Ethnic Favouritism in Environmental Disaster Payouts *

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Abstract

This paper studies the role and extent of ethnic favouritism in environmental disaster relief. Using restricted-access data on government compensation for human-wildlife conflict in the Himalayas, we first show that tribal communities are more exposed to wildlife attacks, yet receive lower compensation than non-tribals. We then build a political economy model which shows that minority leaders target disaster aid to coethnics, undoing discrimination. We test the model using quasi-random variation in India's system for reserving political seats for tribal candidates. Matched difference-in-difference estimates show that under tribal leadership, tribal-dominated villages receive higher payouts than when the leader is non-tribal. Our findings underscore the role of political representation for achieving environmental justice.

Keywords: Political reservation, tribal communities, human-wildlife conflict, India
JEL Codes: Q01, Q54, Q56, P00

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1 Introduction

Natural disasters inflicted nearly $USD 300 billion of damage worldwide in 2022. While 70% of private damage was insured in developed countries, only 14% was insured in developing countries (Straub, 2022). With such minimal coverage, the global poor are often left reliant on inadequate government disaster relief. Widespread systemic barriers to public assistance raise questions about whether such relief reaches its intended beneficiaries[1]. As climate change increases the frequency and severity of natural disasters, finding effective strategies to compensate the poor is increasingly urgent and policy-relevant.

This paper asks whether political representation of marginalized groups can lower barriers to access and improve equity in government assistance. We answer this by studying affirmative action and natural disaster relief in India. We first establish that minorities are compensated less for the same type of damage, and then compare relief payments in places where local political office is reserved for minorities to places holding general elections. Our results show that ethnic alignment between leader and electorate can undo inequities and re-direct disaster relief toward those who need it most.

The government program in question is the compensation bureaucracy for Human-Wildlife Conflict (HWC) in the state of Himachal Pradesh, India. This is a compelling case study for two reasons. First, HWC is a critical yet understudied disaster, on par with wildfires, heatwaves, and floods. In developing countries, wildlife attacks cause livestock and property loss worth almost half of annual incomes (Braczkowski et al., 2023). In India, the death toll from human-elephant conflict alone is one-third of that from floods (Economic Times, 2024; Parida, 2020). Second, minorities bear the brunt of HWC damage. In a recent survey of world leaders, developing country governments identified indigenous people as the main victims of HWC (World Bank, 2023). Addressing HWC is thus both a pressing environmental challenge and a matter of environmental justice.

Himachal Pradesh is an ideal study setting for several reasons. First, it features vast biodiversity, home to over 5000 animal species and 36 protected areas (Gokhale, 2015). Second, the Himalayas face acute landscape fragmentation, narrowing the interface between humans and wildlife (Madhok, 2023). Third, 6% of the population belongs to the Scheduled Tribe (ST) community, India's poorest and most politically excluded groups. Importantly for our context, STs practice forest-dependent livelihoods, making them especially vulnerable to HWC damage. Obtaining compensation requires navigating a forest bureaucracy dominated by caste elites (Doner, 2022). While the Constitution mandates political reservation to remove such power imbalances, its effectiveness in promoting eq-

[1]Some examples can be that poor and socially marginal people are often in remote communities; communities with low levels of formal education find it difficult to complete bureaucratic requirements like forms; or the government bureaucracy comprises of elites creating systemic biases.

uity in environmental disaster relief is an open question.

The first part of the paper characterizes HWC payouts using restricted-access data on all compensation claims approved by the State between 2012-2020. Data are obtained via collaboration with the Indian Forest Service and detail the village, date of attack, compensation amount, predator species, and whether conflict led to livestock loss, human injury, or death. This novel data reveals three key insights about HWC compensation: first, STs live closer to the forest edge, increasing their exposure to wildlife. Second, they experience more HWC incidents as a result. Third, and most critically, tribal villages receive lower payouts for *the same animal attack* compared to non-minorities. These insights spotlight how STs are more exposed to disaster, yet experience discrimination in relief.

Following from these insights, we develop a political economy model to examine how discrimination changes depending on minority representation in local politics. We model the executive arm of government, which must provide HWC relief but can selectively discriminate in the process. The executive can reduce HWC below its natural equilibrium at an abatement cost, and must compensate any lost utility for HWC victims. In doing so, it can withhold some compensation from the minority and rebate it to the majority, or keep some for rent-seeking. We then introduce political reservation, where only minorities can stand for election, and derive optimal discrimination and HWC levels under a benevolent government, a general election government where the majority candidate is elected, and a reserved government where a minority candidate is always elected.

The model yields three testable predictions which we take to the data. First, less HWC is tolerated under reserved elections. This is because the minority leader does not discriminate against her own group and focuses only on abatement. In contrast, the majority leader tolerates extra HWC since more conflict implies more scope for discrimination and, therefore, more utility-enhancing redistribution towards their own group. Second, minorities receive higher compensation under reserved elections. This is because lack of discrimination and fewer conflicts lead to higher payouts per incident. Third, the model predicts ethnic favouritism toward the minority. Since there is no rent-seeking under minority leadership, compensation rises faster with minority share under reserved elections.

The second part of the paper empirically tests each model prediction using a quirk in India's mechanism for reserving political seats for identification. States are allocated seats based on their share of the national tribal population. Seats are then allocated down to districts with the same formula. Finally, constituencies in each district are ranked by tribal population share and reservations are assigned starting from the highest ranked constituency until the total number of reserved seats for the district is reached. We exploit this discrete cutoff rule for identification and designate the three constituencies just below the cutoff in each district as the control group.

Matching on population share in this way ensures comparability of the treatment and matched control group along district characteristics, and comparability across constituencies within districts on ST population share. The main threat is that reserved and unreserved constituencies may vary along other dimensions, such as natural resource access, that covary with ST population and HWC outcomes. We include a variety of geography covariates in all our regressions to address this issue.

Our empirical results corroborate all three model predictions. First, we find that tribal leaders tolerate less HWC compared to non-tribal leaders. Specifically, villages in reserved constituencies experience 6.2% less conflict with wildlife compared to those holding general elections. Second, compensation per incident is notable higher under tribal leadership; victims in reserved constituencies receive payouts 57% higher than victims *of the same type of animal attack* in general election constituencies. These finding are consistent with the theory that tribal leaders face no incentives for discrimination and instead focus abatement, leading to less HWC and higher payouts per incident.

Third, we find clear evidence of ethnic favouritism in HWC payouts. We establish this novel finding with a matched difference-in-difference design comparing the gap in payouts between tribal- and non-tribal villages in reserved constituencies to the gap in unreserved constituencies. Villages with a 10pp. larger tribal population share receive 4.5% more compensation per incident when the leader is tribal compared to when the leader is non-tribal. These findings imply that ethnically aligned villages receive directed transfers as a way to undo environmental injustices.

To demonstrate the strength of our matching design, we show that estimates are similar when using five constituencies just below the cutoff as the control group instead of three. Estimates are also stable when using the full set of unreserved constituencies as the control. Importantly, we also document robustness to spatial correlation, which accounts for clustering of errors within animal ranges rather than administrative units. One remaining concern is reporting bias; if reservation encourages minorities to report minor damages, our coefficients may be downward biased. We address this with a test for systematic reporting bias, and find no evidence that reservation changes the number of low-, medium-, or high-value claims made in tribal-dominant villages.

Literature Contributions This study contributes to three literatures in economics, ecology, and political economy. First, we provide one of the first investigations into the distribution of disaster relief in a developing country. The relevant economics literature is from the USA (Deryugina, 2017; Deryugina et al., 2018; Marcoux and Wagner, 2023), or cross-country comparisons (Botzen et al., 2019; Kahn, 2005; Hsiang and Jina, 2014), mainly focusing on economic impacts at aggregated geographic units. Instead, our granular data enables analysis of distributional impacts across victims in a large developing country.

Deryugina (2017) is among the few to study disaster recovery, and find that disaster aid increases following hurricanes in the United States. We extend this by focusing on a different type of disaster in a developing country, with emphasis on transfers to marginalized groups. Gordon et al. (2024) study disaster aid in Nepal and find that targeting based on property damage maximizes welfare gains. Our study adds a political economy angle and focuses on targeting based on ethnic alignment between politicians and victims.

