)	(4.542)	(1.035)	(0.709)	(0.797)	(0.314)
lnpop	-1.275	-0.764	-0.614	-2.247	-1.741	-1.644	-2.252***	-2.629**	-0.913**
	(1.348)	(5.224)	(27.356)	(3.116)	(3.924)	(2.443)	(0.761)	(1.299)	(0.432)
pol1000	-0.006	-0.146	0.154	0.282	0.357	0.256	0.262	0.382	-0.356*
	(1.094)	(3.236)	(2.256)	(0.572)	(0.786)	(0.418)	(0.181)	(0.435)	(0.185)
adjriots	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
infraindex	1.031	0.818	0.084	-0.854	-1.744	-1.818	-1.189	-1.566	-1.570***
	(10.067)	(5.273)	(4.785)	(3.762)	(4.140)	(4.904)	(0.941)	(2.722)	(0.214)
students	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	0.000
	(0.008)	(0.010)	(0.004)	(0.002)	(0.002)	(0.003)	(0.000)	(0.001)	(0.000)
votesharediff	-0.005*	-0.005	0.001	0.000	0.002	0.003	0.001	-0.000	0.000
	(0.003)	(0.011)	(0.015)	(0.006)	(0.016)	(0.012)	(0.003)	(0.008)	(0.001)
Constant	27.138	15.030	14.596	41.951	31.127	28.396	45.624***	53.487**	15.508*
	(22.863)	(68.932)	(405.160)	(78.457)	(96.867)	(42.985)	(17.086)	(24.951)	(8.958)
$\widehat{Q_z}$	89.49	97.003	110	120	130	140	150	170	200
	(0.456)	(25.16)	(31.754)	(5.837)	(18.987)	(4.893)	(3.546)	(7.762)	(0.316)
N	152	152	152	152	152	152	152	152	152
District Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The quantile estimates is an average of a 1000 jittered samples
after smoothing the dependent variable.
Standard errors at the district level in parenthesis.
$\widehat{Q_z}$ refers to predicted quantile of the dependent variable.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
Riots (*TR*). *ldpc* refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.

Table 15: Robust 4: Quantile Results (*pcld*) - Riots

Outcome Variable :	TR	TR	TR	TR	TR	TR	TR	TR	TR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
α **quantile:**	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
pcld	-2.157***	-2.561***	-2.346	-2.985*	-3.177	-3.940*	-3.908***	-3.889***	-9.667***
	(0.562)	(0.902)	(2.113)	(1.790)	(16.332)	(2.064)	(0.403)	(1.337)	(0.277)
lnpci	0.125	0.439	0.463	1.106	1.028	0.811	1.109	0.552	0.377
	(0.472)	(1.611)	(2.064)	(2.660)	(3.021)	(4.345)	(0.854)	(4.939)	(0.375)
lnpop	-1.006	-0.669	-1.112	-0.434	-0.121	-0.296	0.430	-0.182	-2.502***
	(0.800)	(10.832)	(2.289)	(3.016)	(4.726)	(27.783)	(2.214)	(4.487)	(0.304)
pol1000	0.087	0.121	0.191	0.233	0.239	0.246	0.217	0.138	0.012
	(0.170)	(0.986)	(1.478)	(0.779)	(8.775)	(1.166)	(1.359)	(1.062)	(0.047)
adjriots	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
infraindex	1.512	0.353	-0.384	-1.593	-1.776	-1.676	-2.227	-2.181	-3.311***
	(1.236)	(2.716)	(7.048)	(3.085)	(24.641)	(4.905)	(5.665)	(4.966)	(0.305)
students	-0.002*	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.000
	(0.001)	(0.003)	(0.004)	(0.005)	(0.032)	(0.007)	(0.001)	(0.003)	(0.000)
votesharediff	-0.004**	-0.004	-0.004	-0.002	-0.002	-0.003	-0.004	-0.002	-0.003***
	(0.002)	(0.036)	(0.020)	(0.016)	(0.090)	(0.021)	(0.020)	(0.010)	(0.001)
Constant	17.567*	10.276	16.702	1.714	-2.081	2.860	-10.333	3.799	43.150***
	(10.455)	(172.573)	(47.030)	(66.521)	(100.948)	(442.116)	(37.014)	(108.823)	(7.000)
$\widehat{Q_z}$	88.947	98.289	110	120	130	140	150	170	200
	(0.391)	(9.707)	(15.036)	(14.415)	(37.885)	(102.134)	(28.7)	(13.728)	(0.243)
N	152	152	152	152	152	152	152	152	152
District Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The quantile estimates is an average of a 1000 jittered samples
after smoothing the dependent variable.
Standard errors at the district level in parenthesis.
$\widehat{Q_z}$ refers to predicted quantile of the dependent variable.
* , **, *** indicate significance at 10, 5 and 1 % significance levels
Riots (*TR*). *pcld* refers to per beneficiary redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjriots refers to riots in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.

Table 16: Robust 4: Quantile Results (*ldpc*) - Violent Crimes

Outcome Variable :	VC	VC	VC	VC	VC	VC	VC	VC	VC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
α **quantile:**	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
ldpc	-6.394***	-6.206***	-6.658***	-6.561	-6.616	-7.606	-8.577	-12.668***	-11.244***
	(0.132)	(0.571)	(0.706)	(6.440)	(9.793)	(16.124)	(8.551)	(0.482)	(0.248)
lnpci	2.072***	1.289	-0.079	0.039	0.214	-0.332	-0.650	0.322***	-0.304***
	(0.161)	(0.916)	(0.938)	(1.589)	(2.011)	(1.023)	(2.204)	(0.060)	(0.048)
lnpop	0.601***	-0.341	-1.538	-1.654	-1.416	-1.500	-1.592	0.522***	-0.201***
	(0.157)	(0.923)	(1.017)	(2.442)	(1.503)	(1.620)	(1.885)	(0.092)	(0.045)
pol1000	0.064***	0.021	0.529	0.399	0.414*	0.823	0.884	-0.407***	-0.173***
	(0.020)	(0.047)	(0.655)	(0.492)	(0.217)	(1.297)	(0.718)	(0.068)	(0.030)
adjvc	-0.000***	-0.000***	-0.000	-0.000***	-0.000***	-0.000	-0.000**	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
infraindex	-3.837***	-3.325***	-3.033***	-3.622*	-3.503***	-2.572*	-2.070	0.851***	0.201
	(0.121)	(0.666)	(0.729)	(2.044)	(0.810)	(1.364)	(2.498)	(0.195)	(0.143)
students	-0.004***	-0.003*	-0.003	-0.003***	-0.002	-0.001	0.000	-0.000	-0.000*
	(0.000)	(0.002)	(0.012)	(0.001)	(0.001)	(0.008)	(0.001)	(0.000)	(0.000)
votesharediff	-0.000	0.003	0.012	0.012	0.010***	0.011**	0.011	0.011***	0.008***
	(0.001)	(0.004)	(0.062)	(0.008)	(0.003)	(0.005)	(0.008)	(0.001)	(0.000)
Constant	-19.852***	0.630	29.915	31.103	26.122	31.952	36.057	-2.933	13.636***
	(3.737)	(21.660)	(23.286)	(49.581)	(37.628)	(34.339)	(42.522)	(1.792)	(1.019)
$\widehat{Q_z}$	250	310	360	390	420	460	500	580	660
	(0.264)	(1.758)	(47.381)	(12.216)	(13.09	(23.605)	(30.45)	(1.336)	(0.201)
N	152	152	152	152	152	152	152	152	152
District Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The quantile estimates is an average of a 1000 jittered samples
after smoothing the dependent variable.
Standard errors at the district level in parenthesis.
$\widehat{Q_z}$ refers to predicted quantile of the dependent variable.
*, **, *** indicate significance at 10, 5 and 1 % significance levels
Violent Crimes(*VC*). *ldpc* refers to per cultivator redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.

