Controlling Inflation at Its Source: A Progressive Rental Taxation Framework to Stabilize Housing Costs in India and Tamil Nadu

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Article

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Abstract

India's, or specifically Tamil Nadu's, rapidly escalating residential rental market poses a severe affordability crisis, with house rent constituting over 60% of urban household expenditure in major metropolitan areas. Landlords exercise unchecked discretion in annual rent increases, often exceeding inflation and wage growth by significant margins. This paper proposes a *Progressive Rental Taxation (PRT)* framework that imposes multiplicative tax penalties on landlords who increase rent beyond a permissible threshold anchored to a novel *Rent Hike Index (RHI)*. We formulate the problem as a multi-objective optimization, constructing a Pareto front between government tax revenue maximization, tenant affordability preservation, and rental market stability. A *Rental Escalation Regulatory Index (RERI)* is introduced to quantify the equilibrium state of the rental market under varying tax regimes. We present mathematical models, simulation scenarios, and concrete policy recommendations for the Government of India to curb exploitative rent hikes through targeted fiscal interventions.

Keywords: rental price control; progressive taxation; Pareto optimization; rent hike index; Indian economy; housing affordability; multi-objective optimization; policy recommendation

1. Introduction

1.1. Background and Motivation

The Indian residential rental market has witnessed unprecedented price escalation over the past two decades. According to the National Housing Bank's RESIDEX and the Reserve Bank of India's periodic surveys, urban rental costs in Tier-1 cities such as Mumbai, Delhi NCR, Bengaluru, Hyderabad, and Chennai have grown at compound annual rates of 8–15%, far outpacing the average Consumer Price Index (CPI) inflation of 5–6% and median wage growth of 6–8%. House rent constitutes the single largest component of household expenditure for urban dwellers, often exceeding 30–40% of monthly income for middle-class families and surpassing 50% for lower-income groups.

In Simple Words

Imagine a family earning INR 50,000 per month. If their rent grows at 12% per year but their salary grows at only 7%, every year they fall further behind. After 5 years, their rent has nearly doubled, but their salary has grown by only about 40%. This is the core problem: **rents are running faster than salaries**, and there is no mechanism to slow them down.

The absence of a nationally uniform rent regulation mechanism enables landlords to impose arbitrary annual rent increases. While several states have enacted Rent Control Acts (e.g., the Maharashtra Rent Control Act, 1999; the Delhi Rent Control Act, 1958), these legacy legislations primarily protect existing tenants in older properties and fail to address the modern rental ecosystem dominated by new construction, co-living arrangements, and corporate rentals. The Model Tenancy Act (MTA), 2021,

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proposed by the Central Government, provides a framework for rent agreements but does not impose hard caps on annual rent increases, leaving tenants vulnerable to market-driven price escalation.

1.2. Problem Statement

We address the following core problem:

Central Problem

Given a tenant's current rent R_t at time t, design a taxation framework such that any rent increase $\Delta R = R_{t+1} - R_t$ beyond a permissible threshold δ^* triggers a progressive tax penalty on the landlord, where the tax multiplier is a function of the excess increase, thereby disincentivizing exploitative rent hikes while maintaining market equilibrium.

In Simple Words

The question we are trying to answer is: **How can the government make it financially foolish for landlords to overcharge tenants, without banning rent increases entirely?** Our answer is a tax-based system where the more a landlord overcharges, the more tax they must pay — so much that they actually *lose money* by being greedy.

1.3. Contributions

This paper makes the following contributions:

(i) A formal mathematical model for the **Progressive Rental Taxation (PRT)** framework with double and triple tax multipliers for excessive rent increases.
(ii) A novel **Rent Hike Index (RHI)** that dynamically computes the permissible rent increase threshold based on macroeconomic indicators.
(iii) A **Rental Escalation Regulatory Index (RERI)** for measuring rental market health under different taxation regimes.
(iv) A multi-objective optimization formulation with **Pareto front analysis** balancing government tax revenue, tenant affordability, and market stability.
(v) Concrete **policy recommendations** for the Government of India with implementation roadmaps.

1.4. Conceptual Framework Overview

Figure 1 presents an overview of the proposed PRT framework, showing how macroeconomic inputs feed into the Rent Hike Index, which determines the taxation thresholds, ultimately producing three balanced outcomes.

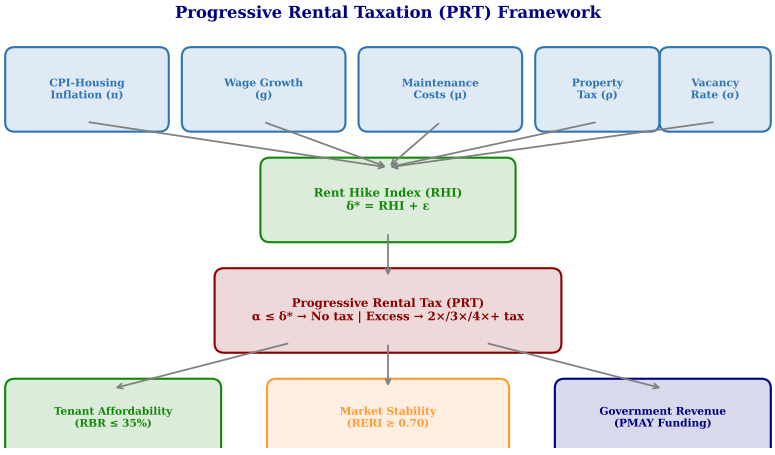

Figure 1. Conceptual overview of the Progressive Rental Taxation (PRT) framework showing the flow from macroeconomic inputs through the Rent Hike Index to taxation decisions and desired outcomes.

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Figure 2 provides a simplified visual summary showing the three-agent interaction within the PRT framework.

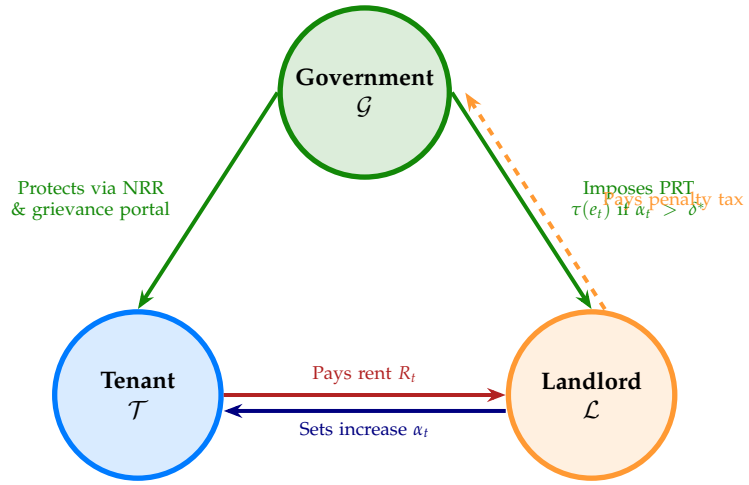

Figure 2. Three-agent interaction in the PRT framework. The tenant pays rent; the landlord sets increases; the government enforces progressive tax penalties on excessive increases and protects tenants through the National Rental Registry.

1.5. Organization

The remainder of this paper is organized as follows. Section 2 reviews related work. Section 3 presents the problem scenario and market analysis. Section 4 defines the Rent Hike Index. Section 5 formulates the Progressive Rental Taxation model. Section 6 introduces the Rental Escalation Regulatory Index. Section 7 develops the multi-objective optimization and Pareto front analysis. Section 8 presents simulation scenarios. Section 9 provides policy recommendations, and Section 11 concludes the paper.

2. Literature Review

2.1. Rent Control: International Perspectives

Rent control mechanisms have been implemented globally with varying degrees of success. First-generation rent controls (hard caps) in cities like New York (1943), Stockholm, and Berlin have been extensively studied, with economists noting both benefits (tenant protection, reduced displacement) and drawbacks (reduced housing supply, quality deterioration). Second-generation controls emphasize "rent stabilization" where annual increases are pegged to inflation indices, as practiced in Germany's *Mietpreisbremse* (rent brake) and the Netherlands' *Huurcommissie* system.

2.2. Taxation as a Regulatory Instrument

Pigouvian taxation, originally formulated for externality correction, has been adapted for real estate markets. Property tax surcharges on vacant units (e.g., Vancouver's Empty Homes Tax), speculative gains taxes (e.g., British Columbia's Speculation Tax), and capital gains adjustments form a toolkit for market intervention. However, taxation specifically targeting *rent increase behavior* rather than property ownership or transactions represents a relatively unexplored policy domain.