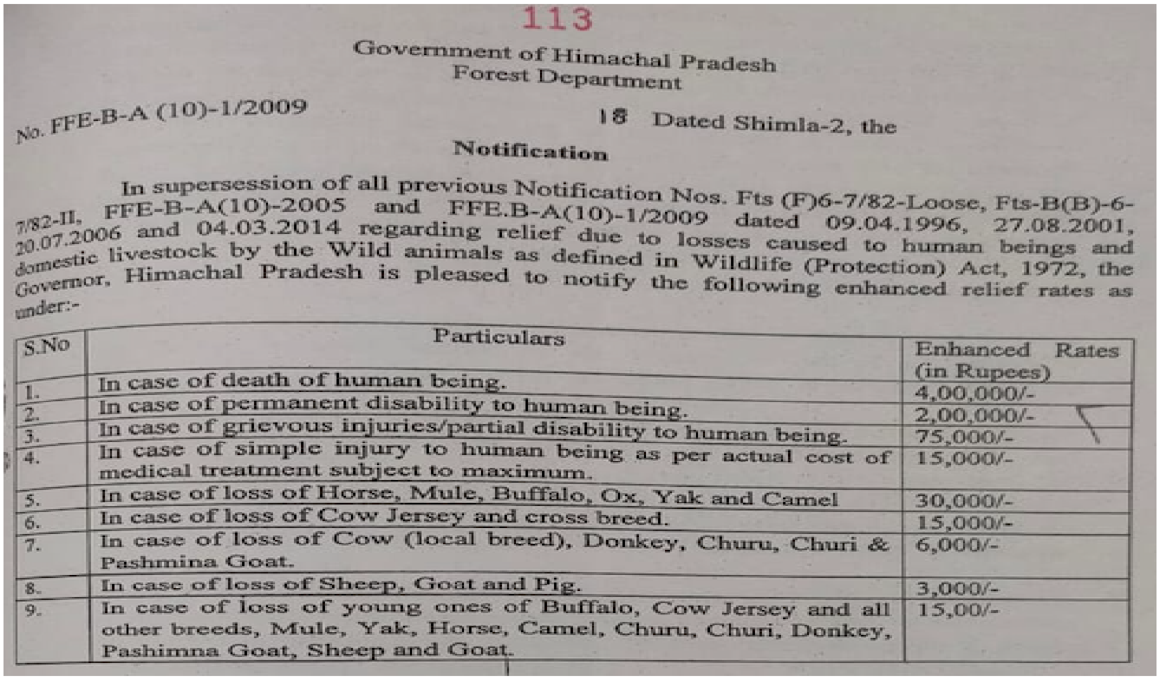
Our second contribution is to integrate the conservation literature on HWC into the purview of economics. Dickman et al. (2011) argue that integrating economic analysis with conservation science is crucial to deepen our understanding of HWC. Our paper is among the first to formalize an economic logic for thinking about HWC, and to derive policy-relevant, empirical insights about HWC using a causal inference toolbox.

Our third contribution is to the political economy literature on targeted public goods provision. We are among the first to extend this literature into the domain of environmental disaster recovery in a developing country. The literature on minority political representation and targeted transfers in India studies impacts on poverty and human capital (Pande, 2003; Chattopadhyay and Duflo, 2004; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014; Chin and Prakash, 2011; Kaletski and Prakash, 2016). At the same time, a new literature studies how politics shapes environmental policy design (Balboni et al., 2023, 2021; Burgess et al., 2012; Lipscomb and Mobarak, 2016), but with less attention on leader identity. We bridge these two literatures by studying how ethnic alignment between leader and electorate influences targeted transfers for environmental disaster recovery. Two exceptions, both from India, are Gulzar et al. (2021), who find that tribal representation reduces deforestation, and Jagnani and Mahadevan (2024), who find that female political representation decreases crop burning. Rather than focus on environmental outcomes per se, we instead document that minority representation mitigates environmental damage through targeted transfers to coethnics.

The next section provides institutional background. Section 3 presents the data and documents three stylized insights about inequities in HWC exposure and compensation. Section 4 sets up a political economy model to articulate the logic giving rise to discrimination in disaster relief. Section 5 tests model predictions and and presents evidence of ethnic favouritism in HWC payouts. Section 6 concludes.

2 Background

This section briefly describes human-wildlife conflict in India, the bureaucracy for disaster relief, barriers to access for minorities, and the connection to affirmative action.



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Government of Himachal Pradesh
Forest Department

No. FFE-B-A (10)-1/2009

18 Dated Shimla-2, the

Notification

In supersession of all previous Notification Nos. Fts (F)6-7/82-Loose, Fts-B(B)-6-7/82-II, FFE-B-A(10)-2005 and FFE.B-A(10)-1/2009 dated 09.04.1996, 27.08.2001, 20.07.2006 and 04.03.2014 regarding relief due to losses caused to human beings and domestic livestock by the Wild animals as defined in Wildlife (Protection) Act, 1972, the Governor, Himachal Pradesh is pleased to notify the following enhanced relief rates as under:-

S.No	Particulars	Enhanced Rates (in Rupees)
1.	In case of death of human being.	4,00,000/-
2.	In case of permanent disability to human being.	2,00,000/-
3.	In case of grievous injuries/partial disability to human being.	75,000/-
4.	In case of simple injury to human being as per actual cost of medical treatment subject to maximum.	15,000/-
5.	In case of loss of Horse, Mule, Buffalo, Ox, Yak and Camel	30,000/-
6.	In case of loss of Cow Jersey and cross breed.	15,000/-
7.	In case of loss of Cow (local breed), Donkey, Churu, Churi & Pashmina Goat.	6,000/-
8.	In case of loss of Sheep, Goat and Pig.	3,000/-
9.	In case of loss of young ones of Buffalo, Cow Jersey and all other breeds, Mule, Yak, Horse, Camel, Churu, Churi, Donkey, Pashimna Goat, Sheep and Goat.	15,00/-

Figure 1: HWC Compensation Rates (Government of Himachal Pradesh, 2018)

2.1 Human-Wildlife Conflict

As human activity encroaches deeper into wildlife habitats, escalating human-wildlife encounters lead to crop destruction, livestock loss, and human death. In India, Human-Elephant Conflict (a subset of HWC) claims an average of approximately 500 lives ever year (Economic Times, 2024). In contrast, floods cause an approximately 1500 deaths every year (Central Water Comission, 2012; Singh and Kumar, 2013; Parida, 2020). Crop and property damage from HWC are estimated at US$ 70 million annually (Barua et al., 2013), and while elephant conflict causes the most damage (Gulati et al., 2021; Sukumar, 2003), conflict with large carnivores like tigers and leopards also cause human injuries, death and major financial losses as well (Karanth and Madhusudan, 2002). It is likely that aggregate HWC losses are comparable to annual flood activity in India. To those living in proximity of India's forests, HWC is an important, frequently occurring, natural disaster.

Similar to other natural disasters, the burden of HWC is not evenly shared—an important environmental justice concern. In Insight 1 (Section 3.4), we show how India's poor and marginalized are more vulnerable to HWC. One tool the government has to mitigate its unequal burden is compensation for losses. We discuss that next.

2.2 The Compensation Bureaucracy in Himachal Pradesh

While India's Wildlife (Protection) Act (1972) does not guarantee compensation for financial losses from HWC, most Indian states offer ex-gratia compensation to people suffering human injury, death, livestock loss or other property losses from HWC. Payouts vary by state (Karanth et al., 2018). In our study area of Himachal Pradesh, residents are eligible for compensation for livestock loss, human injury, or the associated loss of life. Rates range from |3000 for livestock loss to |400,000 for loss of a human life (Figure 1).

On suffering a loss due to HWC, the individual is required to report the incident to the nearest forest office within seven days. A claim is then filed within one month to the nearest Range Officer, under the control of Divisional Forest Officer. The claim can be filed where the applicant lives or where the loss occurred, and includes case details (type of conflict, description, etc.), location and time, and photographic proof of the incident.

Next, in the case of livestock loss, the local veterinary doctor visits the location of the incident to verify whether livestock loss is caused by wildlife[2]. In the event of human death, a medical officer submits a postmortem report. For grievous injury cases, the officer submits a partial or permanent disability certificate as well as verification of medical treatment costs. For simple injuries, a prescription slip is submitted.

In the final step, the Range Officer scrutinizes the application and submits it to the Divisional Forest Officer for approval. The Divisional Forest Officer sanctions the relief payment to the livestock owner or to the victims family in the event of human death.

While the compensation system is designed to mitigate negative effects of HWC, unequal access to the system remains a critical concern. Marginalized communities, especially tribal groups, may face steep barriers to access since they must petition a forest bureaucracy dominated by caste elites and rooted in colonial power imbalances (Doner, 2022). As we document in Insight 3 (Section 3.4), tribal communities receive less compensation than non-tribal communities for the same type of HWC damage. We next turn to an overview of the India's tribal population and the system of affirmative action aimed at reversing historic discrimination. This sets the stage for our analysis of whether political reservation can undo inequities in HWC compensation.

2.3 Scheduled Tribes and Political Reservation

Scheduled Tribes India's tribes, or *Adivasis*, are considered its earliest inhabitants. Pre-independence, Colonial censuses refer to tribes as "animist", "hill and forest tribes", and "backward tribes" (Ambagudia, 2011). Post-independence, the label "Scheduled Tribes"

[2] Verification can also be done by elected representatives and forest officials.

(ST) was applied for administrative purposes. As per the 2011 Census, STs make up 104 million people, or 9% of India's population.

STs are characterized by their unique cultural and religious practices but also by severe economic depravation and socio-political exclusion. In our study area of Himachal Pradesh, STs face an illiteracy rate 42% higher and a salaried employment share 133% lower than the general population (World Bank, 2017).

A legacy of exclusion, geographic isolation, and poverty has left STs especially vulnerable to economic shocks, including those perpetrated by natural disasters. This vulnerability was the basis for creating India's political quota system. Whether the system cushions the negative impacts of disasters on STs is the central question of this paper.

Political Reservation India's political quota system originated through the Poona Pact of 1932, which allocated 148 state legislative seats for "depressed classes" (Scheduled Castes (SCs)) across (then) provincial assemblies (Das, 2000). On independence from British Rule, political reservation was constitutionally mandated and continues to apportion certain seats in the (now) state and national assemblies for SCs and STs. In reserved constituencies, only members from SCs or STs (depending on the category reserved) can stand for election. The goal is to increase representation of minorities in an effort to redirect resources towards them. In the remainder of the paper, we focus only on STs.