Table 17: Robust 4: Quantile Results (*pcld*) - Violent Crimes

Outcome Variable :	VC	VC	VC	VC	VC	VC	VC	VC	VC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
α **quantile:**	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
pcld	1.439	-1.121***	-0.905***	-0.685	-0.658	-1.190***	-1.165***	-1.321***	-2.095***
	(3.145)	(0.057)	(0.130)	(0.431)	(1.369)	(0.230)	(0.181)	(0.057)	(0.319)
lnpci	1.908	0.698***	-0.188	0.156	-0.553	-0.373	-0.336**	-0.532***	0.059
	(12.336)	(0.235)	(0.384)	(0.543)	(0.839)	(0.247)	(0.160)	(0.045)	(0.322)
lnpop	0.593	-0.874***	-2.184***	-1.485**	-1.868	-0.488	-0.541	-0.847***	0.035
	(16.799)	(0.303)	(0.385)	(0.635)	(1.424)	(0.872)	(0.356)	(0.028)	(0.366)
pol1000	0.347	0.194***	0.126	0.268***	0.375**	0.833***	0.896***	0.696***	0.630***
	(9.966)	(0.062)	(0.114)	(0.052)	(0.179)	(0.242)	(0.068)	(0.015)	(0.116)
adjvc	-0.000	-0.000***	-0.000***	-0.000***	-0.000*	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
infraindex	-3.260	-3.355***	-3.910***	-3.606***	-3.159*	-1.633	-2.142***	-3.739***	-3.378***
	(18.566)	(0.299)	(0.483)	(0.241)	(1.887)	(1.905)	(0.490)	(0.142)	(0.054)
students	-0.004	-0.002***	-0.004***	-0.001	-0.002	-0.001	-0.001	-0.001***	-0.001***
	(0.010)	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)
votesharediff	0.000	0.007***	0.007***	0.004***	0.005**	0.005***	0.009***	0.003***	0.004***
	(0.027)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)
Constant	-20.710	12.546*	40.138***	26.502*	38.370	16.059	16.853**	23.994***	6.064
	(361.693)	(6.517)	(9.087)	(14.191)	(28.054)	(15.299)	(6.756)	(0.669)	(8.141)
$\widehat{Q_z}$	250	320	350	390	420	460	500	600	660
	(0.733)	(1.096)	(1.759)	(2.976)	(6.861)	(1.78)	(1.871)	(0.413)	(0.221)
N	152	152	152	152	152	152	152	152	152
District Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The quantile estimates is an average of a 1000 jittered samples
after smoothing the dependent variable.
Standard errors at the district level in parenthesis.
$\widehat{Q_z}$ refers to predicted quantile of the dependent variable.
*, **, *** indicate significance at 10, 5 and 1 % significance levels
Violent Crimes(*VC*). *pcld* refers to per beneficiary redistribution.
lnpci refers log per capita income. *lnpop* refers to log population.
pol1000 refers to police personal per thousand population.
adjvc refers to violent crimes in neighboring districts with shared borders.
infraindex refers to infrastructure index.
students refers to the number of students per institute.
votesharediff gives the measure of statewide political opposition.

7 Inferences and Discussion

The theoretical model and the empirical verification of the hypotheses that emanate from it are an exposition of the tradeoff between redistribution and different types of violence in the context of PLRI. As this tradeoff is influenced by the policy choices made by the incumbent and to a limited, but critical extent by the cadre, the investigation is carried out in the specific context of West Bengal. Therefore the direct evidence-based inferences that we can draw about the proposed hypotheses are limited to the specific case of West Bengal. However, some of these inferences can be generalized to prepare the ground work for further investigations into the dynamics of PLRI in other contexts and geographies.

The evidence for hypotheses 1 and 2 holds across all empirical tests and is robust to changes in control variables and estimation techniques.

The most general - Hypothesis 1: The theoretical model brings out how decreasing returns of agricultural surplus sharpens the trade-offs for the incumbent to retain power. The notion that the incumbent gains votes, if farmers utility is above a subsistence level or below zero, generates the impetus to generate violence, especially as the surplus from agriculture decreases over time. With violence, the incumbent can guarantee votes from the lowest type of farmers. Hypothesis 1 is driven by the model result that lack of surplus to redistribute requires the imposition of violence to ensure support for the incumbent. The resulting idea of handouts and violence being substitutes is likely to hold in many different contexts where PLRI may have been attempted. The choice of type of violence to deploy and its extent might vary on the source of cadre income, but the negative relationship between the two is likely to hold. It is however possible that the direction of causality proposed for the case of Bengal may not hold elsewhere.

The slightly less general - Hypothesis 2: The theoretical model relies on Ricardian rent-seeking to explain the unraveling of the incumbent's hold over power when attempting large-scale PLRI. The loss of support from high-type farmers, who if their land was not acquired, are likely to have supported the incumbent, leads to an increase in both types of violence. The cadre leave as it expects the incumbent to lose power (in addition to being unable to expropriate direclty from large scale industry - the new source of surplus) and can form the locus of an opposition along with disgruntled (resource-rich) farmers. This coalition engage in individual level violent crime, while the state use group violence to supplement its redistribution efforts (and possibly also in response to individual violence).

Hypothesis 3: This is essentially a test of the proposed mechanism of the incumbent losing control over cadre and therefore over the extent of violent crimes, but not over the ability to impose group-level violence (riots). The evidence for this seems to be mixed as it does not hold for the broader measure of redistribution (*ldpc*), but it does hold for the narrower measure (*pcld*) of redistribution. On closer inspection, this is what we should expect. The broader measure of redistribution by construction cannot account for redistribution to specific types, but losing control over the cadre is driven by the loss of support from higher-type farmers. This possible type specificity of redistribution should imply that the narrower measure (*pcld*) of redistribution is a better fit to assess this hypothesis. With this measure, the empirical results are consistent with the hypothesis. However, this hypothesis does not account for the possibility of interactions between the two types of violence and therefore may not reflect the complexities of violent conflict in other cases.