In Simple Words

What is a Pigouvian tax? It is a tax designed to discourage behaviour that harms society. For example, a carbon tax makes pollution expensive. Our **PRT works the same way**: it makes excessive rent increases expensive for landlords. Just as a carbon tax does not ban factories — it just makes dirty factories pay more — our tax does not ban rent increases, it just makes unfair increases costly.

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2.3. Indian Rental Market Dynamics

The Indian rental landscape is characterized by significant heterogeneity across states, governed by disparate rent control legislations. The Model Tenancy Act 2021 sought to balance landlord and tenant interests but lacks enforcement teeth. Prior studies by the National Institute of Urban Affairs (NIUA) and the Indian Council for Research on International Economic Relations (ICRIER) have documented the rent-to-income ratio crisis but have not proposed taxation-based corrective mechanisms.

2.4. Multi-Objective Optimization in Policy Design

Multi-objective optimization using evolutionary algorithms (NSGA-II, MOEA/D) and Pareto front analysis has been applied in policy design contexts including environmental regulation, healthcare resource allocation, and urban planning. Application to rental market regulation through tax policy optimization represents a novel intersection of operations research and housing economics.

In Simple Words

What is multi-objective optimization? In everyday life, we often face trade-offs. When buying a car, you want it to be *cheap*, *fuel-efficient*, and *powerful* — but you cannot maximize all three at once. Multi-objective optimization is a mathematical technique to find the **best possible compromises**. In our paper, we use it to find tax settings that balance three competing goals: (1) protecting tenants, (2) generating revenue for affordable housing, and (3) keeping the rental market healthy. The set of best compromises is called the **Pareto front** (explained in detail in Section 7).

3. Problem Scenario and Market Analysis

3.1. Current Scenario

Consider the rental market ecosystem with three principal agents:

Definition 1 (Rental Market Agents)**.** *The rental market comprises three agents:*

(a) ***Tenant*** $(\mathcal{T})$***:*** *The occupant paying rent* R_t *at time* t*.*
(b) ***Landlord*** $(\mathcal{L})$***:*** *The property owner setting rent and deciding annual increases* ΔR_t*.*
(c) ***Government*** $(\mathcal{G})$***:*** *The regulatory authority imposing taxation policy* $\tau(\cdot)$*.*

3.2. Rent Escalation Pattern

Let R_t denote the monthly rent at year t. In the absence of regulation, landlords typically impose the following increase pattern:

$$R_{t+1} = R_t \cdot (1 + \alpha_t) \tag{1}$$

where α_t is the landlord's chosen annual increase rate. Empirical analysis across Indian metropolitan areas reveals:

Table 1. Typical Annual Rent Increase Rates in Indian Metro Cities (2018–2024).

City	Mean α_t (%)	Median (%)	Max Observed (%)	CPI Growth (%)
Mumbai	10.2	8.5	25.0	5.8
Delhi NCR	8.7	7.0	20.0	5.5
Bengaluru	12.5	10.0	30.0	5.2
Hyderabad	11.3	9.0	28.0	5.6
Chennai	7.8	6.5	18.0	5.4
Pune	9.4	8.0	22.0	5.3
Kolkata	6.5	5.5	15.0	5.7

The key observation is that $\alpha_t \gg \pi_t$ (CPI inflation rate) in most cases, creating a widening gap between rental costs and general price levels.

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In Simple Words

Look at Bengaluru in the table above: landlords increase rent by **12.5% on average**, but the general price level (CPI) grows by only **5.2%**. This means rent is growing **more than twice as fast as inflation**. A family paying INR 20,000 today will pay INR 35,000 in just 5 years at this rate — even though the cost of everything else has only gone up by about 30%.

3.3. Impact Assessment

The unchecked rent escalation creates cascading economic effects:

$$\text{Rent Burden Ratio (RBR)} = \frac{R_t}{Y_t} \times 100\% \tag{2}$$

where Y_t is the monthly household income. International standards suggest RBR $\leq 30\%$ for housing affordability. In Indian metros, the median RBR has crossed 35–45%, with lower-income quintiles experiencing RBR $> 60\%$.

In Simple Words

What is the Rent Burden Ratio? It is simply the fraction of your monthly income that goes to rent. If you earn INR 50,000 and pay INR 20,000 rent, your RBR is $20{,}000/50{,}000 = 40\%$. International guidelines say this should be **at most 30%**. In many Indian cities, families are spending 40–60% of their income on rent, leaving too little for food, healthcare, and education.

4. The Rent Hike Index (RHI)

4.1. Index Construction

We propose the **Rent Hike Index (RHI)** as a composite index that determines the maximum permissible annual rent increase.

Definition 2 (Rent Hike Index). *The Rent Hike Index at time t for city c is defined as:*

$$\text{RHI}_{t,c} = w_1 \cdot \pi_t^{CPI} + w_2 \cdot g_t^{wage} + w_3 \cdot \mu_t^{maint} + w_4 \cdot \rho_t^{prop} - w_5 \cdot \sigma_t^{vacancy} \tag{3}$$

where:

- π_t^{CPI}*: CPI inflation rate (housing component) at time t*
- g_t^{wage}*: Median wage growth rate in city c*
- μ_t^{maint}*: Property maintenance cost escalation rate*
- ρ_t^{prop}*: Property tax increase rate*
- $\sigma_t^{vacancy}$*: Vacancy rate adjustment factor (higher vacancy $\Rightarrow$ lower permissible increase)*
- $w_i \geq 0$, $\sum_{i=1}^{5} w_i = 1$*: Weights determined by a regulatory committee*

In Simple Words

Think of the RHI like a recipe. Just as a recipe combines different ingredients in specific proportions, the RHI combines five economic indicators to produce a single "fair rent increase" number.

Why these five ingredients?

1. **Inflation (30%):** If prices of goods go up, some rent increase is fair.
2. **Wage growth (30%):** If salaries are growing, tenants can afford a bit more — but rent should not grow faster than wages.
3. **Maintenance costs (15%):** If repairs and plumbing cost more, landlords deserve compensation.

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4. **Property tax (10%):** If the municipality increases property tax, part of that cost can be passed on.
5. **Vacancy rate (-15%):** If many houses are empty (high vacancy), landlords have no excuse to raise rent. This component *reduces* the limit.

The **minus sign** on vacancy is crucial: it acts as a natural brake. When many houses are available, the RHI goes down, preventing unjustified increases.

4.2. Weight Calibration

The weights $\mathbf{w} = (w_1, w_2, w_3, w_4, w_5)$ are calibrated using the Analytic Hierarchy Process (AHP) with input from stakeholder groups:

Table 2. Recommended RHI Weight Configuration.

Component	Symbol	Recommended Weight
CPI Inflation (Housing)	w_1	0.30
Median Wage Growth	w_2	0.30
Maintenance Cost Escalation	w_3	0.15
Property Tax Increase	w_4	0.10
Vacancy Rate Adjustment	w_5	0.15

4.3. Permissible Threshold

The permissible annual rent increase threshold is:

$$\delta^*_{t,c} = \text{RHI}_{t,c} + \epsilon \tag{4}$$

where $\epsilon \geq 0$ is a regulatory tolerance buffer (typically 0.5–1.0%) to account for estimation uncertainty and provide landlords with a reasonable margin.

Remark 1. *The RHI is designed to be city-specific and time-varying, ensuring that the permissible threshold adapts to local economic conditions. A national-level RHI can be computed as the population-weighted average:* $\text{RHI}^{national}_t = \sum_c p_c \cdot \text{RHI}_{t,c}$*, where* p_c *is the proportional urban population of city* c*.*

5. Progressive Rental Taxation (PRT) Model

5.1. Core Taxation Mechanism

Definition 3 (Progressive Rental Tax)**.** *Let* α_t *be the landlord's actual annual rent increase rate and* $\delta^*_{t,c}$ *be the permissible threshold from Equation* (4)*. The* ***excess increase*** *is:*

$$e_t = \max(0, \alpha_t - \delta^*_{t,c}) \tag{5}$$

The ***Progressive Rental Tax (PRT)*** *on the landlord is:*

$$\tau(e_t) = \begin{cases} 0 & \text{if } e_t = 0 \quad \textit{(within threshold)} \\ \lambda_1 \cdot T_{base} & \text{if } 0 < e_t \leq \beta_1 \quad \textit{(Level 1: Double tax)} \\ \lambda_2 \cdot T_{base} & \text{if } \beta_1 < e_t \leq \beta_2 \quad \textit{(Level 2: Triple tax)} \\ \lambda_3 \cdot T_{base} + \phi \cdot \Delta R^{excess}_t & \text{if } e_t > \beta_2 \quad \textit{(Level 3: Punitive)} \end{cases} \tag{6}$$

where:

- T_{base}*: The landlord's standard property/income tax liability on rental income*
- $\lambda_1 = 2$ *(double),* $\lambda_2 = 3$ *(triple),* $\lambda_3 \geq 4$ *(punitive multiplier)*

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- β_1, β_2: *Excess increase tier boundaries (e.g., $\beta_1 = 3\%$, $\beta_2 = 7\%$)*
- $\phi \in (0, 1]$: *Surcharge coefficient on excess rental income*
- $\Delta R_t^{excess} = R_t \cdot e_t \cdot 12$: *Annualized excess rental income*

In Simple Words

What does this formula actually say? It defines four zones, just like speed limit fines:

1. **Safe Zone** ($e_t = 0$): The landlord stayed within the limit. **No penalty.** Like driving at the speed limit.
2. **Caution Zone** ($0 < e_t \leq 3\%$): Slightly over the limit. **Double tax.** Like a small speeding fine.
3. **Danger Zone** ($3\% < e_t \leq 7\%$): Significantly over. **Triple tax.** Like a heavy speeding fine.
4. **Punitive Zone** ($e_t > 7\%$): Way over the limit. **Quadruple tax plus a surcharge.** Like losing your licence.