Reserved seats are allocated through a cascading sequence, with a quirk that enables a natural experiment comparing similar constituencies with and without reservation. First, reservations in the State Assembly are allocated based on their share of the national ST population. Himachal Pradesh has 68 seats in the State Assembly, and 4% of India's tribal population, giving it $68 \times 0.04 = 3$ reserved seats for STs. Second, seats are allocated down to districts with the same formula[3]. Third, constituencies within districts are ranked by minority population share and reserved seats are assigned starting with the highest ranked constituency (with the highest share of minorities) until the total number of reserved constituencies for the district is reached.

The third step generates a discrete cutoff around which we compare constituencies to empirically identify the impact of political reservation on disaster payouts in Section 5. We designate the three constituencies within each district ranked just below the cutoff as the control group. This constitutes a matched sample, where "matched" refers to matching treatment and control constituencies on minority population share. The advantage of this approach is that matching within districts ensures that reserved and matched unreserved constituencies are balanced on district characteristics such as elevation, rugged-

[3]For example, a district with 25% of Himachal Pradesh's tribal population receives $0.25 \times 3 = 0.75$ seats. This will be rounded to the nearest integer (1 seat) in the final allocation calculation.

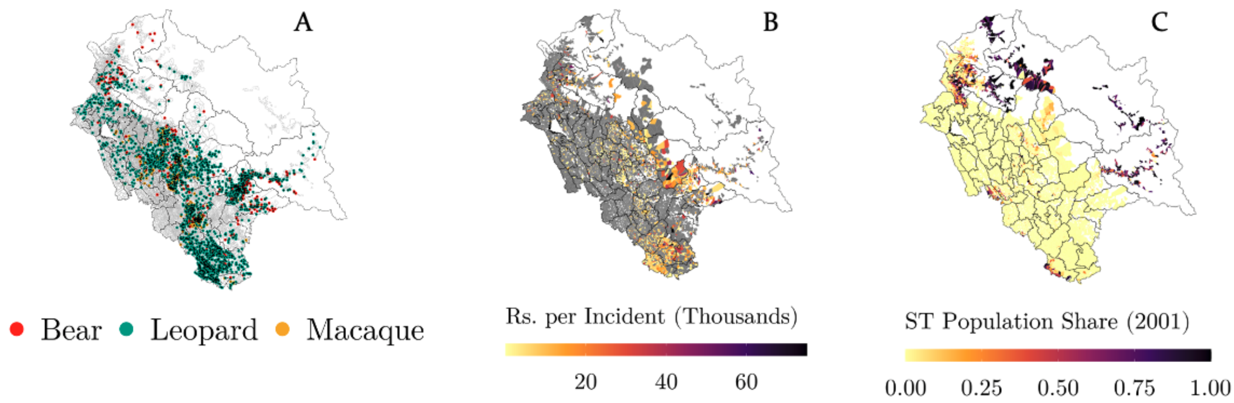

Figure 2: Distribution of Human-Wildlife Conflict, Compensation, and Tribal Population

Note: Boundary lines denote assembly constituencies. Panel A shows locations of HWC incidents. Panel B shows mean compensation within villages. Panel C shows ST population share from the 2001 census.

ness, and climate, which co-vary with ST population share and HWC incidence. More details on the empirical strategy are provided in Section 5.1.

3 Data

We study the political economy of HWC compensation by drawing on several new datasets. Geotagged compensation claims are obtained from the Indian Forest Service. We match this with village population shares of tribal and non-tribal communities, and political data on constituency reservation status. The resulting victim-level panel describes population and leadership characteristics of all villages where HWC claims were made between 2012-2020. This section describes the data and provides summary statistics.

3.1 Compensation Claims

We obtained a restricted-access panel of HWC compensation claims through our partnership with the Indian Forest Service. This fills an important data gap since victim-level compensation claims are not publicly available in India[4]. Our panel covers the universe of claims made at local forest offices between 2012-2020 across Himachal Pradesh. Data are at the incident level, geocoded to the village centroid, and include date, animal, case type (livestock loss, human injury, or death), and compensation paid.

Table A1 shows that leopard, bear, and macaque attacks are most common (Panel A). Bear attacks receive the highest payout, three times more than leopards and six times

[4]Previous work has been limited to the state-level (Karanth et al., 2018)

more than macaques. In terms of case type, livestock loss is the most common outcome (Panel B), receiving compensation worth |9,240 per incident on average. In the rare event that human death occurs, compensation is fifteen times higher.

Figure 2A shows locations of HWC incidents colored by animal type. Leopard (green) and bear (red) attacks are common statewide, whereas Macaque attacks (yellow) occur only in the south, where tribal population is low (Panel C). We thus focus on bear and leopard incidents when decomposing our regression estimates by animal (Section 5).

3.2 Village Covariates

The first set of covariates pertain to village demographics. In the absence of data on victim identity, we characterize each HWC incident by the tribal population share of the village where it occurred. Tribal population share is computed using ST and total population counts from the 2001 Census. Figure 2C plots tribal population share across villages. Lower Himachal is largely devoid of tribal communities whereas the mountainous Upper Himachal region is dominated by tribes. This data enables us to investigate the distribution of compensation across across villages along tribal lines.

The second set of covariates pertain to natural resource access, a key determinant of HWC. To characterize village exposure to conflict, we compute the distance from each village centroid to the nearest water body, protected area, and forest. Distance to water is measured by the straight-line distance using inland water shapefiles from ISCGM/Survey of India[5]. Distance to the nearest protected area is measured in the same way.

Measuring distance to the forest frontier is more complex. We first obtain gridded forest cover (250m resolution) for 2012 from the Vegetative Continuous Field (VCF) satellite product (Townshend et al., 2017). We then classify pixels with $> 40\%$ forest cover as dense forest based on the IFS definition, and clump adjacent dense forest cells into "patches". Lastly, we compute the straight-line distance from each village to the nearest forest patch.

3.3 Political Reservation

There are 68 state assembly constituencies in Himachal Pradesh[6] (Figure 3A). We obtain electoral data for each one from the SHRUG database (Asher et al., 2021), including winner name, party, and reservation status in every election. There are three ST reserved constituencies in Northern Himachal (red), where ST population share is highest (Figure 2C). There are 16 SC (Scheduled Caste) reserved constituencies scattered around the state (green). The remaining 49 are unreserved, where general elections are held (yellow).

[5] Data available at: https://maps.princeton.edu/catalog/stanford-jq724hb1204

[6] Constituencies were redrawn in 2008, though this does not affect our analysis since data begin in 2012.

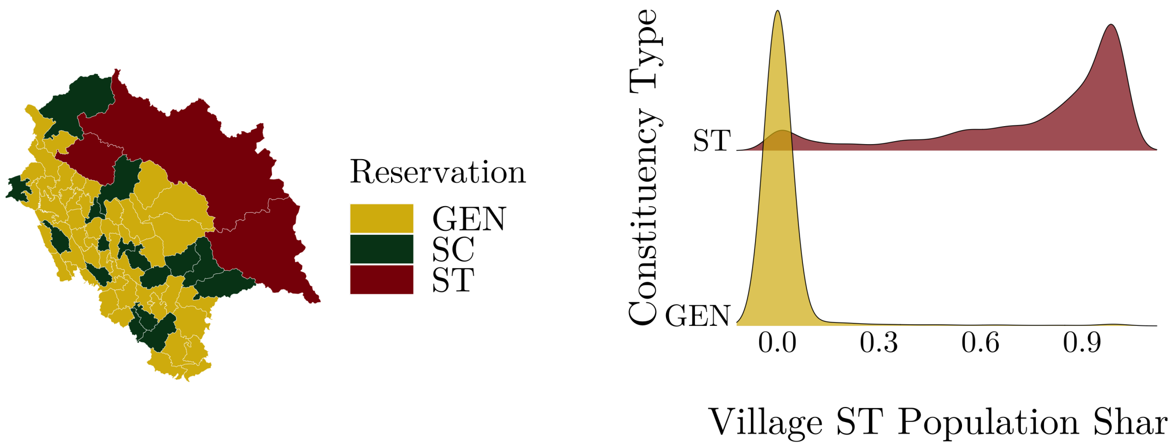

Figure 3: Political Reservation and Tribal Population

Note: Panel A is a map of assembly constituencies obtained from Datameet. Panel B shows histograms of tribal population across villages within constituency types. ST constituencies are reserved for ST candidates, SC constituencies for SC candidates, and GEN for general election constituencies.

Constituencies have a median of 239 villages. Figure 3B shows the ST population distribution across villages within constituencies. Most villages in ST reserved constituencies are over 60% tribal (red). However, there is also a mass near zero, implying that some villages in ST reserved constituencies have a small ST population. This characterizes a unique empirical setting for studying targeted spending toward co-ethnics since leader ethnicity is the majority in some villages and the minority in others.

Table A2 summarizes HWC payouts in reserved and non-reserved constituencies. On average, payouts are about |8,000 higher per incident in reserved constituencies compared to non-reserved constituencies. This is true even controlling for animal (Panel A) or case type (Panel B). While there may be many explanations, we focus on the idea that higher payments under reservation are an attempt to mitigate discrimination.

3.4 Empirical Patterns

Having described the data, we now turn to a deeper investigation of data patterns relating to inequities in HWC exposure and compensation. These insights lay the groundwork for the formal model that follows in Section 4.