Re-assessing land reforms: The results of this paper highlight the tradeoff between violence and land redistribution during PLRI induced by a key principle of evenly implemented land reforms – all farmers should have (roughly) equal land. But as all land is

not equally productive, and all farmers are not equally motivated or capable of extracting surplus from land, redistribution over long periods may trigger other types of inequality, including a more rapid decline in agricultural surplus. In the case of PLRI, these inequalities across farmers create a choice – stick to the principle that all farmer (or land) type are the same and risk ignoring which type is likely to support the incumbent or find the less productive farmers who need more benefits and undermine the principle of equality of access that underpins successful land reforms. Large amounts of land taken from low-type farmers would be ideal for the incumbent, but then why were low-type farmers expected to make a living from land redistributed to them in the first place?

This question also finds indirect expression in the work of Ghatak and Mookherjee (2024) where they find that markets in which *security* ("security provided by access to cultivable land against uncertain costs of food subsistence requirements") of land is the primary determinant of value, have allocation biases in favor of low ability poor farmers. We further this argument to show that this problem arising from the premise of land reforms continues to have an effect on post-land-reform efforts to industrialize. Attempts at correcting this misallocation by transferring land from agriculture to industry during PLRI generates violence that stems from the previous mis-allocation during land reforms. This presents a complementary view of the role of the state to the one explored in works that show that secure land rights can improve outcomes **?**. Here the misallocation of land rights in the reform process can lead to poor outcomes both before, during and after attempts at PLRI.

How large should be the large-scale PLRI: Proposition 3 of the theoretical model also points at an intriguing possibility for an incumbent attempting large-scale industrialization. The result shows that if a large enough amount of land is acquired from farmers (likely to be happen under large scale PLRI), then cadre switching is unlikely as they would be able to collect sufficient rent to ensure they are not any worse off with large scale industrial players. This proposal contradicts the commonly accepted principle of *piloting* idea before increasing scale and scope. But our results suggest that in the case of PLRI, if an incumbent is to retain power and avoid an increase in both types of violence, then it is better to acquire large amounts of land in the first go.

8 Conclusion

The paper examines the relationship between land redistribution and violence in a post-land-reform setting. We show that a political incumbent in an agrarian economy cannot be in power by banking on even redistribution of benefits after land reforms when agricultural surplus decreases over time. The incumbent therefore creates avenues of alternate surplus generation through industrialization. However contrary to the expected benefits, attempts at redistribution of land away from farmers towards industry during PLRI can generate violence of different types. This suggests a tradeoff between violence and redistributive benefits as incumbent attempts PLRI. In other words violence and redistributive benefits become substitutes.

We argue that while individual violence is a result of an incumbent applying coercive violence through decentralized governance, group violence is an outcome of organizational splits in the decentralized governance allowing for rural mobilization by new political challengers. We derive multiple hypothesis and test the expected relationship between redistributive benefits (land redistributed) and violence after PLRI was announced in West Bengal. The key findings are the following. First, there is negative relationship between land

redistribution and (individual and group) violence during PLRI. Second, attempts at large scale PLRI increases both individual and group violence. Third, during attempts at large scale PLRI, land redistribution remains a substitute for group violence but not for individual level violence. This we argue is a result of cadre switching away from incumbent strengthening opposition if attempts at large scale PLRI do not succeed.

The study attempts to fill an existing gap within the literature where limited attention has been paid as to why violent conflict over land persists after land reforms have been evenly implemented as a policy prescription to reduce land inequality and enhance economic output. While our theoretical framework attempts to characterize the nature and persistence of violent conflict leading to limited surplus generation during PLRI as a consequence of evenly implemented land reforms with declining agriculture surplus over time, the empirical section tests the derived relationship between post reform land redistribution bridging land inequality and conflict type. Our data on West Bengal is limited to information for years after PLRI was announced in 1994. Hence using more granular data under similar settings we encourage future research to estimate the direct effects of PLRI on land conflict. Another avenue of future research would be to estimate the long term impact of the trade off between fragmented redistribution and land conflict on economic growth and other development outcomes.

Online appendix

A Proof of propositions 1 and 2

(i) **Individual-level violence:**When cadres impose individual-level violence, utility of any affected farmer reduces by 1. Since utility of all farmer is below 1 and incumbent cannot impose violence on all farmers, the only way to impose individual violence is on the lowest types. Cadres can impose violence and gain vote share of $\frac{S_t^c}{C^c}$ share of farmers by reducing their utility below 0. The remaining $\alpha - \frac{S_t^c}{C^c}$ share of votes can be gained from the highest types. In other words, the utility of farmers of types equal to or above $\theta = \alpha - \frac{S_t^c}{C^c}$ must enjoy at least the subsistence utility of e^s after handouts. t_h' in equation 5 solves the equality condition in the following inequality.

$$(1 - \gamma_I - \gamma_C)\Big[1 - \alpha - \frac{S_t^c}{C^c}\Big]\Big(\frac{x_t}{N}\Big)^t + \frac{r}{2} \geq e^s$$

The implication is that after t_h', the share of farmers able to have at least the subsistence utility falls below $\alpha - \frac{S_t^c}{C^c}$. Therefore the total vote share falls below α leading to the exit of the incumbent.

(ii) **Collective violence:** After individual-level coercion, if the incumbent exercises violence at the group-level, then utility of all farmers reduce by $\frac{V_t^s}{N}$. Let $\underline{\theta}$ be the farmer who will be able to enjoy the subsistence utility of e^s even after the group-level violence. $\underline{\theta}$ is such that

$$\underline{\theta} = \Big(e^s + \frac{V_t^s}{N} - \frac{r}{2}\Big)\frac{1}{(1 - \gamma_I - \gamma_c)(\frac{x_t}{N})^t}$$

A section of farmers $\frac{S_t^c}{C^c}$ of the lowest types being coerced by the cadres have negative utility and hence vote for the incumbent. Hence the incumbent retains power as long as $1 - \underline{\theta} > \alpha - \frac{S_t^c}{C^c}$. t_c in equation 6 characetrizes this inequality.

B 1990 to 2011 - PLRI, Violent Opposition and the Left's Decline

Between 1970 and 1990, the Left using a mix of decentralized land reforms, authoritarian governance, and violence eliminated all political opposition in rural areas.[29] The economic gains from land reforms in 1980s witnessed a hard decline in the 1990s. Specifically, growth in food grain production fell from 5.5 % in 1980s to just around 2 % in the 1990s (Sarkar, 2006, Guha, 2007, Ray, 2017). The decline in agricultural productivity was a result of long term diminishing gains from land fragmentation and resulting structural bottlenecks in

[29]The Left exercised power through local provision of land or other reform benefits to its clients, namely the middle land owning peasantry and the landless wage laborers between 1970 and 1990. Middle landowning peasantry refers to reform beneficiaries who owned neither large nor very small land-holdings post-reforms. The main opposition party the Indian National Congress which had a major political presence in WB until 1971-72 was decimated in terms of electoral performance in successive panchayat, municipal and state elections. See appendix section B.1 for a detailed background on the political economy of land reforms leading to the rise of authoritarian Left between 1970 and 1990.