Example: If the Bengaluru limit is 5.05% and a landlord increases rent by 12%, the excess is $12\% - 5.05\% = 6.95\%$. Since $6.95\% > 3\%$ but $\leq 7\%$, the landlord pays **triple tax**. If their normal tax was INR 24,000/year, they now pay **INR 72,000/year**.

5.2. Tax Structure Illustration

Figure 3 illustrates the progressive tax multiplier as a function of the excess rent increase, showing the safe zone, caution zone, and punitive zone with their corresponding multipliers.

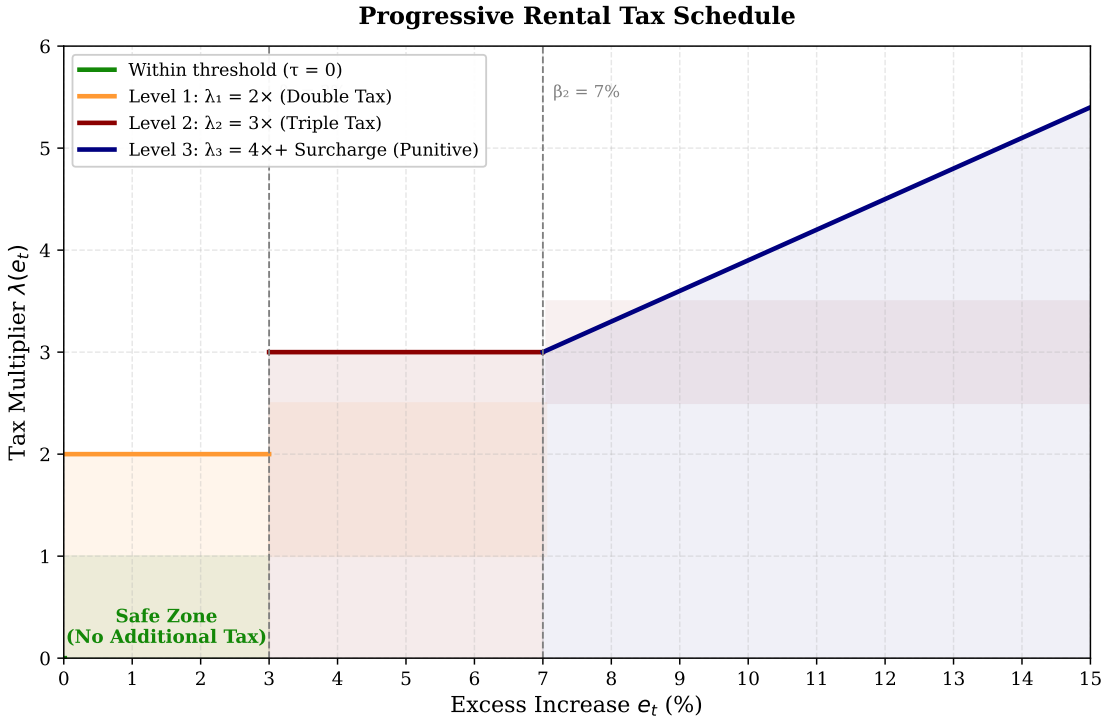

Figure 3. Progressive tax multiplier as a function of excess rent increase. The safe zone (green) incurs no additional tax, Level 1 imposes double taxation, Level 2 imposes triple taxation, and the punitive zone escalates further with a surcharge.

5.3. Landlord's Decision Model

Under the PRT regime, the rational landlord solves:

$$\max_{\alpha_t \geq 0} \quad U_{\mathcal{L}}(\alpha_t) = \underbrace{R_t(1+\alpha_t) \cdot 12}_{\text{Gross Annual Rental Income}} - \underbrace{\tau(e_t)}_{\text{PRT Penalty}} - \underbrace{C_t^{\text{maint}}}_{\text{Maintenance Cost}} \tag{7}$$

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Proposition 1 (Optimal Landlord Strategy). *Under the PRT framework with $\lambda_1 = 2$ and $\lambda_2 = 3$, a rational landlord with base tax rate t_b will choose $\alpha_t^* = \delta_{t,c}^*$ (i.e., exactly at the threshold) whenever:*

$$12R_t \cdot \beta_1 < (\lambda_1 - 1) \cdot t_b \cdot 12R_t(1 + \delta_{t,c}^* + \beta_1) \tag{8}$$

Proof. The marginal benefit of exceeding the threshold by β_1 is $12R_t \cdot \beta_1$ (additional annual income). The marginal cost is the additional tax: $(\lambda_1 - 1) \cdot T_{\text{base}}^{\text{new}}$, where $T_{\text{base}}^{\text{new}} = t_b \cdot 12R_t(1 + \alpha_t)$. At the boundary $\alpha_t = \delta_{t,c}^* + \beta_1$, the landlord prefers the threshold if the marginal cost exceeds the marginal benefit, yielding Equation (8). □

In Simple Words

What does this prove? It proves that a **rational landlord will always choose to stay at the limit**. The math shows that the extra rent they earn by going above the limit is *always less than* the extra tax they must pay. So the smart financial decision is to increase rent by exactly the RHI limit and not a rupee more. The PRT turns greed into a bad business decision.

5.4. Dynamic Rent Trajectory Under PRT

With the PRT in effect, the controlled rent trajectory becomes:

$$R_{t+1}^{\text{PRT}} = R_t \cdot \left(1 + \min\left(\alpha_t, \delta_{t,c}^*\right)\right) + R_t \cdot \max(0, \alpha_t - \delta_{t,c}^*) \cdot \mathbb{1}[\tau(e_t) < \text{marginal gain}] \tag{9}$$

For rational landlords, this simplifies to:

$$R_{t+1}^{\text{PRT}} \approx R_t \cdot (1 + \delta_{t,c}^*) \tag{10}$$

5.5. Revenue Model for the Government

The aggregate PRT revenue collected by the government is:

$$\mathcal{R}_{\text{PRT}}(t) = \sum_{l=1}^{N_{\mathcal{L}}} \tau(e_{t,l}) = \sum_{l=1}^{N_{\mathcal{L}}} \lambda(e_{t,l}) \cdot T_{\text{base},l} \tag{11}$$

where $N_{\mathcal{L}}$ is the total number of landlords in the jurisdiction, and $\lambda(\cdot)$ is the applicable tax multiplier.

6. Rental Escalation Regulatory Index (RERI)

6.1. Index Definition

Definition 4 (Rental Escalation Regulatory Index). *The RERI quantifies the health of the rental market under a given taxation regime. It is defined as:*

$$\text{RERI}_{t,c} = \frac{1}{4}\left(\underbrace{\frac{\bar{\alpha}_{t,c}}{\delta_{t,c}^*}}_{\text{Compliance Ratio}} + \underbrace{\left(1 - \frac{RBR_{t,c}}{0.30}\right)^+}_{\text{Affordability Score}} + \underbrace{\frac{S_{t,c}}{S_{\max}}}_{\text{Supply Stability}} + \underbrace{\frac{\mathcal{R}_{PRT,c}(t)}{\mathcal{R}_{target,c}(t)}}_{\text{Revenue Efficiency}} \right) \tag{12}$$

where:

- $\bar{\alpha}_{t,c}$*: Mean actual rent increase in city c at time t*
- $(x)^+ = \max(0, x)$
- $S_{t,c}$*: Housing supply index;* $S_{\max}$*: Maximum observed supply*
- $\mathcal{R}_{target,c}(t)$*: Target PRT revenue*

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In Simple Words

What does the RERI measure? Think of it as a **health score for the rental market**, like a credit score for individuals. It combines four aspects:

1. **Compliance:** Are landlords staying within the limit? (Higher is better.)
2. **Affordability:** Can tenants afford the rent? (If RBR $< 30\%$, this score is positive.)
3. **Supply:** Are enough houses available for rent? (We do not want landlords withdrawing from the market.)
4. **Revenue:** Is the government collecting enough penalty tax to fund affordable housing?