Insight 1. *Scheduled Tribes are more exposed to HWC.*

The first insight from the data is that STs are more exposed to HWC by virtue of living closer to forests. We establish this empirically by comparing how village proximity to forests varies with ST population share:

$$log(Distance_{vd} + 1) = \alpha + \beta \cdot ST_{vd} + \gamma_d + \epsilon_{vd} \tag{1}$$

Table 1: Three Empirical Insights from the Data

	Distance to Nearest:		HWC	Compensation	
	(1)	(2)	(3)	(4)	(5)
	Forest	Protec. Area	# Conflicts	Human	Livestock
Village ST Share	-1.228***	-1.447***	0.258	-0.599**	0.220
	(0.188)	(0.205)	(0.208)	(0.299)	(0.165)
Geography Controls	No	No	Yes	Yes	Yes
Data	Cross-section	Cross-section	Panel	Panel	Panel
Estimator	OLS	OLS	Poisson	OLS	OLS
District FEs	✓	✓	✓	✓	✓
Year FEs			✓	✓	✓
Animal FE				✓	✓
Observations	17043	17043	2763	803	2810

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. In columns 1-2, data are a cross-section of all villages in Himachal Pradesh. In column 3, data are at the village-year level. In columns 4-5, data are at the incident level. Geography controls include: distance to nearest forest, protected area, and water body as well as elevation, ruggedness and nightlights. Standard errors are clustered by village.

where v and d index the village and district, respectively. $Distance_{vd}$ measures kilometres from the centroid of village v to the nearest forest patch. We add one to $Distance$ before taking the logarithm to account for zero values, i.e., villages inside forested areas. ST_{vd} is village ST population share. γ_d is a district fixed effect which accounts for some regions having higher forest cover than others.

We find $\beta < 0$, implying that tribal-dominated villages are closer to the forest edge compared to less-tribal villages within the same district (Column 1, Table 1). Villages with larger tribal populations are also closer to protected areas (Column 2). These results reflect a general pattern of natural-resource dependence among tribal communities.

Insight 2. *Scheduled Tribes experience greater wildlife conflict.*

The second insight is that tribal communities experience more wildlife conflict. To show this, we aggregate to a village-year count of HWC events and estimate the correlation with ST population as follows:

$$Conflicts_{vdt} = \alpha + \delta \cdot ST_{vd} + \Gamma X'_{vd} + \gamma_d + \theta_t + \epsilon_{vdt} \quad (2)$$

where v, d, and t index the village, district, and year, respectively. $Conflicts_{vdt}$ denote the number of HWC incidents and ST_{vd} is the village ST population share. X'_{vd} is a vector of geographic covariates including distance to forests, water, and protected areas. γ_d and θ_t are district and year fixed effects, respectively. We estimate δ with a poisson maximum-likelihood estimator since the outcome are event counts:

Our regression finds a positive yet statistically insignificant association between tribal population share and HWC incidence. While $\delta > 0$ implies that the count of HWC increases across villages within the same district as ST share increases (Table 1 (column 3), estimate imprecision implies that we cannot assert this difference as being meaningful.

Insight 3. *Scheduled Tribes receive smaller compensation amounts for similar conflict events.*

The third insight is that tribal communities are compensated less for wildlife attacks, which hints at possible discrimination. We establish this with the following panel regression on incident-level data:

$$log(Compensation_{iavdt}) = \alpha + \zeta \cdot ST_{vd} + \Gamma X'_{vd} + \gamma_d + \theta_t + \mu_a + \epsilon_{iavdt} \quad (3)$$

where i, a, v, d, t index the HWC incidents, animal, village, district, and year, respectively. $Compensation_{icvdt}$ denotes compensation paid for conflict i and, as before, ST_{vd} is village ST population share. X'_{vd} is the same set of geography covariates as Equation 2. γ_d and θ_t are district and year fixed effects, respectively. Animal fixed effects, μ_a, ensure that comparisons are made between incidents involving the same animal. We present estimates for human injury/death and livestock loss separately.

We find $\zeta < 0$ for HWC cases involving human death or injury (Table 1, Column 4), implying that compensation for *the same type of animal attack* is lower in villages with larger tribal communities compared to less-tribal communities. The point estimate implies that a 1pp. increase in tribal population share is associated with 0.60% lower compensation.

Summary of Empirical Patterns These three insights from the data highlight the vulnerability of India's tribal population in terms of exposure to HWC as well as the inadequacy of the compensation bureaucracy for mitigating damages. The fact that tribal communities receive lower compensation for similar conflict points to possible discrimination. It also raises the question of whether mandating tribal representation in local politics can help re-direct transfers toward ST communities and undo such inequities. We next build a theoretical model to explore this idea.

4 Model

This section develops a political economy model of a public bad with selective discrimination[7]. The goal is to articulate the economic logic giving rise to discrimination in compensation for the public bad. The model generates testable predictions about how political reservation alters the incentives for discrimination, and we test these predictions in Section 5. Detailed theoretical proofs are in Appendix C.

4.1 Set-up

Group Utility The economy consists of two groups $i \in \{s, n\}$, denoting Scheduled Tribes, s, and non-tribes, n. Population is normalized to unit mass, with $\pi < \frac{1}{2}$ denoting the share of s (the minority). Each group is potentially exposed to a public bad, X, which we interpret as HWC for the remainder of the model. Utility for group i linearly increases in private income, y_i, and decreases with exposure to the public bad:

$$U_i(y_i, X) = y_i - \alpha_i X, \tag{4}$$

where α_i parameterizes the marginal disutility from X. We assume $\alpha_s \geq \alpha_n$ to incorporate the idea that s is more vulnerable to HWC (Insight 1). We also assume s is poorer than n, given by $0 < y_s \leq y_n$, in line with official statistics (Ministry of Tribal Affairs, 2023).

Abatement Costs Given animal populations, human encroachment, and other landscape features, a natural equilibrium level of HWC emerges, $\bar{X}$. The executive arm of an incumbent government can set $X < \bar{X}$ at an Abatement Cost (AC) given by:

$$AC = \frac{\beta}{2}(\bar{X} - X)^2,$$

where β parameterizes the marginal cost of abatement actions such as investing in conservation education, fencing, and other measures.

Discrimination In principle, the executive must compensate losses from X. Without discrimination, group i is compensated $\alpha_i X$ and final utility is $U_i = y_i$. In practice, the executive can discriminate against s by reducing their compensation and redistributing a portion of withheld funds to n. This follows from Insight 3, where we showed that STs receive lower payouts than non-tribals for similar types of HWC. Formally, letting $\delta \in [0, 1]$ be the proportion of discrimination, s is paid $(1 - \delta)\alpha_s X$ instead of $\alpha_s X$[8].

[7] The model combines insights from existing models of political reservation (Besley and Coate, 1997; Besley et al., 2004; Anderson et al., 2015; Old, 2020; Chattopadhyay and Duflo, 2004), special interest politics (Grossman and Helpman, 2008), and their application to environmental contexts (Aidt, 1998; Gulati, 2008).

[8] The assumption that δ is non-negative implies that discrimination against n is not possible.

Political Costs of Discrimination Discrimination also induces rent-seeking behaviour. Let θ be the proportion of funds withheld from s lost to grifters. Both discrimination and rent-seeking behaviour reduce re-election chances. The Political Cost (PC) of discrimination is given by:

$$PC = \theta\delta\pi\alpha_s X + \frac{\delta^2}{2}\pi,$$

where $\theta\delta\pi\alpha_s X$ is the portion of diverted compensation from s lost to corruption. We assume that the political cost of rent-seeking increases linearly in the proportion of the rent seeking, θ. In addition, $\frac{\delta^2}{2}\pi$ is the political cost of alienating tthe tribals, s. We assume that this increases quadratically in the proportion of discrimination, δ.

After discrimination, compensation to s is $(1-\delta)\alpha_s X$, and final utility is $U_s = y_s - \delta\alpha_s X$. Compensation to n becomes $\alpha_n X + \frac{(1-\theta)\delta\alpha_s X}{1-\pi}$, and final utility is $U_n = y_n + \frac{\pi}{(1-\pi)}(1-\theta)\delta\alpha_s X$. If we sum compensation to both groups, we can write out the total Cost of Compensation (CC):

$$CC = [\pi\alpha_s + (1-\pi)\alpha_n - \theta\delta\pi\alpha_s]\, X$$

Next, we study how the Social Planner sets the level of δ and X and compare it to an elected politician under general and reserved elections.

4.2 The Social Planner

To benchmark the socially optimal allocation, a social planner chooses the proportion of discrimination, δ^*, and the level of the public bad, X^*, to minimize social costs:

$$\arg\max_{\delta, X} \{-(CC + AC + PC)\} \tag{5}$$

Taking the first order conditions yield:

$$\delta^* = 0 \tag{6}$$

$$X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right) \tag{7}$$

The detailed derivation is in Appendix C.1. In words, the planner does not discriminate because doing so only adds to political costs, without any aggregate benefit. The optimal allocation of X is the natural level less the linear population weighted sum of marginal damages for each group divided by the marginal abatement cost[9].

[9] We assume that the parameters in our model satisfy the conditions necessary for $X^* > 0$, in other words, we assume that $\bar{X} > \frac{1}{\beta}\left(\pi\alpha_s + (1-\pi)\,\alpha_n\right)$.

4.3 Election Process

We now model the political process, either a general election (n wins) or a reserved election (s wins)[10]. Politicians are citizens and have the same preference as their ethnic group, a simplifying assumption which enables us to abstract from political selection. The politician from group i chooses δ and X to minimize social costs, which increases re-election chances, while also caring about their own utility[11]:

$$\arg\max_{\delta,X} \{-(CC + AC + PC) + \gamma U_i\} \qquad \text{where } i \in \{s, n\} \tag{8}$$

Where γ is a weight on group i's utility. We solve for optimal δ and X under general and reserved elections, and then present a set of theoretical results about ethnic favouritism in HWC compensation.