increasing productivity from technology adoption (Sarkar, 2006, Ray, 2017).[30] The diminishing returns to farming resulted in increasing non-farm occupations (Sarkar, 2006, Chatterjee, 2009). Increasing vulnerability of rural population in sustaining farming incomes forced them to seek non-farm jobs primarily in urban areas. This farm to non-farm migration was not backed up by any efficient industrial base resulting in more informal employment such as small manufacturers, traders, hawkers, shopkeepers, auto-rickshaw drivers etc (Chatterjee, 2009, Ray, 2017). From 1980s, industrial growth in WB had shown a steady decline. The share of WB in all India real value added by organized industries was 11.53 % in 1980-81. It slipped to 5.79 % in 1989-90.[31] The growth of manufacturing between 1980-1990 was below 2 percent and raised meagrely to 3 percent between 1990 to 1994.[32]

The Left government against a backdrop of industrial decline and an increase in non-farm informal jobs announced WB's first Industrial policy on 23rd September 1994 (WBIP). WBIP pointed towards a very liberal and investor friendly approach by the Left with a major emphasis being placed upon an enhanced role of the private sector to boost output in i) power generation, ii) industrial infrastructure, iii) communications and iv) large scale manufacturing (Chakravarty and Bose, 2010). However given the clientelistic relationship between the Left and its support base described in appendix section B.1, the implementation of industrial policy was non- programmatic and piecemeal with built-in incentives for rent-seeking by the party driven government machinery (Ray, 2017). The piecemeal approach to promote industrialization was result of a compromise between local party machinery and top level leadership of the Left. Specifically, the local machinery opposed a programmatic approach to industrialization as it wanted to maintain the persistence of informal economy in rural areas through its clientelistic control on public goods (Bardhan et al., 2009, Das, 2013, Ray, 2017). For the top level leadership organizational cohesion of the regime could only be maintained if local party cadre were allowed to select industrial projects with built-in-incentives for rent seeking. This resulted in fragmented and inefficient industrialization. Hence for most of 1990s and 2000s WB did not witness large scale productive private investments necessary to scale up the industrial base as an alternative source for rural employment.[33]

However the inefficient industrialization ex-post WBIP did result in land redistribution in favor of new industrial elites vis-$\grave{a}$-vis the rural poor. In order to attract industries in an atmosphere of growing inter-state competition in India during the 1990s, the Left offered agricultural land at discounted prices to new industries. This meant there was a reduction in total or expected land redistribution among the rural poor. For example thousands of small, marginal farmers and sharecroppers were displaced when the Left forcefully acquired land for pig iron companies of the Tata's and Birla's at Kharagpur (Midnapore District) in the beginning of 1992. This resulted in peasant protests leading to violence. The major reasons for protests include inadequate compensation for loss in the value of acquired land, lack of adequate rehabilitation, and refusal of displaced peasants to discontinue their agricultural pursuits (Guha, 2007).[34] Throughout the 1990s and early 2000s

[30]The resulting structural bottlenecks included i) lack of water for high yielding water intensive seeds; ii) dependence on labor intensive techniques; iii) fall in domestic demand, low exports; and iv) rise in input prices (Chattopadhyay, 2005, Harriss-White, 2008).

[31]Figures taken from the Annual survey of Industries, Government of West Bengal.

[32]Figures taken from the Annual survey of Industries, Government of West Bengal.

[33]For example in 2004-2005, the ex-factory value of industrial output in WB as a percentage India's output was down to 4.3 % when compared to 4.7 % in 1995-1996 (Chakravarty and Bose, 2010). The growth in organized manufacturing increased from 3.57 % between 1980 and 1994 to only about 4.62 % between 1995 and 2005 (Chakravarty and Bose, 2010).

[34]The issue of rehabilitation, compensation and sustainable livelihood on land acquisition by the government

peasant unrest and violence from land acquisition did not get adequate media attention. Some of the reasons include i) a non existent political opposition, ii) localized rural unrest being put down by targeting individual protesters by local party members, and iii) acquisition of mono-crop agricultural land rather than multi-crop as justification for piecemeal industrialization (Guha, 2007).[35]

Rural protests against land acquisition for industry gained prominence only after 2006 elections. The Left won a record 7th consecutive victory in 2006 by winning 235 out of 294 electoral seats. Galvanized by decisive electoral dominance, the Left pursued new industrialization projects. Specifically, in 2006 the Left embarked on a project for acquiring land for a TATA car factory in Singur village about 35 km from Kolkata. Similar to previous years protests erupted among village beneficiaries who feared losing their landholdings. However unlike previous years where rural protestors were quickly put down due to a lack of organized resistance, Trinamool Congress (TMC) entered the fray giving individual driven protests a significant political articulation against the Left across WB and India.[36] This was soon followed by the Nandigram protests in the same year where TMC organized rural resistance against land acquisition for a chemical hub to be set up by Salem, an Indonesian business group.[37]. Prior to 2006 , TMC was unable to organize rural grievances against Left's PLRI since its inception as a new political opposition in 1998. This was because the Left managed to curtail the influence of political opposition and coerce the support of rural poor in its favor. Banerjee and Roy (2007) analysing the social dynamics of Left's governance between 1998 and 2006 in two rural WB constituencies shows the following. First, there were a series of individual violent clashes between CPI(M) and TMC workers which took place in districts located in Left's stronghold across south WB. The violent clashes also increased the number of uncontested seats in a vast number of districts. Second, during the 1998 village elections and 2001 assembly elections, a TMC-BJP combine witnessed a surge in popular support, but their supporters were assaulted after the election so as to create fear among members of electorate against supporting the new opposition. Third, CPI(M) coercively disallowed Left Front members (who were more radical or ideological) to either separately contest elections or create a separate political base. Fourth, CPI(M) cadres resorted to violent crimes such as murder, assault, rapes, intimidation to dissuade specific leaders of majority lower castes and tribals to join the opposition. As the lower castes and tribals formed the bulk of the agricultural working class and voted as a block, rural voters remained outwardly loyal to the CPI(M) and the Left. Fifth, the fear of CPI(M) cadres, lack of an alternative party with a strong presence and dependence on CPI(M)'s local organizational patronage, never allowed marginal farmers and the agriculture working class to fully express their grievances and discontentment with the Left. This allowed the Left to successively dominate elections between 1998 and 2006 despite TMC's arrival

is determined by the 1894 Land Acquisition Act in WB. This act stands in complete contrast to the party driven authoritarian decision making on land acquisition or redistribution where peasant protests on loses to livelihoods were violently managed (Banerjee and Roy, 2007).

[35]Given the declining agricultural productivity and increasing input costs, the Left argued that mono-crop land holdings could not sustain rural livelihoods unless re-acquired for industry. This justified the logic of piecemeal industrialization at the cost of land reform beneficiaries.

[36]The murder and rape of Tapasi Malik, one of the protestors allegedly by local CPI(M) activists allowed Mamata Banerjee, the TMC leader to justify an indefinite hunger strike against the Singur land acquisition (Ray, 2017). This indefinite hunger strike forced the TATA group to cease construction work on the acquired land allowing the Singur protests to become a powerful movement against the Left (Ray, 2017).