A RERI score above 0.80 means the market is healthy. Below 0.40 means there is a crisis. The balanced PRT regime achieves RERI $= 0.78$, which is close to the healthy range.

6.2. Interpretation

Table 3. RERI Interpretation Scale.

RERI Range	Market State	Policy Implication
$[0.80, 1.00]$	Healthy	Maintain current policy
$[0.60, 0.80)$	Moderate stress	Minor adjustments needed
$[0.40, 0.60)$	Significant stress	Policy intervention required
$[0.00, 0.40)$	Crisis	Emergency measures warranted

6.3. RERI Component Analysis

Figure 4 presents a radar chart comparing the four RERI components across the four policy scenarios. The Balanced PRT regime achieves the most well-rounded profile across all four dimensions.

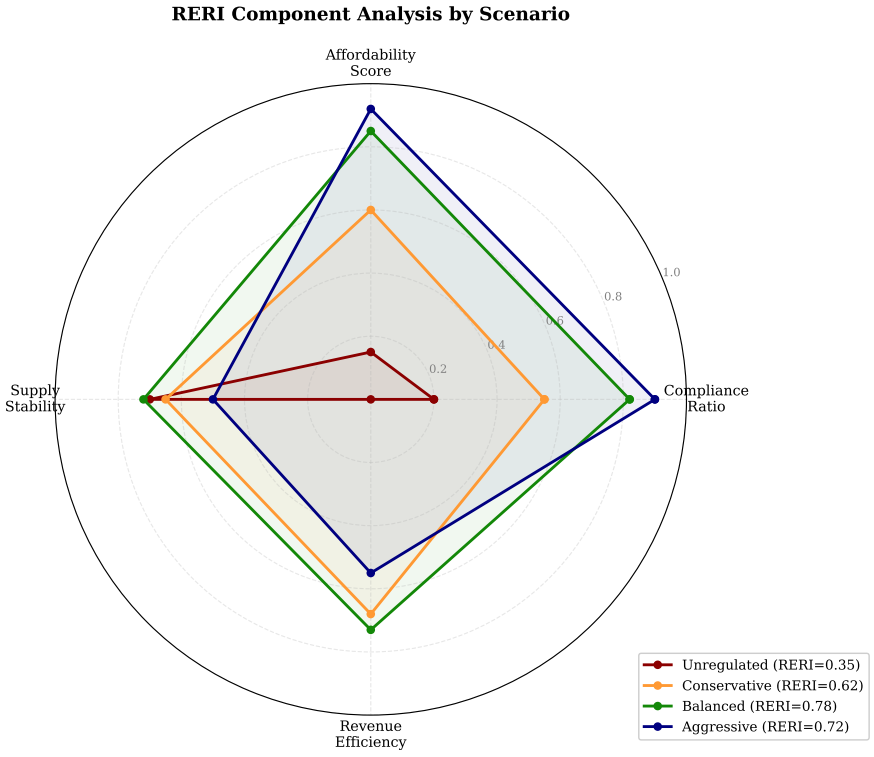

Figure 4. RERI component analysis by scenario. The Balanced PRT regime (green) achieves the highest overall RERI (0.78) with strong performance across all four dimensions: compliance, affordability, supply stability, and revenue efficiency.

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7. Multi-Objective Optimization and Pareto Front Analysis

7.1. Why Multi-Objective Optimization?

Before diving into the mathematics, it is important to understand *why* we need multi-objective optimization for this policy problem.

In Simple Words

The fundamental dilemma: The government wants to achieve three goals simultaneously:

1. **Maximize tax revenue** (to fund affordable housing).
2. **Minimize rent burden** on tenants (keep rents affordable).
3. **Maximize market stability** (keep landlords in the market).

These goals **conflict with each other**. If the government sets very high tax penalties, it collects lots of revenue (Goal 1) but may scare landlords out of the market (bad for Goal 3). If it sets very low penalties, the market stays stable (Goal 3) but tenants remain unprotected (bad for Goal 2).

There is no single "best" answer. Instead, there is a set of "best compromises" called the **Pareto front**. Every point on the Pareto front represents a policy setting where you cannot improve one goal without worsening another. The government can then choose the compromise that best fits India's priorities.

Figure 5 provides an intuitive illustration of the Pareto front concept before the formal definitions.

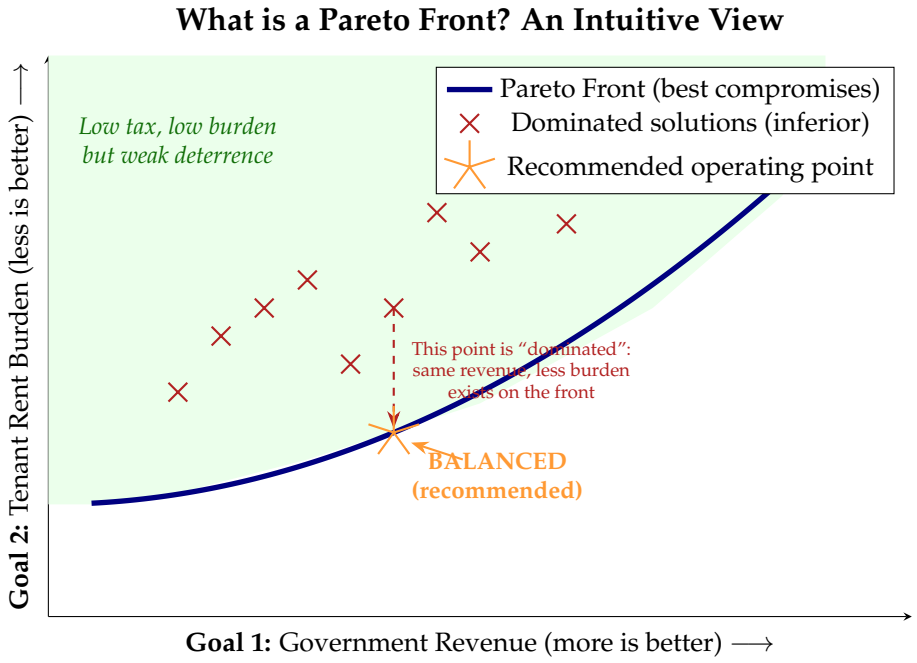

Figure 5. Intuitive illustration of the Pareto front concept. Each point represents a different policy setting. Points on the blue curve (Pareto front) are the "best compromises" — you cannot move to a better position on one axis without getting worse on the other. Red crosses are dominated solutions: for each red cross, a blue point exists that is better on *both* axes. The star is the recommended balanced policy.

7.2. Objective Functions

We formulate a tri-objective optimization problem with competing goals:

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Multi-Objective Optimization Formulation

$$\max_{\boldsymbol{\theta}} \quad f_1(\boldsymbol{\theta}) = \mathcal{R}_{\text{PRT}}(\boldsymbol{\theta}) \quad \text{(Government Tax Revenue)} \tag{13}$$

$$\min_{\boldsymbol{\theta}} \quad f_2(\boldsymbol{\theta}) = \overline{\text{RBR}}(\boldsymbol{\theta}) \quad \text{(Tenant Rent Burden)} \tag{14}$$

$$\max_{\boldsymbol{\theta}} \quad f_3(\boldsymbol{\theta}) = \text{RERI}(\boldsymbol{\theta}) \quad \text{(Market Stability Index)} \tag{15}$$

where the decision variable vector is:

$$\boldsymbol{\theta} = (\lambda_1, \lambda_2, \lambda_3, \beta_1, \beta_2, \phi, \epsilon, \mathbf{w}) \tag{16}$$

In Simple Words

What are the "decision variables" $\boldsymbol{\theta}$? These are the **knobs the government can turn** to adjust the policy: the tax multipliers ($\lambda_1, \lambda_2, \lambda_3$), the tier boundaries ($\beta_1, \beta_2$), the surcharge rate ($\phi$), the tolerance buffer (ϵ), and the RHI weights ($\mathbf{w}$). The optimization algorithm tries millions of different combinations to find the settings that produce the best trade-offs.