General Elections: A representative from the majority non-tribal group n is always elected. After substituting their utility into Equation 8, the first order conditions of their maximization problem yield:

$$\delta^g = \frac{\gamma(1-\theta)}{(1-\pi)}\alpha_s X^g > 0 \tag{9}$$

$$X^g = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n - \frac{\gamma(1-\theta)\pi}{(1-\pi)}\delta^g \alpha_s\right) \tag{10}$$

The detailed derivation is in Appendix C.2. In words, Equation 9 implies that there is discrimination against the minority under general elections. The majority incumbent obtains personal benefit from discrimination, and does so until the marginal benefit from discrimination equals the re-election cost from alienation of the minority. Discrimination increases in the weight that n places on their utility, and falls as rent-seeking rises.

Equation 10 implies that a larger amount of HWC may be tolerated by the majority incumbent as increasing HWC increases the personal benefit from discrimination. Note that if $X^* > 0$ is positive, then $X^g > 0$ too.

Reserved Elections A representative from minority tribal group s is required to be elected. After substituting their utility into Equation 8, the first order conditions yield:

$$\delta^r = \delta^* = 0 \tag{11}$$

$$X^r = X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right) \tag{12}$$

[10] This assumption is backed by the fact that $< 2\%$ of STs win unreserved seats Old (2020).

[11] This assumption is common in special interest–incumbent models (Grossman and Helpman, 2008).

The detailed derivation is in Appendix C.3. Like the social planner, the minority executive does not discriminate. This is because we assumed discrimination only reduces compensation to the minority, and there is no way to discriminate against the majority (i.e. $\delta \in [0,1]$). The tribal executive therefore has no incentive to discriminate and will behave like the social planner in equilibrium[12].

4.4 Testable Predictions

We conclude the model with equilibrium comparative statics that yield predictions about the impact of reservation on conflict, compensation, and discrimination. Each theoretical prediction has an empirical analog, which we test in the next section.

Proposition 1 (Conflict tolerance under reserved elections)**.** *Less human-wildlife conflict is tolerated under reserved compared to general elections.*

Proof. $X^g - X^r = \frac{1}{\beta}\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta^g\alpha_s > 0$, since $\delta^g > 0$ from Equation 9. □

Under general elections, the leader from n tolerates additional HWC because more conflict implies more scope for discrimination and, as a result, more utility-enhancing redistribution towards their own group. Under reserved elections, the leader from s faces no benefit from discrimination and thus focuses only on abatement.

We test Proposition 1 with a simple difference regression that compares the HWC frequency in reserved and unreserved constituencies (Section 5.2). Our second proposition evaluates how payouts for these incidents varies across the two types of constituencies.

Proposition 2 (Compensation paid to s under reservation)**.** *Under reserved elections, s receives higher compensation relative to general elections.*

Proof. $\alpha_s X^* - (1-\delta^g)\alpha_s X^g = \delta\alpha_s X^* > 0$. See Appendix C.4 for full proof. □

When moving from general to reserved elections, two competing forces affect compensation to the minority. First, removing discrimination increases compensation per incident. Second, lower HWC decreases overall compensation (Proposition 1). The elimination of discrimination dominates because the marginal damage from HWC is larger for minorities ($\alpha_s \geq \alpha_n$), providing higher utility from fair compensation compared to n.

[12] While we make a restrictive assumption of no possible discrimination against the majority, a more plausible version—that the cost of discrimination against the majority is higher than the cost of discriminating against the minority—will also yield a similar outcome. This is because even under reservation, government machinery and law enforcement are often dominated by the majority, so despite being in power, the minority is less able to discriminate as successfully as the majority. For this more plausible assumption, we are likely to see a reduced level of discrimination, instead of its elimination.

Our empirical test of Proposition 2 compares average payouts in reserved versus unreserved constituencies. Formally, we test $\frac{CC^r}{X^r} - \frac{CC^g}{X^r} \geq 0$ with a simple difference design on victim-level data (Section 5.3). In the absence of data on victim identity, this serves as a valid test since reserved villages are 70% tribal (Table A3).

The third proposition, and key theoretical result of the paper, arises from a comparative static that varies tribal population share. The comparative static shows how compensation changes when the proportion of tribal constituents increases in reserved versus unreserved constituencies, which doubles as a test for ethnic favouritism.

Proposition 3 (Ethnic Favouritism: Tribes)**.** *The increase in average compensation when tribal population share rises is higher under reservation than the increase under general elections.*

Proof. $\frac{\partial}{\partial \pi}\left[\frac{CC^r}{X^r}\right] - \frac{\partial}{\partial \pi}\left[\frac{CC^g}{X^g}\right] = \delta \alpha_s \theta > 0$. Full proof in Appendix C.5. □

There is no rent-seeking under tribal leadership, which enables the full increase in compensation to reach constituents as tribal population share rises. Compensation per incident therefore rises faster with tribal population share under reserved compared to unreserved elections. Put simply, tribal leaders direct transfers toward co-ethnics, a phenomenon we call ethnic favouritism.

Our target theoretical parameter, $\delta \alpha_s \theta$, conveniently maps to a difference-in-difference coefficient in terms of model primitives. Having presented the empirical mapping for each Proposition, we now test each one using quasi-random variation in which political seats are reserved for tribal candidates.

5 Main Results

This section presents evidence of ethnic favouritism in environmental disaster payouts. We structure our results by empirically testing each model prediction in turn. Our identification strategy relies on a policy rule that generates quasi-random variation in which political seats are reserved for minorities, giving rise to plausible control groups: other constituencies that are very similar but instead face general elections (see Section 2.3).

5.1 Empirical Design

Our empirical design for testing Propositions 1-3 consists of comparing HWC outcomes across villages in treatment (reserved) and control (unreserved) constituencies. Treatment exogeneity is based on the discrete cutoff rule for allocating reserved seats (see Section 2.3). By choosing the three constituencies just below the cutoff as the control group, we obtain a matched sample with a better counterfactual than if we had used all unreserved constituencies in the district or state as the control. In particular, matching within districts ensures the estimation sample is balanced on district geographic characteristics that may covary with ST population share and HWC outcomes. The matched sample thus enables cleaner identification of the causal impact of political reservation on HWC payouts. We next discuss the validity of this approach in more detail.

The first concern is that matching only ensures similar ST population shares; treatment and control groups may still differ along other dimensions. Table A3 shows balance across treatment, control, and matched control groups along several village covariates. Although the treatment-matched control differences (column 5) are smaller than treatment-control differences (column 4), the differences are statistically significant. This means that matching is somewhat imperfect despite improving covariate balance. To overcome this, we control for these covariates in all of our regressions.

The second concern is that constituencies could have been gerrymandered. We are convinced via Iyer and Reddy (2013) that the redrawing of constituencies in 2008 was largely devoid of strategic political motives. We are thus confident that the matched sample features quasi-random variation in seat reservation.

Third, matching substantially reduces sample size, a common issue with cutoff-based estimators. This also means that estimates are only locally valid. We therefore present the full-sample analogs of all regressions as robustness checks for comparison.

Lastly, estimate validity depends on the extent of reporting bias. Reservation likely empowers minorities to report incidents that they would otherwise not have reported. If the distribution of conflict type remains unchanged, this only adds precision without biasing estimates. Yet we do expect this distribution to change since, under reservation, minorities may report smaller HWC damages than before. We address this in two ways. First, we design a test for reporting bias in Section 5.4.1, and find no evidence of bias. Second, the dependent variable in all our regressions is compensation paid *per incident*, and the coefficient on reservation reflects average compensation. If reservation prompts more reports of low-damage incidents, the coefficient will be biased downwards, counter to our prediction of higher payments under reservation. Therefore, if our results validate those predictions, they hold in spite of reporting bias and not because of it.

5.2 Results: HWC in Reserved Constituencies

Estimation Framework Proposition 1 from the model states that HWC is lower under reserved elections. We test this with the following equation:

$$HWC_{vcft} = \alpha + \delta \cdot R_{cf} + \Gamma X'_{vcft} + \theta_{ft} + \epsilon_{vcdt} \quad (13)$$

where HWC_{vcft} is the number of HWC incidents in village v of constituency c, in forest division f, and at time t. R_{cf} indicates whether the constituency is reserved for STs. The time index is dropped since reservation status does not change during our study period. In the matched sample, R_{cf} is zero for the three general election constituencies in the relevant district just below the tribal population cutoff.[13] X'_{vcft} is a vector of village level geography covariates described in Section 3.2. Forest division-by-year fixed effects, θ_{ft}, account for forest officer identity—as HWC reports and compensation amounts are approved by the divisional forest officers, a position which can be shuffled annually.

δ is the empirical analog of $X^G - X^*$ from the model, and $\delta < 0$ is the empirical test of Proposition 1. The intuition is that, absent reservation, the marginal benefit of discrimination exceeds the abatement cost of reducing HWC. Once the incentive for discrimination is removed under reserved elections, the minority chooses to abate instead, thereby lowering HWC incidence in reserved constituencies.

Results and Robustness Table 2 presents our estimates of Equation 13. The outcome in column 1 is log of total conflicts. We find $\delta < 0$; and statistically significant, implying that political reservation for tribal leaders leads to fewer HWC incidents, consistent with Proposition 1 of the model. The point estimate suggests that villages in reserved constituencies experience 6.2% fewer HWC incidents compared to villages in matched general election constituencies in the same forest division.