[37]TMC was able to organize a violent resistance against the Left in Nandigram as large number of protestors were allegedly murdered by CPI(M) who had infiltrated the ranks of policeman and had shot indiscriminately at the protesting villagers (Ray, 2017). TMC's involvement under Mamata's Banerjee's leadership forced the Left to stop the Salem chemical factory in Nandigram.

in the political scene.

For the first time since 1970, Singur and Nandigram peasant movements turned CPI (M) into villains in the eyes of its rural support base - rural agricultural working class and marginal farmers.[38] It also for the first time brought up a statewide acceptance of TMC as a credible opposition given its successful role in organizing peasant resistance. TMC utilizing the outburst of grievances and discontentment from Left's rural organizational strongholds, aggressively pushed its own organization between 2006 and 2011 at the village level in order to break the Left's stranglehold as the new caretaker and protector of rights for marginal farmers and agriculture working class (Banerjee, 2008, 2011). These inroads by the TMC saw mass defections of Left's local leadership to TMC suggesting a prior weakening of organizational cohesion within the Left (Ray, 2017). This lead to an increase in political contestation at Panchayat or village elections where the percentage of uncontested seats which increased from 0.73 % in 1978 to 11 % in 2003, fell to less 4.39 % in 2008 on the back of TMC's growing credibility (Banerjee, 2011). [39] The ability of TMC to organize credible rural resistance and contest Left's electoral rule while weakening CPI(M)'s organizational cohesion allowed it form the first non Left government in 2011, after 34 years.

B.1 1970 to 1990 - Land Reforms, Violence and Single Party rule of the Left

The political mandate in WB since late 1970s has been to elect one-party or single majority Left governments comprised of a support coalition involving both moderate and radical left parties.[40] The CPI (M) was the organizational authority around which all other left parties rallied as coalition partners to form the Left. The Left's 1977 decisive electoral victory was a result of promised land reforms involving a fundamental change in the landlord-peasant relationship across WB. Specifically, the Left or LF promised ex-post implementation of the following. First, introduction of anti-eviction measures preventing landlords from forcibly removing peasants access to farming as bargadars(or share-croppers). Second, allowing hereditary farming rights to peasants as bargadars and guarantees of fair share of total crop cultivated. Third, bringing in legal amendments where the burden of proof of disproving any claims to share-cropping rights were put on landlords. Fourth, redistribution of vested agricultural ceiling-surplus land or non-agricultural public land holdings to the rural landless for crop cultivation, for afforestation and community development purposes, and as homestead plots. These measures once implemented effectively redistributed large scale land holdings from large landlords to landless peasants with permanent legal rights.[41] They improved land security for the rural poor resulting in high

[38] Table 1 in section 1 of the manuscript gives time line of Singur and Nandigram Violence.

[39] Banerjee (2011) states, "*Elections in the state are usually controlled by parties having exclusive hegemony in a particular area....ensures that no opposition polling agents will be present in polling booths to challenge malpractices of the dominant party. People can be coerced to vote for a particular candidate while some may be not allowed to vote at all*".

[40] Among the constituent parties of the Left in West Bengal CPI (M or Marxist) formed the largest and the most important member followed by Communist Party India (CPI), Revolutionary Socialist Party (RSP), All India Forward Bloc (FB), Revolutionary Communist Party of India (RCPI), Marxist Forward Bloc (MFB), Samajwadi Party (SP), Democratic Socialist Party (DSP), Biplobi Bangla Congress, Workers Party of India and Bolshevik Party of India.

[41] More than 65 % of an estimated 2.3 million share croppers were registered between 1977 and 1993 (Banerjee, Gertler and Ghatak, 2002, Chattopadhyay, 1979). Approximately, 1025000 acres of 1262000 acres of ceiling-surplus land vested from large landlords were redistributed to 2.5 million households between 1977 and 1995 (Rawal, 2001). Homestead plots not exceeding 0.8 acres were redistributed to approximately 500,000 agricultural workers, rural artisans and fish-worker households between 1977 and 1995 (Rawal, 2001).

growth of agricultural output, rural earnings and over 28 % increase in agricultural productivity between 1978 and 1993 (Banerjee, Gertler and Ghatak, 2002, Sarkar, 2006). Table 1 in section 1 of the manuscript gives time line of key land reform policies initiated by the Left.

The implementation of these reforms starting in 1977 was subject to an effective decentralized governance structure lead by a dense and hegemonic party organization (of the CPI(M)) penetrating into each and every aspect of rural WB (Ray, 2017). The implementation process involved different types of conflict generated through political mobilizations by non party organizations in concert with the Left cadres or party workers.[42] Ruud (1994) demonstrates how the CPI (M) "vis-$\grave{a}$-vis the peasantry came to fill a role homologous to that of a patron to his supporters." Ruud (1994) using the case of Burdwan district demonstrates how the CPI (M) aligned itself with non governmental organizations such as the Kisan Sabha (loosely translated as Farmer's Meeting) to oppose rural land lords from 1968 in order to consolidate electoral power.[43] The modus operandi involved the following (Ruud, 1994). Firstly, only the richest and the most exploitative landlords were targeted area by area and one by one.[44] Secondly this tactic was aimed at splitting the landlords' ranks. Thirdly, the non-political organizations of low caste peasants (dalits and adivasis) were given military training by the CPI(M) cadres in order to violently confront the targeted landlords if they did not surrender their surplus land. Fourthly, while violence involving arms was organized and promoted by the Marxist-Peasant coalition, other ways such as harassment, land invasions, forcible confinement, forcible harvesting in 'terms' favorable to the peasants and social ostracization were also employed. Fifthly, the organized violent revolt against the landlords in the rural areas were supported by the Left policy makers who had formed the government in Kolkata. This strategy of the Left allowed it to gain electoral seats in the subsequent assembly elections in 1971 and 1977.[45]

The Left employing rural mobilization and violent confrontation managed to create a large support base in most rural WB by the end of 1980s forcing the political opposition in the form of Congress to cede political space and virtually disappear. This also allowed the Left to setup a hegemonic party organization controlling the political space across rural WB (Rogaly, 1998, Ray, 2017). For example, CPI(M) members in rural areas were primarily made up of lower castes dalits and adivasis who were earlier deprived and exploited by the upper caste land owners and middle class('Bhadralok') (Rogaly, Harriss-White and Bose, 1995, Rogaly, 1996, 1998). Once the Left had consolidated its power in rural WB, the dominating class in the villages shifted from Bhadralok to the CPI(M) members and the middle peasantry who had benefited from the land reforms (Rogaly, Harriss-White and Bose, 1995, Rogaly, 1996, 1998).[46] This economic inter-dependence between middle peasantry and local CPI (M) leaders lead to an understanding that the Left would not promote any opposing voices among agricultural wage workers and the landless to articulate their de-

[42] As late as 1967, the CPI (M)'s organizational ability to politically oppose the ruling Congress in rural areas of West Bengal was still very poor (Webster, 1990, Rogaly, 1998).