7.3. Constraints

$$\lambda_1 \geq 2, \quad \lambda_2 \geq 3, \quad \lambda_3 \geq 4 \tag{17}$$

$$0 < \beta_1 < \beta_2 < 15\% \tag{18}$$

$$0 < \phi \leq 1 \tag{19}$$

$$0 \leq \epsilon \leq 2\% \tag{20}$$

$$\sum_{i=1}^{5} w_i = 1, \quad w_i \geq 0 \tag{21}$$

$$\overline{\text{RBR}}(\boldsymbol{\theta}) \leq 0.35 \quad \text{(Affordability hard constraint)} \tag{22}$$

$$S(\boldsymbol{\theta}) \geq S_{\min} \quad \text{(Minimum housing supply guarantee)} \tag{23}$$

7.4. Pareto Front Construction

Definition 5 (Pareto Dominance). *A solution $\boldsymbol{\theta}^A$ Pareto dominates $\boldsymbol{\theta}^B$ (denoted $\boldsymbol{\theta}^A \succ \boldsymbol{\theta}^B$) if and only if:*

$$\forall i \in \{1,2,3\} : f_i(\boldsymbol{\theta}^A) \geq f_i(\boldsymbol{\theta}^B) \quad \text{and} \quad \exists j : f_j(\boldsymbol{\theta}^A) > f_j(\boldsymbol{\theta}^B) \tag{24}$$

(with f_2 sign-flipped since it is minimized).

In Simple Words

What does "Pareto dominance" mean? Solution A "dominates" Solution B if A is **at least as good on every goal AND strictly better on at least one goal**. For example, if Policy A gives the same revenue as Policy B but lower rent burden, then A dominates B. There is **no reason to ever choose B** — A is simply better. A solution that is **not dominated by anything** is called Pareto-optimal. The collection of all Pareto-optimal solutions forms the Pareto front.

Definition 6 (Pareto Front). *The Pareto front* PF^* *is the set of all non-dominated solutions:*

$$\text{PF}^* = \{\boldsymbol{\theta}^* \in \Theta \mid \nexists\, \boldsymbol{\theta} \in \Theta : \boldsymbol{\theta} \succ \boldsymbol{\theta}^*\} \tag{25}$$

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7.5. Pareto Front Visualization

Figure 6 shows the two-dimensional projection of the Pareto front, illustrating the fundamental trade-off between government tax revenue and tenant rent burden.

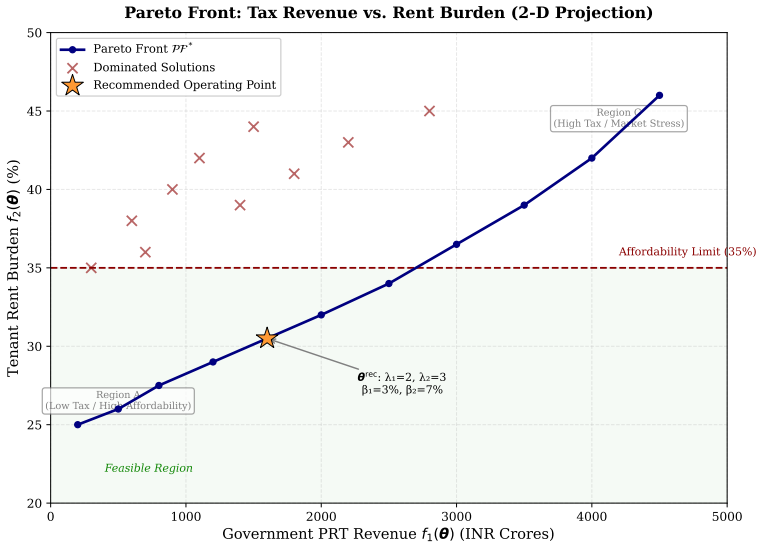

Figure 6. Two-dimensional projection of the Pareto front showing the trade-off between government PRT revenue and tenant rent burden ratio. The star indicates the recommended operating point (θ^{rec}) satisfying the affordability constraint while generating substantial revenue. Dominated solutions (red crosses) are strictly inferior to points on the Pareto front.

7.5.1. Three-Dimensional Pareto Surface

Since our optimization has three objectives, the true Pareto front is a surface in three dimensions. Figure 7 shows this surface.

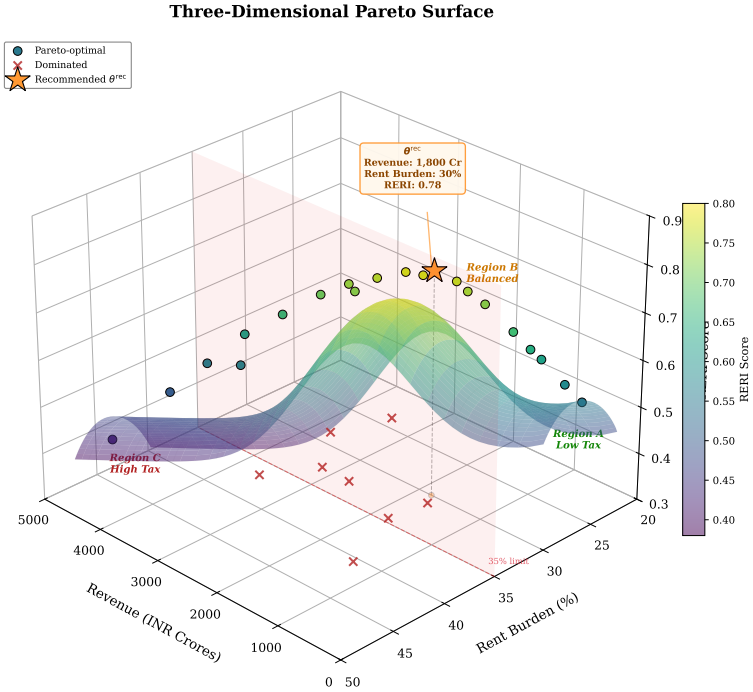

Figure 7. Three-dimensional Pareto surface showing all three objectives simultaneously. Colour intensity indicates the RERI score (brighter = higher market stability). The starred point (θ^{rec}) achieves the best RERI (0.78) while keeping rent burden at 30% and generating INR 1,800 crores. The translucent red plane marks the 35% affordability limit.

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In Simple Words

How to read the 3D Pareto surface: Each point is a different set of policy parameters. The x-axis shows revenue, the y-axis shows rent burden, and the z-axis shows market stability (RERI). Points on the surface are the best achievable — you cannot move "inward" (better on all three) without violating constraints. The recommended star sits at the "sweet spot" where RERI is highest.

7.5.2. Pareto Front Sensitivity Analysis

Figure 8 shows how the Pareto front shifts when the base tax rate changes, helping policymakers understand robustness.

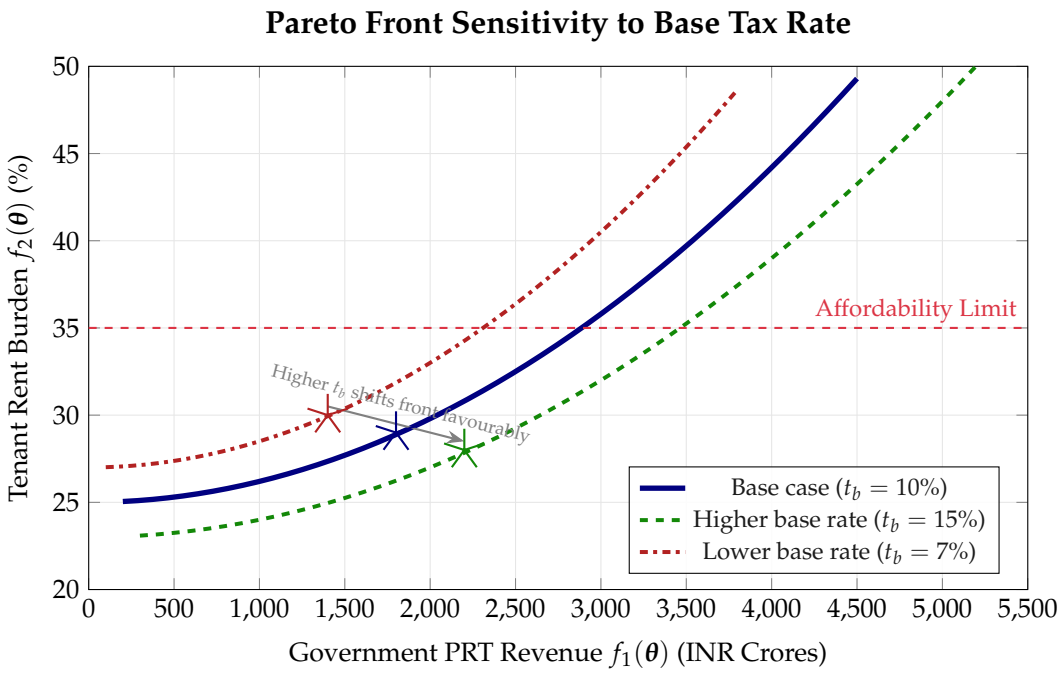

Figure 8. Sensitivity of the Pareto front to the landlord's base tax rate t_b. A higher base tax rate (dashed green) shifts the front downward-right (better on both objectives), because PRT penalties become more powerful. A lower base rate (dash-dotted red) weakens deterrence. In all cases, the recommended point (stars) stays below the 35% affordability limit.