The remaining columns decompose the estimates by animal and case type. We find that the lower aggregate incidence of HWC is driven by fewer conflicts with bears in reserved constituencies (Column 2). In contrast, villages in these constituencies experience greater leopard attacks (Column 3). Similarly, we find that the reduction in aggregate HWC is driven by a drop in human injuries and death (Column 4), while there is a positive, but insignificant impact on livestock loss (Column 5) in reserved constituencies.[14]

Table A4 explores sensitivity of the main estimates. Column 1 tests robustness to a matched sample with five constituencies (instead of three) just below the cutoff as the control group. The coefficient is virtually unchanged. Column 2 shows that the estimate is robust to measuring the outcome in levels; the coefficient remains negative and signif-

[13] Although we exclude district fixed effects, we include forest division fixed effects, which are highly congruous with district boundaries in India.

[14] A possible, but untestable, explanation for these decompositions is that since bear conflict commands the highest payouts (Table A1), and is most associated with human injury and death, reserved constituencies shift abatement resources away from leopards and towards bears, leading to more leopard conflict.

Table 2: Political Reservation and Incidence of Human-Wildlife Conflict

	Total	Animal Type		Case Type	
	(1)	(2) Bear	(3) Leopard	(4) Human	(5) Livestock
ST Reserved	-0.062**	-0.242***	0.165*	-0.097*	0.010
	(0.030)	(0.081)	(0.085)	(0.057)	(0.052)
Geography Controls	Yes	Yes	Yes	Yes	Yes
Village ST Share	Yes	Yes	Yes	Yes	Yes
Division × Year FEs	✓	✓	✓	✓	✓
Observations	239	239	239	239	239
R^2	0.168	0.197	0.255	0.459	0.361

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the village-year level. The outcome is log number of conflicts reported. Column 1 pools over all reports and remaining columns subset the sample by animal (column 2-3) and case (columns 4-5). "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by village.

icant. Lastly, column 3 tests robustness to using the full set of unreserved constituencies as the control group. The coefficient remains very similar, though precision declines.

5.3 Results: HWC Payouts in Reserved Constituencies

Estimation Framework Proposition 2 from the model states that average payouts are higher in ST reserved constituencies. We test this with the following specification:

$$Payout_{iasvcft} = \phi \cdot R_{cf} + \Gamma X'_{vcft} + \theta_{ft} + \eta_{ia} + \mu_{is} + \epsilon_{iasvcft} \tag{14}$$

where $Payout$ is compensation paid (in |) for incident i, with animal a, leading to HWC case type s (human or livestock loss) s, in village v, of constituency c, in forest division f, at time t. R_{cf} indicates whether constituency c is reserved for STs. As before, X'_{vcft} is a vector of village-level covariates and θ_{ft} are division-by-year fixed effects, which account for forest officer rotations. We also include animal fixed effects, η_{ia}, and case fixed effects, μ_{is} to ensure comparisons are made between reserved and unreserved constituencies for the same type of animal attack, and the same type of case (human or livestock loss).

ϕ is the empirical analog of $\delta\alpha_s X^*$ from the model, and $\phi > 0$ is the empirical test of Proposition 2. Note that $\phi > 0$ means that tribal representation increases *average* compen-

Table 3: Political Reservation and Compensation for HWC

	(1) All Animals	(2) Bear	(3) Leopard
ST Reserved	0.572***	-0.618	0.893***
	(0.218)	(0.386)	(0.267)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Forest Division × Year FEs	✓	✓	✓
Animal FEs	✓		
Case FEs	✓	✓	✓
Observations	294	85	191
R^2	0.536	0.734	0.498

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the victim-year level. The outcome is log compensation. Column 1 pools all reports and remaining columns are subsamples by animal. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. All specifications include animal, case, and division-by-year fixed effects as well village level controls for: distance to forest, distance to nearest PA, and distance to nearest water body. Standard errors clustered by village.

sation in reserved constituencies, not whether benefits are directed *towards* the leader's co-ethnic group. We investigate the latter in Section 5.4.

Results and Robustness Estimates of Equation 14 are presented in Table 3. The outcome in column 1 is log of compensation (in ₹). We find that $\phi > 0$, consistent with Proposition 2 from the model, and suggesting that tribal representation in local politics increases average payouts relative to the average paid to matched unreserved constituencies in the same district. The point estimate implies that, on average, victims in reserved constituencies are compensated 57.2% more than victims of the same type of animal attack in unreserved constituencies. These results imply that lack of political representation is a key roadblock to equitable compensation.

Remaining columns present estimates from sub-samples by animal. The main result appears to be driven by higher payouts for leopard attacks (column 3). In contrast, the coefficient for bears (column 2) is negative and statistically insignificant, implying that payouts for bear conflict do not vary across treatment and matched control constituencies. [15] At the incident level, we are unable to test heterogeneity by case type as there are

[15] Notice the small number of incidents (85) for bear attacks in this subsample, which may be a reason for

insufficient cases of human injury/death between matched constituencies.

Table A5 explores sensitivity to the same robustness checks as the previous section. The coefficient remains similar when the control group consists of five constituencies just below the cutoff instead of three (Column 1). When the outcome is in levels (Column 2), the coefficient also remains positive and significant. Lastly, our estimates are robust to using the full sample (Column 3); the coefficient remains positive and statistically significant when all unreserved constituencies serve as the control.

Having established that mean payouts in reserved constituencies are higher, we next turn to the main question of the paper: whether higher payments reflect tribal leaders directing transfers toward their own communities. This requires looking *within* reserved and unreserved constituencies and comparing the payout distribution *across* villages.

5.4 Results: Ethnic Favouritism in Reserved Constituencies

Estimation Framework Proposition 3 from the model states that tribal constituency leaders target transfers toward coethnic villages, which we have been referring to as ethnic favouritism. We test this behaviour with a difference-in-difference design using the matched sample. Our specification compares the difference in payouts between villages with high and low tribal population shares (first difference) in reserved constituencies to the same difference in general election constituencies (second difference).

In a more standard design, policy timing creates time variation and the difference-in-difference is across treatment and control before and after policy implementation. We present an analog that exploits the ST share as the treatment variable. Our difference-in-difference estimator thus captures how payouts vary between low- and high-ST share villages across reserved and unreserved constituencies. The estimating equation is:

$$\begin{aligned} Payout_{iasvcft} = \xi \cdot (R_{cf} \times ST_{vcf}) + \beta \cdot R_{cf} + \delta \cdot ST_{vcf} + \Gamma X'_{vcft} \\ + \gamma_c + \theta_{ft} + \eta_{ia} + \mu_{is} + \epsilon_{iasvcft} \end{aligned} \quad (15)$$

As before, $Payout$ is the compensation paid (in |) for incident i, with animal a, leading to HWC case type s (human or livestock), in village v, of constituency c, in forest division f, and at time t. X'_{vcft} are village covariates. We include division-by-year fixed effects, θ_{ft}, animal fixed effects, η_{ia}, case fixed effects, μ_{is}, and constituency fixed effects, γ_c. R_{cf} is constituency reservation status, which enters interacted with village ST population share, ST_{vcf}, so that the interaction coefficient, ξ, captures the difference-in-difference effect. Standard errors are clustered at the constituency level.

the imprecision of the estimate.

Table 4: Ethnic Favouritism in Environmental Disaster Payouts

	(1) All Animals	(2) Bear	(3) Leopard
ST Reserved × Village ST Share	0.450*	-0.032	0.925***
	(0.203)	(0.650)	(0.193)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Constituency FEs	✓	✓	✓
Forest Division × Year FEs	✓	✓	✓
Animal FEs	✓		
Case FEs	✓	✓	✓
Observations	294	84	191
R^2	0.540	0.750	0.513

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the victim-year level. The outcome is log compensation. Column 1 pools all reports and remaining columns are subsamples by animal. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. All specifications include constituency, division-year, animal, and case fixed effects, and village controls for: distance to forest, distance to nearest PA, and distance to nearest water. Standard errors clustered by constituency.

The coefficient of interest, ξ, is the empirical analog of $\delta\alpha_s\theta$ from the model, and $\xi > 0$ is the empirical test of Proposition 3. As discussed in the model, the intuition is that since the incentive for rent-seeking is eliminated under reservation, the full increase in compensation in tribal-dominated villages, which experience more HWC, reaches the victims.

Results and Robustness Difference-in-difference estimates of Equation 15 are presented in Table 4. Column 1 uses the entire matched sample and includes animal and case fixed effects to ensure that treatment-control comparisons are made for the same type of animal and case incident. We find that $\xi > 0$, consistent with Prediction 3 from the model; tribal leaders exhibit coethnic preferences and direct transfers toward villages with larger tribal populations. The point estimate is interpreted as follows: when the constituency leader is tribal, villages under their governance with 10pp. larger tribal populations receive 4.5% more compensation compared to when the leader is from the majority.

The remaining columns document heterogeneity by animal type. Ethnic favourisitm is particularly salient in compensation for leopard attacks (column 3), whereas we find no evidence of favourisitm in compensation for bear attacks (column 2). Note the small number of observations for bear conflict, as identified earlier.

Table A6 explores sensitivity of the estimates to alternative samples and functional forms. Coefficient magnitude and precision is virtually unchanged when the matched control group consists of five constituencies just below the cutoff instead of three (column 1). The coefficient is also stable when the outcome is in levels, although precision declines (column 2). Lastly, the coefficient remains positive and statistically significant when using the full set of general election constituencies as the control group (column 3).

Table A7 shows the estimates adjusted for alternative standard error clustering. Column 1 replicates the baseline for comparison, where errors are clustered at the level of the treatment. However, given that the forest policy decision making unit is the forest division and and circle, unobserved determinants of payout amounts may be correlated within these administrative units. Columns 2 and 3 show that estimate precision is very similar under division and circle clustering, respectively.