[43] During the Left rule since 1970s, Burdwan district in central WB was considered to be the Left's model district and a political fortress.

[44] Minor landlords, rich peasants and the middle class were not targeted

[45] Assembly Elections refer to the state wide elections in West Bengal held once every 5 years where the West Bengal electorate choose the members of the West Bengal State Legislative Assembly and where the members of the majority party form the government.

[46] Basu (2001) states that the land reforms introduced by the Left replaced one class of pre-independent rulers (the large landowners) with another (the middle class of landowners) as the dominant economic and political force in WB without really benefiting the rural proletariat in giving them more sustainable economic, and political upliftment.

mands (Rogaly, Harriss-White and Bose, 1995, Rogaly, 1996, 1998). At the same time local party leaders were able to firmly entrench a dense organizational and institutional structure within and outside the village panchayat. These party driven structures allowed for a violent confrontation and containment of emerging grievances from agricultural workers and the landless (Rogaly, Harriss-White and Bose, 1995, Rogaly, 1996, 1998). This resulted in decentralized local patron-client networks to develop with the CPI (M) becoming the main patron. These networks allowed for the Left to exploit upper-lower caste divisions within the party or its affiliate organizations while providing clientelistic benefits to placate rural grievances as a compensation for not receiving any direct benefits from land redistribution (Rogaly, Harriss-White and Bose, 1995, Rogaly, 1996, 1998). Some of these benefits included higher agricultural wages, non-seasonal employment and better share of the total output as share tenant or share cropper (Rogaly, Harriss-White and Bose, 1995, Rogaly, 1996, 1998). This ensured that the Left secured both the loyalty and votes of the large landless proletariat while keeping a firm check on any political resistance allowing it win consecutive WB state and panchayat elections.

Therefore the Left managed to maintain its rural dominance on the basis of land reform gains between 1970 and 1990 and violent conflict management to prevent political opposition. This allowed for single party rule through decentralized patron-client networks at village level institutions controlled by the party apparatus (Roy and Banerjee, 2006, Rogaly, 1998).[47]

C Additional Controls and Methodology

C.1 Additional Controls

Fractionalization Index: The data used to construct the effective number of parties (ENP) are from elections held within each municipality ward (aggregated over districts) in WB between 1996 and 2008. It is important to note that the majority of wards had elections in 1995, 2000 and 2005. Other municipality wards had their elections in 2004, 2006, 2007 or in 2008. The data for those years where elections are not held is similar to the most recent preceding election year until the next election year. There are five political parties namely a) Left Front, b) All India Trinamool Congress(TMC), c) Congress, d) BJP and e) Independents. The measure of political fractionalization we use in our analysis is the effective number of party index called the Golosov index (or *GL*). Golosov Index is calculated as : $\sum_{i=1}^{n}[\frac{1}{1+\frac{p_1^2}{p_i}-p_i}]$, where p_i = maximum p_i : i=1,2,3.....n (Golosov, 2010). The variable p_i is the proportion of seats won by party i.[48] Higher the index, higher is the political competition or fractionalization.

Infrastructure Index: We construct an infrastructure index for each district. Following (Raychaudhuri and Haldar, 2009) we adopt a weighted principal component analysis (PCA) and construct the index in the following manner. Firstly we choose 8 measures of infrastructure (for each of the 18 districts) namely i) registered working factories per ten thousand people, ii) new cottage and small factories per ten thousand people, iii) number of villages electrified, iv) length of roads per thousand people, v) number of post and telegraph offices per thousand population, vi) working capital of agricultural credit societies,

[47] Studies like Rogaly, Harriss-White and Bose (1995), Rogaly (1996, 1998) demonstrates the working and development of rural relations and conflict management using district level case studies.

[48] This corresponds to variables prop Left, prop TMC, prop INC, prop BJP and prop independents in our data.

vii) working capital of non agricultural societies and viii) total warehouse and cold storage capacity. Secondly, we normalize each of the eight variables by choosing the highest and the lowest values in a particular infrastructure indicator. Once the best (highest) and the worst (lowest) values are determined, the following formula is used to obtain the normalized values (NV): $NV_{ij} = 1 - [bestX_{ij} -$ observed $X_{ij}]$/R, where R = best $X_{ij} -$ worst X_{ij}, i = i_{th} observation and $j = j_{th}$ district. Thirdly, we run a principal component analysis (PCA) on the normalized values generated that lie between 0 and 1. Here PCA is used to compute the factor loadings and weights of the eight indicators. The following formula is used to calculate the index after the PCA is completed, namely INFRA = $\frac{\sum_i X_i(\sum_{j=i}|l_{ij}|.E_j)}{\sum_i(\sum_{j=i}|l_{ij}|.E_j)}$ (where INFRA is the infrastructure index or *infraindex*), X_i is the i-th indicator, L_{ij} is the factor loading of the i-th variable on the j-th factor, and E_j is the Eigen value of the j-th factor (Raychaudhuri and Haldar, 2009).

C.2 Methodology

Poisson: The pooled poisson estimator assumes that our dependent count variables (TR and VC) are poisson distributed with a conditional mean given by equation 12.[49]

$$E(y_{it}) = \exp(X_{it}^{'})\beta \tag{12}$$

As discussed in the main text we know that the distribution of TR and VC is overdispersed as a result of unobserved heterogeneity. In other words the conditional variance exceeds the conditional mean. The pooled poisson estimator accounts for the over-dispersion using a poisson maximum likelihood estimator which retains the conditional mean given in equation 12 but relaxes the equivariance assumption by obtaining a robust estimator of the variance-covariance matrix (Cameron and Trivedi, 2005, 2009).[50]

Negative Binomial:The pooled negative binomial (NB) estimator is an alternative to the robust pooled poisson estimates which accounts for over-dispersion in the concerned variable caused by the presence of unobserved heterogeneity. This unobserved heterogeneity can be accounted by introducing multiplicative randomness in a count variable y. This is done by multiplying the conditional mean of y (μ) with a random variable ν. The random variable ν follows a gamma distribution with a mean of one and variance α. This α parameter refers to the heterogeneous dispersion parameter introduced explicitly in the NB distribution. Hence under NB, the marginal density of y is unconditional on the random parameter ν but now conditional on the deterministic parameters μ and α. These two deterministic parameters determine the first two moment conditions of the NB distribution given as:

$$E[\frac{y}{\mu, \alpha}] = \mu \tag{13}$$

$$2V[\frac{y}{\mu, \alpha}] = \mu + \alpha\mu^2 \tag{14}$$

While equation 13 gives the expected mean of y, equation 14 gives the quadratic variance of y under NB. When the variance under NB is modeled as quadratic in the mean we call the

[49]Vector X includes *ldpc* or *pcld* and all control variables in equation 11.