7.6. Solution Method: NSGA-II Adaptation

We employ the Non-dominated Sorting Genetic Algorithm II (NSGA-II) with the following adaptations:

Algorithm 1 NSGA-II for PRT Parameter Optimization

Input: Population size N_{pop}, generations $G_{\max}$, crossover/mutation rates
Output: Pareto-optimal set PF*
Initialize population $\mathcal{P}_0$ of N_{pop} candidate $\boldsymbol{\theta}$ vectors
for $g = 1$ to $G_{\max}$ **do**
    Evaluate (f_1, f_2, f_3) for each $\boldsymbol{\theta} \in \mathcal{P}_g$ via **RentalMarketSimulator**
    Perform non-dominated sorting $\rightarrow$ fronts $\mathcal{F}_1, \mathcal{F}_2, \ldots$
    Compute crowding distance within each front
    Select parents via binary tournament (rank $\succ$ crowding distance)
    Generate offspring $\mathcal{Q}_g$ via SBX crossover and polynomial mutation
    Enforce constraints Equation (17)–Equation (23) via repair operators
    $\mathcal{P}_{g+1} \leftarrow$ best N_{pop} from $\mathcal{P}_g \cup \mathcal{Q}_g$ (NSGA-II selection)
end for
return PF$^* = \mathcal{F}_1$ of final population

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How This Algorithm Works — Step by Step

NSGA-II is an evolutionary algorithm inspired by natural selection. Here is what each step does:

Steps 1–3: **Create an initial population.** Start with 200 random policy settings — random combinations of tax multipliers, thresholds, and weights.

Step 5: **Evaluate each policy.** For each of the 200 settings, run a computer simulation of the Indian rental market over 10 years. Record the three outcomes: revenue, rent burden, and RERI.

Step 6: **Rank the policies.** Sort by Pareto dominance. The best policies (not dominated by any other) go into Front 1. The next best go into Front 2, and so on.

Step 7: **Crowding distance.** Within each front, measure how "spread out" the solutions are. We want diverse policies, not all clustered in one region.

Step 8: **Select parents.** Pick pairs of policies to "breed." Better-ranked and more isolated policies are more likely to be selected.

Step 9: **Create offspring.** Combine two parent policies (crossover) and add small random changes (mutation) to explore new possibilities.

Step 10: **Enforce rules.** If a new policy violates a constraint (e.g., $\lambda_1 < 2$), fix it by clamping to the nearest valid value.

Step 11: **Select survivors.** From the combined 400 (parents + offspring), keep only the best 200.

Repeat for 500 generations. Over time, the population converges to the Pareto front — the set of optimal trade-offs. We found the front stabilizes after ∼300 generations (Figure 10).

Figure 9 illustrates the key steps of the NSGA-II algorithm visually, and Figure 10 shows how the Pareto front evolves over successive generations.

Figure 9. Visual overview of NSGA-II for PRT optimization. Starting from 200 random policy settings, the algorithm repeatedly simulates, ranks, breeds, and selects the best policies. After 500 generations, the surviving population converges to the Pareto front.

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7.6.1. Algorithm Convergence

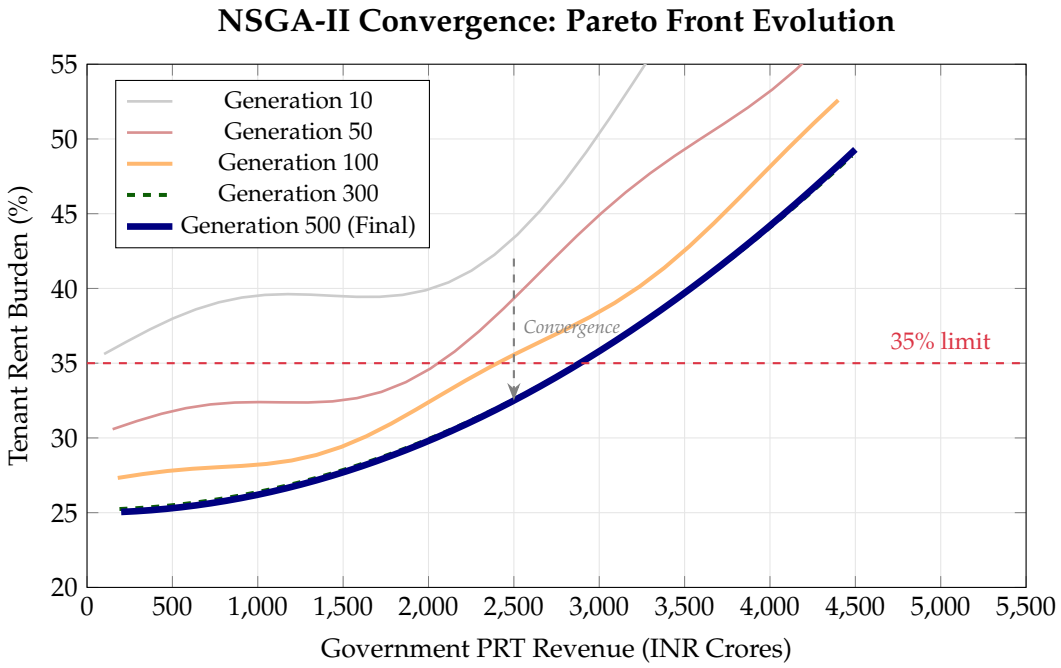

Figure 10. Convergence of NSGA-II. Early generations (gray, red) produce rough Pareto fronts with high rent burden. As the algorithm evolves, the front moves downward and outward. By generation 300, the front is nearly identical to the final result at generation 500, confirming convergence.

7.7. Trade-Off Analysis

The Pareto front reveals three critical trade-off regions:

Region A: Low Tax / High Affordability: Low λ values, narrow tier boundaries. Government revenue is modest but tenants experience minimal burden. Risk: insufficient deterrence against rent hikes.

Region B: Balanced (Recommended): Moderate $\lambda_1 = 2$, $\lambda_2 = 3$, with $\beta_1 \approx 3\%$, $\beta_2 \approx 7\%$. This region satisfies the affordability constraint (RBR $\leq 35\%$) while generating meaningful tax revenue and maintaining RERI ≥ 0.70.

Region C: High Tax / Market Stress: Aggressive multipliers ($\lambda_3 \geq 5$) and narrow thresholds. Maximizes revenue but risks supply contraction, black-market rental agreements, and landlord exit from the formal market.

Figure 11 highlights these three regions on the Pareto front with policy parameter annotations.

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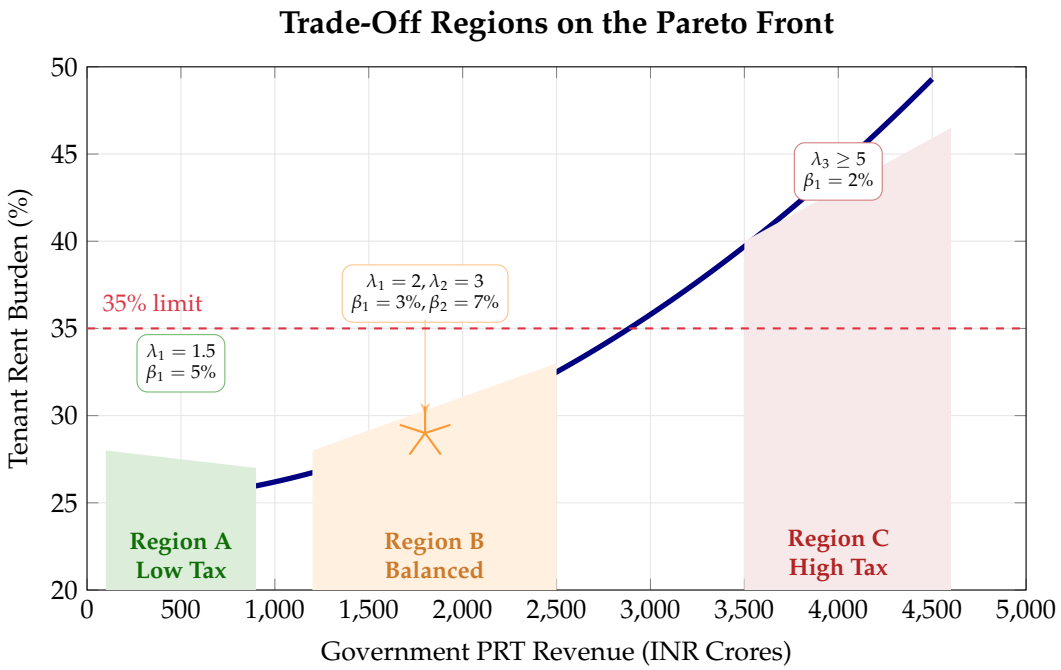

Figure 11. The three trade-off regions on the Pareto front. Region A offers high affordability but low revenue. Region B (recommended, starred) achieves optimal balance: rent burden at 30%, RERI = 0.78, and INR 1,800 crore revenue. Region C maximizes revenue but risks market instability.