Another view is that the appropriate cluster is ecological, not administrative. Since compensation varies by animal, unobserved determinants of payouts may be correlated within animal ranges, which do not adhere to administrative boundaries. In the absence of range maps, we instead investigate spatial correlation by implementing Conley (1999) standard errors for various choices of the kernel cutoff distance. Reassuringly, precision remains similar, even when allowing for longer distance spatial correlation up to 200km.

5.4.1 Reporting Bias

As noted in Section 5.1, estimate validity depends on the extent of reporting bias. If reservation increases the likelihood that STs file claims, this would increase the extensive margin (i.e., add more data points), improving precision of ξ without biasing it. ξ is only biased if changes in the extensive margin are systematic. For example, if STs underreport minor damages in unreserved constituencies (as the systemic barriers are costly to overcome), then compensation amounts in the control group are right-censored. If political representation induces STs to report these minor damages, then small values of compensation claims appear in the treatment and attenuate ξ. Yet despite this expected downward reporting bias, our difference-in-difference estimate is positive (Table 4), implying that that either ethnic favouritism dominates reporting bias, or there is no reporting bias.

In what follows, we formally test for reporting bias by examining whether the distribution of compensation amounts changes in tribal-dominated villages under reservation. We first bin the number of reports in a village into three quantiles of compensation values and then estimate the following village-level specification:

$$Reports_{vcft} = \varphi \cdot (R_{cf} \times ST_{vcft}) + \beta \cdot R_{cf} + \delta \cdot ST_{vcft} + \Gamma X'_{vct} + \gamma_c + \theta_{ft} + \epsilon_{vcft}$$

where $Reports \in \{low, med, high\}$ is the number of compensation claims of low, medium, or high value. All subscripts and terms are the same as Equation 15. φ is the test for reporting bias. When the outcome is low-value reports, $\varphi > 0$ implies that reservation prompts STs to report more minor damages, potentially downward biasing ξ in Equation 15. Lack of reporting bias is indicated by $\varphi = 0$.

Table A8 reports estimates from this test; we find no evidence of reporting bias in the matched sample. The outcome in all columns is the number of compensation claims in a village of low, medium, and high value. The interaction coefficient in columns 1-3 is statistically insignificant, suggesting that reservation does not induce victims in tribal-dominated villages to report more low-, medium-, or high-value claims. Since the outcome is a count, columns 4-6 report Poisson estimates. We use the pseudo-maximum likelihood estimator to adjust standard errors (Wooldridge, 1999). Again, there is no statistically discernible difference in the number of low, medium or high-value claims under reservation. These findings help build confidence in the credibility of our research design.

6 Conclusion

This paper studies the role of ethnic favouritism in the allocation of environmental disaster relief. The global poor are largely uninsured against disasters, leaving them reliant on government relief. Yet, the poor and marginalized face systemic barriers to access government assistance, raising concerns about the effectiveness of disaster aid. While affirmative action policies around the world aim to remove these power imbalances, their success at providing equitable disaster relief is an important and understudied question.

Our setting concerns Human-Wildlife Conflict (HWC) in Himachal Pradesh, India, a largely overlooked natural disaster responsible for massive income loss and a death toll similar to floods. Using novel data on HWC compensation claims, we document that India's tribal community are most vulnerable to wildlife attacks, yet are compensated less that non-tribals for the same type of damage. These empirical patterns hint at possible discrimination against of India's most vulnerable and politically excluded groups.

We next build a political economy model to explore whether political representation of tribal communities can undo discrimination in payouts. Our model shows that the gap in payouts between tribal and non-tribal areas narrows when political seats are reserved for tribal candidates, a phenomenon we call ethnic favouritism. While targeted public spending toward coethnics has been studied in the context of poverty alleviation and human capital formation, its relationship to disaster spending is relatively unexplored.

We empirically test the model using a quirk in India's system for reserving political seats for tribal candidates. Our difference-in-difference estimates confirm the model predictions. We find that villages with higher tribal population shares receive substantially larger payouts per incident when their constituency leader is also tribal. These results imply that political representation directs disaster aid toward those who need it most.

Our analysis is not without limitations. First, we are careful to attribute lower payouts to tribal communities as evidence of discrimination. While we condition on the type of animal attack, case type, and other geographic determinants of HWC, there may be other explanations that are unobserved in our model. Second, our estimates are only valid for constituencies around the cutoff, making broader state-level policy extrapolations more challenging. Fortunately, our estimates are similar under the full sample. Lastly, we focus on "wide" ethnic alignment between constituency leaders and victims, whereas victims mainly interact with their local forest office. Without data on forest officer identity, exploring the impact of "narrower" ethnic alignment remains a task for future research.

Overall, our paper contains several critical insights for policy. First, ensuring representation for marginalized groups can help rectify historic environmental injustices and direct resources toward the most vulnerable. Second, standardized and transparent compensation processes can reduce discretionary biases and ensure fairness in disaster relief allocation. Lastly, enhancing coordination between elected representatives and bureaucratic agencies can amplify the salience of abatement efforts and lower the disaster risk faced by minorities. As climate change continues to exacerbate natural disasters, integrating these lessons into policy design will be crucial for fostering environmental justice.

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A Appendix Tables

Table A1: Summary Statistics of HWC Compensation

	Number of Incidents	Mean Compensation (Thousand |)	Std. Dev. (Thousand |)
Panel A: Animal Type			
Bear	348	29.70	37.59
Boar	4	24.34	34.30
Fox	8	5.00	0.00
Jackal	1	2.44	.
Leopard	3001	9.82	15.95
Macaque	831	4.74	15.28
Sambhar	1	6.61	.
Wolf	8	3.67	1.19
Total	4202	10.45	19.57
Panel B: Case Type			
HumanDeath	20	147.50	89.55
HumanMajorInjury	127	50.26	21.38
HumanNA	1009	6.37	21.76
LivestockLoss	3048	9.24	10.31
Total	4204	10.44	19.57

Note: Panel A summarizes compensation by animal type. Panel B shows the same for case type. "Human NA" denotes human-related cases where death or injury type is unknown.

Table A2: Summary Statistics: Compensation by Reservation Status

	Reserved			Non Reserved		
	Obs.	Mean (Thousand |)	SD	Obs.	Mean (Thousand |)	SD
Panel A: Animal Type						
Bear	60	17.20	18.64	287	32.35	40.03
Leopard	137	19.48	24.70	2828	9.41	15.33
Total	197	18.79	23.00	3666	10.37	19.92
Macaque				551	3.86	17.42
Panel B: Case Type						
HumanDeath	3	150.00	0.00	16	150.00	100.00
HumanMajorInjury	4	64.50	21.00	106	52.09	21.76
HumanNA	8	15.73	24.14	734	7.00	25.34
LivestockLoss	190	15.24	14.11	2826	8.88	9.91
Total	205	18.20	22.73	3682	10.37	19.91

Note: Panel A summarizes compensation by animal type. Panel B shows the same for case type. "Human NA" denotes human-related cases where death or injury type is unknown.

Table A3: Covariate Balance

	(1) Treatment	(2) Control	(3) Matched Control	(4) Difference	(5) Matched Difference
Village ST Share	0.76	0.03	0.30	0.73***	0.46***
Dist. to Forest	1.74	0.92	0.33	0.82*	1.42***
Dist. to Protected Area (km)	8.38	10.34	8.63	-1.96***	-0.24
Dist. to Water (km)	105.09	35.09	32.14	70.00***	72.95***
Elevation (m)	2622.59	1315.49	1467.09	1307.10***	1155.51***
Ruggedness Index	49.56	31.58	39.54	17.98***	10.02***

Note: Columns 1 reports sample means in ST reserved constituencies. Columns 2 and 3 report sample means in *all* non-reserved constituencies, and non-reserved constituencies in the matched control group, respectively. Column 4 is a t-test for the difference in means between columns 1 and 2. Column 5 is the same for columns 1 and 3. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A4: Robustness: Political Reservation and HWC Incidence

	(1)	(2)	(3)
ST Reserved	-0.052*	-0.157**	-0.037
	(0.027)	(0.079)	(0.034)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Sample	Matched	Matched	Full
Matched Controls	5	3	
Specification	log-lin	lin-lin	log-lin
Division × Year FEs	✓	✓	✓
Observations	248	239	2691
R^2	0.165	0.161	0.152

* $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the village-year level. The outcome is number of of conflicts reported. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. Column 1 is a log-linear specification which uses five constituencies below the cutoff as the matched control group. In column 2 the outcome is in levels. In column 3, the full set of unreserved constituencies is the control group. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by village.

Table A5: Robustness: Reservation and HWC Payouts

	(1)	(2)	(3)
ST Reserved	0.436*	7.448**	0.446**
	(0.222)	(2.954)	(0.173)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Sample	Matched	Matched	Full
Matched Controls	5	3	3
Specification	log-lin	lin-lin	log-lin
Division $\times$ Year FEs	✓	✓	✓
Animal FEs	✓	✓	✓
Case FEs	✓	✓	✓
Observations	306	294	3810
R^2	0.540	0.630	0.581

* $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the individual level. The outcome is compensation amount. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. Column 1 is a log-linear specification which uses five constituencies below the cutoff as the matched control group. In column 2 the outcome is in levels. In column 3, the full set of unreserved constituencies is the control group. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by village.