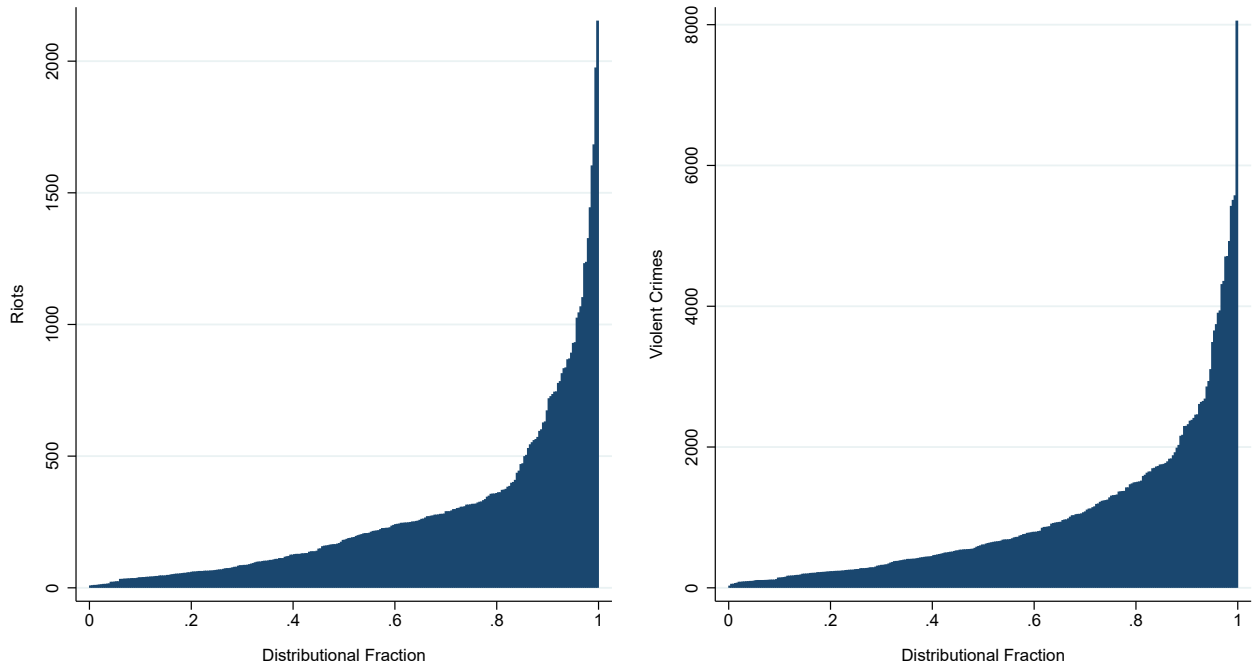
[50]This robust estimator of the variance-covariance matrix should also account for any serial correlation in TR or VC (Cameron and Trivedi, 2005, 2009).

model NB2 in the literature. This quadratic variance specification of NB2 provides greater flexibility in approximating over-dispersion in count data. Hence we estimate pooled NB2 coefficients. We next lay out the interpretation of the coefficients presented in the main text. The parameter estimates for NB2 can be interpreted as semi elasticities calculated at mean for the whole sample. For example if our regressor is x_j, then β_j can be expressed as semi elasticity in the following manner:

$$\widehat{\beta_j} = \frac{\partial E(TR/x = \overline{x})}{\partial x_j} \frac{1}{\exp(\overline{x})} \tag{15}$$

Quantile Regressions: Count-quantile regressions (QR) study the relationship between a count variable and X regressors at different points on the conditional distribution of the count variable. QR should provide a better picture compared to the conditional mean relationship from poisson and NB2 estimates. This is because quantile regressions have the following advantages. First, they are more robust to outliers compared to pooled poisson or NB2 estimates. Second, they allow for a better understanding of the data by assessing the impact of the regressors on both the location and scale parameters of the model. They have a semi-parametric nature which does not impose assumptions on the parametric distribution of the error term. (Cameron and Trivedi, 2005, 2009). Figures C1 depicts the quantile plots for TR and VC. The plots clearly show step like discontinuities from the count nature of TR and VC. Following Machado and Silva (2005), Miranda (2007) we smooth the count data using a jittering process before employing the standard quantile estimator.[51] This gives us the quantile estimate of the form, $Q_z(\alpha \mid X) = \alpha + \exp(X.\beta(\alpha))$, for the α-quantile of TR or VC.

Figure C1: Quantile Plots: Riots and Violent Crimes



We next discuss the interpretation of our quantile estimates. As stated earlier we first transform TR and VC variables into a continuous variable and then estimate the standard quantile semi parametric model. Therefore QR estimates are for the transformed quantiles of

[51] We use the qcount command in STATA.

TR and VC, $Q_z(\alpha \mid X)$, where z = TR + u (or VC + u) and u represents the realization of a uniform random variable, making the distribution of TR and VC smooth and continuous. These can be interpreted as semi-elasticities similar to the pooled poisson and NB2 coefficient estimates. Hence results presented in the main text are semi elasticities on the transformed TR and VC. We briefly discuss the marginal effects of our baseline quantile estimates for our narrow land redistribution measure (*pcld*) which corresponds to the semi-elasticities presented in tables 15 and 17 in the manuscript. This illustrates the effect of *pcld* or x_j on the shape and distribution of TR and VC. The marginal effect is calculated at the mean of *pcld* for the given quantile. Hence the marginal effect of a unit change in x_j (from x_j^0 to x_j^1) on the conditional quantile of the original TR or VC, given that all control variables remain fixed at their mean, is evaluated as

$$\Delta_j Q_y = Q_y(\alpha|x_j^1, x) - Q_y(\alpha|x_j^0, x) \tag{16}$$

,where $Q_y(\alpha|x) = [Q_z(\alpha|x) - 1]$, y = TR or VC and [.] represents the ceiling function. This is akin to a finite difference method. These marginal effects are also used to calculate the predicted quantiles of TR and VC given by $\widehat{Q_z}$ shown in the quantile results in section 6.

In table 17, setting *pcld* and all other controls at their mean values, a one acre increase per beneficiary would reduce VC by approximately 355 incidents in the 2nd decile. In the 6th and 8th deciles the marginal effect of *pcld* is larger as VC is reduced by approximately 543 and 787 incidents, respectively. Similarly referring to table 15, setting *pcld* and the other controls at their mean, a one acre increase per beneficiary would increase TR by approximately 191 incidents in the first decile.In the 6th and 8th deciles the marginal effect of *pcld* is larger as TR is reduced by approximately 536 and 657 incidents, respectively.

The important points to note with regard to count quantile semi-elasticities and their corresponding marginal effects are the following. First, while $Q_{TR} \mid \alpha$ or $Q_{VC} \mid \alpha$ can be recovered from $Q_z \mid \alpha$, different quantiles of z correspond to the same quantile of TR or VC because they are discrete (i.e. it takes only integer values). This implies one can move from Q_z to Q_{TR} or Q_{VC} but not the other way around. Second, if a given variable x_j has a coefficient $\beta_j(\alpha)$ which is statistically not different from zero, then we can conclude x_j does not affect $Q_{TR} \mid \alpha$ or $Q_{VC} \mid \alpha$. Third, given all the other covariates, if $\beta_j(\alpha)$ is statistically different from zero, then it will affect $Q_{TR} \mid \alpha$ or $Q_{VC} \mid \alpha$ only if it is capable of changing the integer part of $Q_z \mid \alpha$. Fourth, if a given x_j has no impact on Q_{TR} or Q_{VC} but has a significant effect on Q_z, it does not mean that x_j never affects Q_{TR} but rather x_j significantly affects only a subpopulation of Q_{TR} or Q_{VC} (Machado and Silva, 2005, Miranda, 2007).[52]

D Appendix Results (cited in manuscript)

[52]These results only hold when we control for other covariates by fixing their values to their respective means in a given quantile.