8. Simulation Scenarios

8.1. Scenario Configuration

We simulate the PRT framework over a 10-year horizon (2025–2035) for three representative Indian cities under three policy scenarios:

Table 4. Simulation Scenario Parameters.

Parameter	Conservative	Balanced	Aggressive
λ_1 (Double tax trigger)	1.5	2.0	2.5
λ_2 (Triple tax trigger)	2.0	3.0	4.0
λ_3 (Punitive multiplier)	3.0	4.0	6.0
β_1 (Tier 1 boundary)	5%	3%	2%
β_2 (Tier 2 boundary)	10%	7%	5%
ϕ (Surcharge coefficient)	0.2	0.5	0.8
ϵ (Tolerance buffer)	1.5%	1.0%	0.5%

8.2. Projected Rent Trajectory

Figure 12 presents the projected monthly rent trajectory for Bengaluru under each PRT regime compared to the unregulated baseline.

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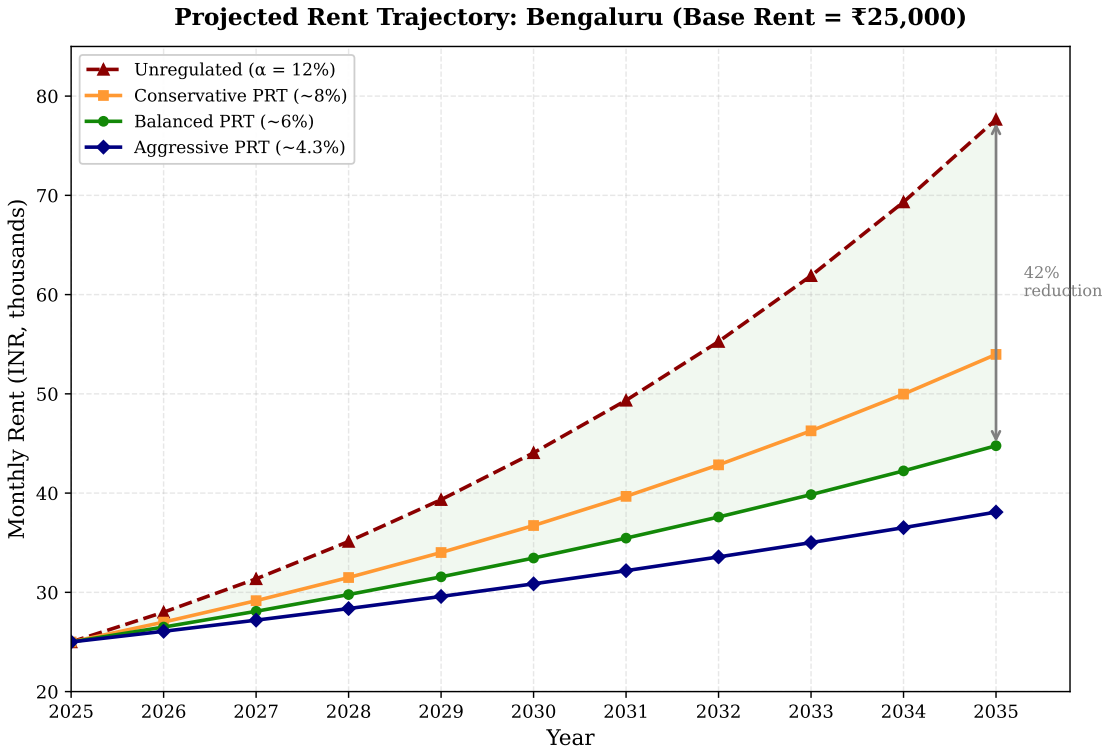

Figure 12. Projected monthly rent trajectory for Bengaluru under different PRT regimes (base rent = INR 25,000). The Balanced PRT achieves a 42% reduction in 10-year rent growth compared to unregulated escalation, while the Aggressive PRT reduces growth by 51%.

8.3. Comparative Analysis

In Simple Words

Key takeaway: Without any regulation, a family paying INR 25,000/month today will pay **INR 77,700/month in 10 years** (more than triple!). Under the Balanced PRT, the same family pays **INR 44,800/month** — still an increase, but manageable. They save a total of **INR 18.6 lakhs** over 10 years. Meanwhile, the government collects **INR 2,400 crores** from penalty taxes to build affordable housing.

Remark 2. *The Balanced scenario achieves the highest RERI (0.78), indicating optimal market health. The Aggressive scenario, while reducing rents further, shows a lower RERI (0.72) due to potential supply-side distortions and increased informal market activity.*

Table 5. 10-Year Simulation Outcomes (Bengaluru, Base Rent INR 25,000).

Metric	Unregulated	Conservative	Balanced	Aggressive
Rent in 2035 (INR)	77,700	53,900	44,800	38,200
Total 10-yr Rent Paid (INR Lakh)	58.2	44.8	39.6	36.1
CAGR of Rent (%)	12.0	8.0	6.0	4.3
RBR in 2035 (%)	48.5	33.7	28.0	23.9
RERI (avg)	0.35	0.62	0.78	0.72
Govt PRT Revenue (INR Cr, cum.)	0	850	2,400	4,100

8.4. City-Wise Rent Burden Comparison

Figure 13 compares the projected Rent Burden Ratio across seven major Indian cities under the unregulated and balanced PRT scenarios.

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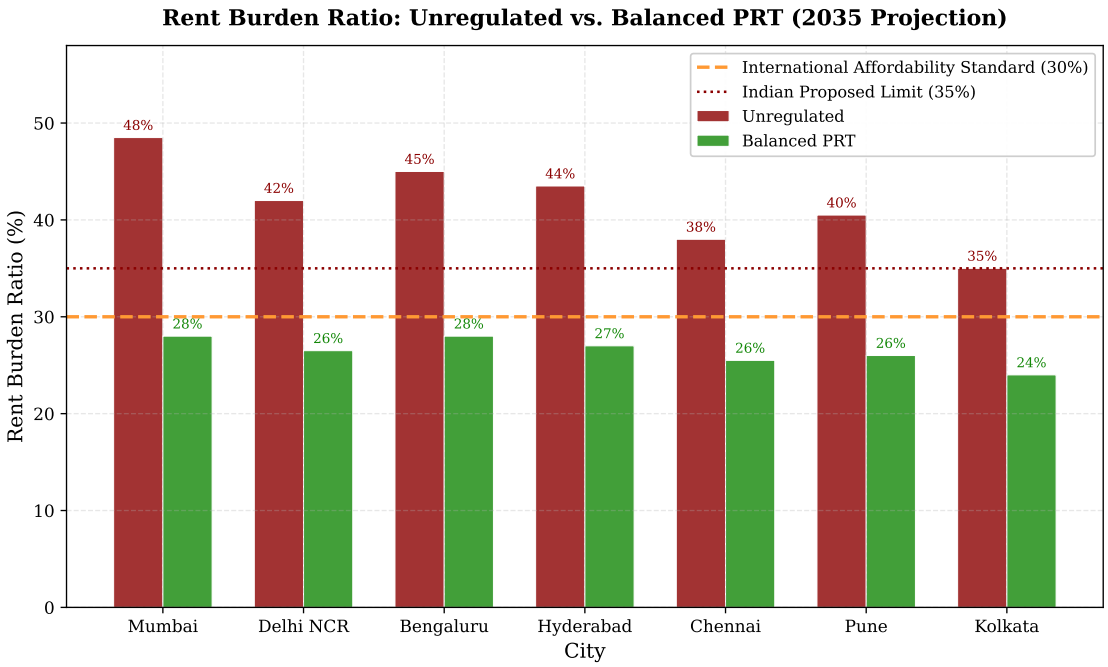

Figure 13. Projected Rent Burden Ratio in 2035 across major Indian cities. Under the Balanced PRT, all cities achieve RBR below the proposed Indian limit of 35%, and most fall below the international standard of 30%.