Table A6: Robustness: Ethnic Favouritism in HWC Payouts

	(1)	(2)	(3)
ST Reserved × Village ST Share	0.412*	10.516	0.547***
	(0.207)	(6.934)	(0.161)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Sample	Matched	Matched	Full
Matched Controls	5	3	3
Specification	log-lin	lin-lin	log-lin
Constituency FEs	✓	✓	✓
Division × Year FEs	✓	✓	✓
Animal FEs	✓	✓	✓
Case FEs	✓	✓	✓
Observations	306	294	3807
R^2	0.549	0.633	0.592

* $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the individual level. The outcome is compensation amount. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. Column 1 is a log-linear specification which uses five constituencies below the cutoff as the matched control group. In column 2 the outcome is in levels. In column 3, the full set of unreserved constituencies is the control group. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by village.

Table A7: Matched Sample: Robustness—Alternative Standard Errors

	Standard Error Boundary			Conley Spatial Error Cutoff			
	Constituency	Division	Circle	20km	50km	100km	200km
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ST Reserved × Village ST Share	0.443*	0.443**	0.443*	0.443*	0.443***	0.443***	0.443***
	(0.209)	(0.103)	(0.117)	(0.231)	(0.097)	(0.139)	(0.047)
Village ST Share	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constituency FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Division × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Animal FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Case FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	303	303	303	303	303	303	303
R^2	0.557	0.557	0.557	0.557	0.557	0.557	0.557

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Coefficient estimates and standard errors from baseline specification with alternative clustering. Column 1 replicates the main estimate with clustering at the constituency level. In columns 2-3, standard errors are clustered by forest division and forest circle, respectively. Columns 4-7 implement Conley (1999) standard errors for four different values of the kernel cut off distance (in km).

Table A8: Matched Sample: Reporting Bias

	OLS Estimates			Poisson Estimates		
Outcome: # of reports with low, med, high value	(1) Low	(2) Med	(3) High	(4) Low	(5) Med	(6) High
ST Reserved × Village ST Share	-0.146	0.007	0.304	-2.070	-0.055	0.344
	(0.094)	(0.061)	(0.193)	(1.562)	(0.200)	(0.230)
Village ST Share	Yes	Yes	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constituency FEs	✓	✓	✓	✓	✓	✓
Forest Division × Year FEs	✓	✓	✓	✓	✓	✓
Observations	239	239	239	75	222	239
R^2	0.362	0.181	0.265			

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data comprise the matched sample. The unit of observation is a village-year. The outcomes are the number of compensation reports in a village of low (first quantile), medium (second quantile) and high (third qantil) value. "ST Reserved" indicates whether the incident occurred in a reserved constituency. "Village ST Share" is village tribal population share. All regressions include constituency and forest division-by-year fixed effects as well as controls for distance to forest, distance to nearest PA, and distance to nearest water body. Standard errors clustered by constituency.

B Appendix Figures

C Model Appendix

C.1 Social Planner Maximization (Equation 5)

The Social Planner problem is:

$$\arg\max_{\delta,X} \{-(CC + AC + PC)\} \tag{16}$$

FOC δ: We present the possibility of a corner solution as it is relevant in this case. A full FOC for a constrained maximization has three components, the partial derivative of the social planner problem w.r.t. δ, the constraint that δ is non-negative, and the product of the choice variable, and its partial derivative which equals zero. This gives:

$$-\delta\pi \leq 0; \delta \geq 0; \text{ and } \delta(-\delta\pi) = 0. \tag{17}$$

As $\pi > 0$, Equation 17 is satisfied iff $\delta^* = 0$. In other words, the benevolent government chooses not to discriminate against the minority. This is because discrimination has no aggregate benefit, only adding to political costs.

FOC X: For its choice of HWC, a corner solution is not relevant, so we only present the partial derivative of the planner problem w.r.t. X and equate it to zero.

$$-\pi(\alpha_s - \alpha_n + \alpha n) + \beta(\bar{X} - X) = 0. \tag{18}$$

Equation 18 can be rewritten as,

$$X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right), \tag{19}$$

implying that the optimal allocation of X is the natural level less the linear population weighted (by population weight) sum of the marginal damages for each group divided by the marginal cost of reduction. We assume that the parameters in our model satisfy the conditions necessary for $X^* > 0$, in other words, we assume that $\bar{X} > \frac{1}{\beta}\left(\pi\alpha_s + (1-\pi)\,\alpha_n\right)$.

C.2 Majority Politician Maximization

The majority group, n, always wins under general elections. After substituting their utility into Equation 8, the maximization problem is:

$$\arg\max_{\delta,X} \left\{ -(CC + AC + PC) + \gamma \left(y_n + \frac{\pi}{(1-\pi)}(1-\theta)\delta\alpha_s X \right) \right\}.$$

FOC δ For its choice of discrimination, δ^g, a corner solution is not relevant, and thus we set the partial derivative w.r.t. δ equal to zero, which gives:

$$-\delta\pi + \gamma(1-\theta)\frac{\pi}{(1-\pi)}\alpha_s X^g = 0. \tag{20}$$

FOC X: For its choice of X, a corner solution is also not relevant, so we only present the partial derivative with respect to X and equate it to zero, which gives:

$$-\left(\pi\left(\alpha_{ST} - \alpha_{NT}\right) + \alpha_{NT}\right) + \beta(\bar{X} - X) + \gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta\alpha_{ST} = 0 \tag{21}$$

The above first order conditions give us:

$$\delta^g = \frac{\gamma(1-\theta)}{(1-\pi)}\alpha_{ST} X^g, \tag{22}$$

and

$$X^g = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n - \frac{\gamma(1-\theta)\pi}{(1-\pi)}\delta^g\alpha_s\right), \tag{23}$$

which implies a positive amount of discrimination against the minority when the incumbent majority is in power. Note that if $X^* > 0$, then $X^g > 0$ also.

C.3 Minority Politician Maximization

Under reserved elections, only the minority, s, can run for office. After substituting their utility into Equation 8, the maximization problem is:

$$\arg\max_{\delta, X} \{-(CC + AC + PC) + \gamma (y_s - \delta \alpha_s X)\}$$

FOC δ For its choice of discrimination δ, a corner solution in the FOC is relevant. A full FOC for a constrained maximization has three components, the partial derivative of the maximization problem w.r.t. δ, the constraint that δ is non-negative, and the product of the choice variable and its partial derivative, which equals zero. This gives:

$$-\delta\pi - \gamma\alpha_{ST} X^r \leq 0; \delta \geq 0; \text{ and } \delta(-\delta\pi - \gamma\alpha_s X^r) = 0. \tag{24}$$

FOC X For its choice of X, a corner solution is not relevant, so we only present the partial derivative of the maximization problem and equate it to zero:

$$-\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right) + \beta(\bar{X} - X) - \gamma\delta\alpha_s = 0 \tag{25}$$

Since $\{\pi, \gamma, \alpha_s\} > 0$, Equation 24 is satisfied iff

$$\delta^r = 0$$

which implies that

$$X^r = X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right) \tag{26}$$

Despite a political preference, discrimination and the choice of conflict under minority reservation are the same as those from the benevolent government.

C.4 Proof of Proposition 2

Proposition 4 (Compensation paid to s under reservation)**.** *Under reserved elections, s receives higher compensation relative to general elections.*

Proof. In reserved elections, tribal compensation is $\alpha_s X^*$, and in general elections tribal compensation is $(1-\delta^g)\,\alpha_s X^g$. When discrimination is removed, however, HWC is also lower. To be able to determine the overall effect, we need to evaluate the difference between them,

$$
\begin{aligned}
&\alpha_s X^* - (1-\delta^g)\,\alpha_s X^g \\
=&\alpha_s\left(X^* - X^g\right) + \delta\alpha_s X^g \\
=&\alpha_s \frac{1}{\beta}\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta^g\alpha_s - \alpha_s\frac{1}{\beta}\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta^g\alpha_s + \delta\alpha_s X^* \\
=&\delta\alpha_s X^* > 0
\end{aligned}
$$

□

C.5 Proof of Proposition 3

Proof. We can write the average compensation under reservation as: $\frac{CC^r}{X^r} = [(\alpha_s - \alpha_n)\pi + \alpha_n]$ and average compensation under general elections is: $\frac{CC^g}{X^g} = [(\alpha_s - \alpha_n)\pi + \alpha_n - \delta\pi\alpha_s\theta]$. Next we take the partial derivative of these two terms.

$$
\begin{aligned}
&\frac{\partial}{\partial\pi}\left[\frac{CC^r}{X^r}\right] = \frac{\partial}{\partial\pi}\left[(\alpha_s - \alpha_n)\pi + \alpha_n\right] = \left[\alpha_s - \alpha_n\right]. \\
&\frac{\partial}{\partial\pi}\left[\frac{CC^g}{X^g}\right] = \frac{\partial}{\partial\pi}\left[(\alpha_s - \alpha_n)\pi + \alpha_n - -\delta\pi\alpha_s\theta\right] = \left[\alpha_s - \alpha_n - \delta\alpha_s\theta\right]. \\
&\frac{\partial}{\partial\pi}\left[\frac{CC^r}{X^r}\right] - \frac{\partial}{\partial\pi}\left[\frac{CC^g}{X^g}\right] = \delta\alpha_s\theta.
\end{aligned}
$$

Given our assumptions we know that:

$$\delta\alpha_s\theta > 0.$$

Thus average compensation rises faster when the proportion of tribal constituents rise under reservation than under general elections. This is mostly because there is no rent seeking in tribal elections, which allows the full increase in compensation to increase as tribal populations (that have higher damage) increase. □