Figure C2: Yearly Trend in Agricultural Land Holdings

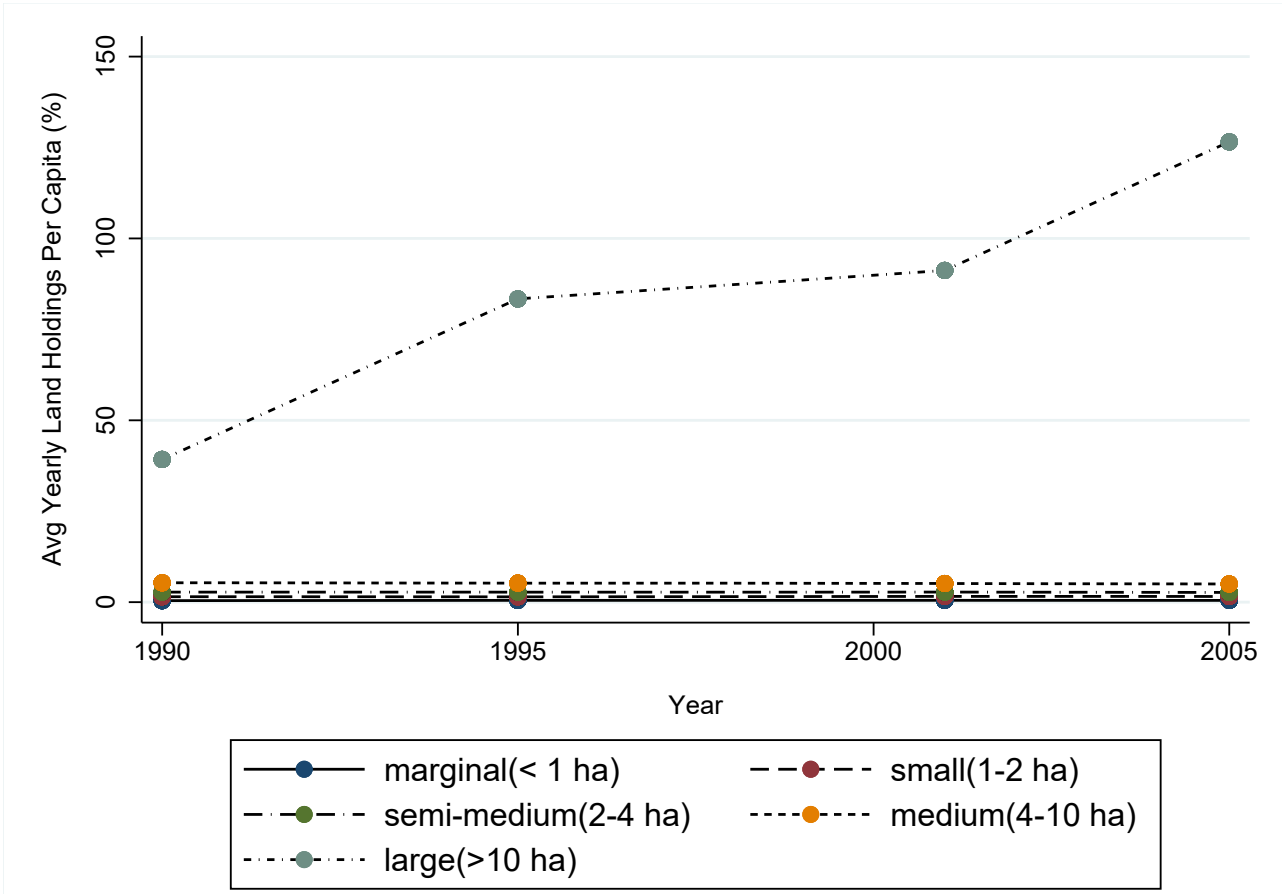
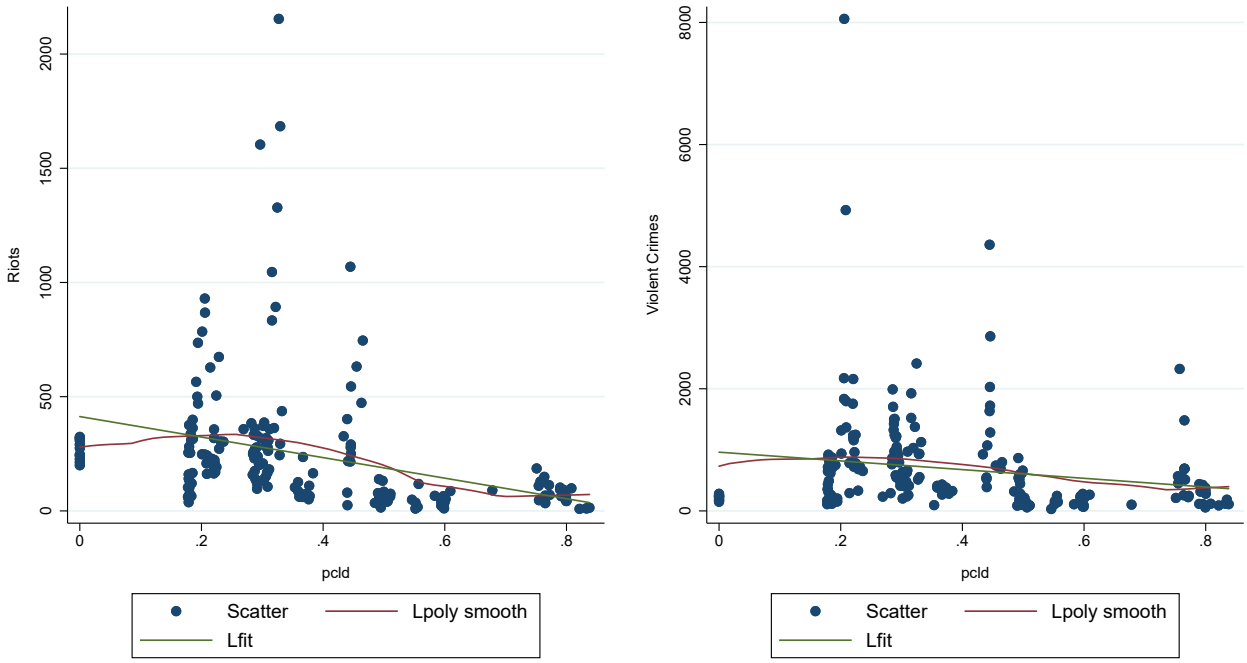


Figure C3: Correlation Graphs between Riots, Violent Crimes and pcld



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