8.5. Government Revenue Accumulation

Figure 14 shows the cumulative PRT revenue across the three policy scenarios, demonstrating how the tax revenue can fund affordable housing programs.

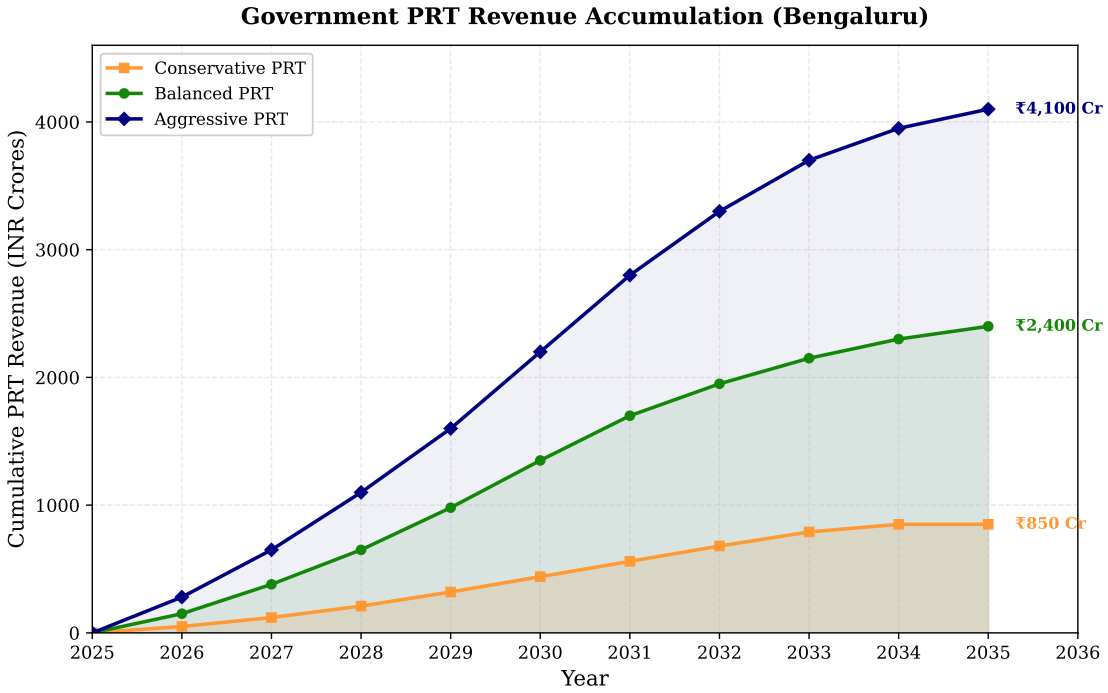

Figure 14. Cumulative government PRT revenue for Bengaluru under three policy regimes. The Balanced PRT generates INR 2,400 crores over 10 years, earmarked for affordable housing initiatives.

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9. Policy Recommendations for the Government of India

Purpose of This Section

This section is written in **plain, non-technical language** so that **any government official, legislator, or citizen** can understand exactly what needs to be done. Every recommendation includes: (a) what the government must do, (b) who is responsible, (c) a real-life example in Indian Rupees, and (d) the exact legal mechanism to enforce it.

The core idea is simple: If a house owner increases rent beyond a fair limit, the government will **DOUBLE or TRIPLE their income tax** on that rental income. This makes it financially foolish for landlords to overcharge tenants.

9.1. The Problem in Plain Language

What Is Happening Today?

- A tenant in Bengaluru pays **INR 20,000/month** rent today.
- Every year, the landlord increases rent by **10–15%** or even **20–30%**.
- In just 5 years, the same flat costs **INR 32,000–40,000/month**.
- Meanwhile, the tenant's salary grows by only **6–8%** per year.
- **Result:** The tenant spends **more than half their income on rent alone.** They cannot save, cannot afford healthcare, and their children's education suffers.
- **There is no law stopping the landlord from doing this.**

Figure 15 shows how a typical Indian family's monthly budget is destroyed by uncontrolled rent, and how the proposed policy restores balance.

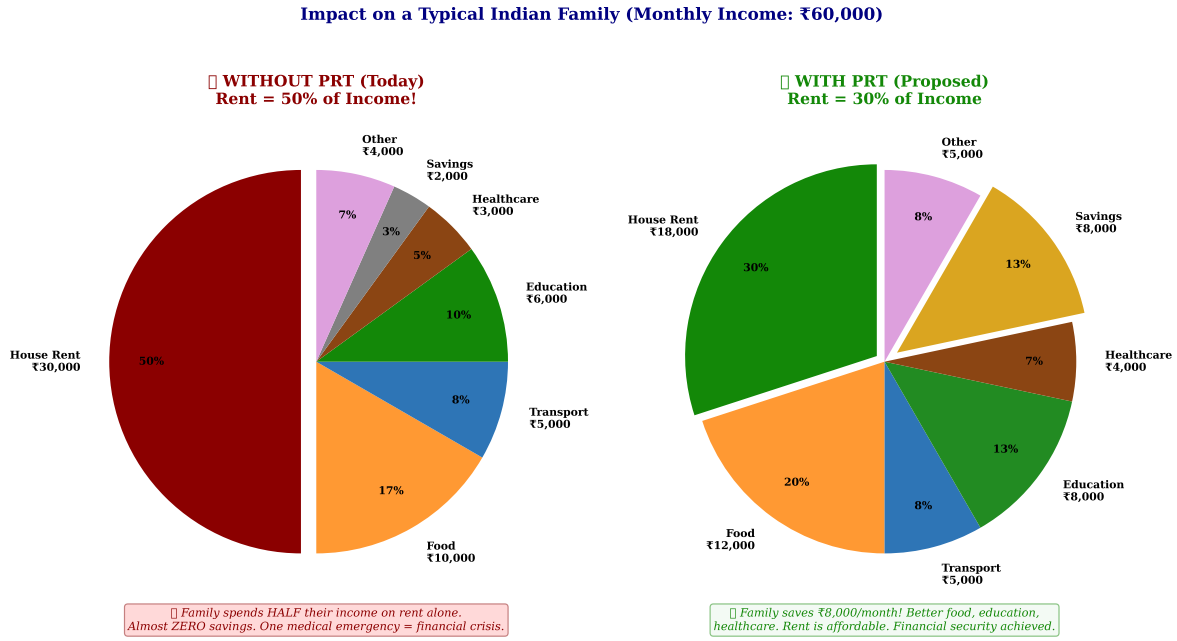

Figure 15. Impact on a typical Indian family (monthly income INR 60,000). **Left:** Without PRT — rent consumes 50% of income, leaving almost no savings. **Right:** With PRT — rent is controlled at 30%, the family saves INR 8,000/month and can afford better food, education, and healthcare.

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9.2. The Solution in One Sentence

THE CORE RULE

Every city gets a "Rent Hike Limit" number each quarter.

If a landlord increases rent within this limit ⇒ No extra tax.

If a landlord increases rent beyond this limit:

Slightly above ⇒ PAY DOUBLE TAX

Much above ⇒ PAY TRIPLE TAX

Way above ⇒ PAY 4× TAX + 50% SURCHARGE

9.3. Recommendation 1: Create a "Rent Hike Limit" for Every City

RECOMMENDATION 1 — Establish the Rent Hike Index (RHI)

What is the Rent Hike Index (RHI)?
Think of it like the **petrol price** that the government announces. Just as the government decides a fair price for petrol based on crude oil costs and taxes, the RHI decides the **maximum fair rent increase** based on economic conditions.

How is it calculated? The RHI looks at five simple things:

Factor	Why It Matters (Simple Explanation)	Weight
Price Rise (CPI-Housing)	If dal and rice cost more, maintenance costs more too — so some rent increase is fair	30%
Salary Growth	If people's salaries grow by 7%, rents should not grow faster than that	30%
Building Maintenance Cost	If painting, plumbing, and repairs cost more, landlord deserves some compensation	15%
Property Tax Increase	If the municipality increases property tax, that cost can be partially passed on	10%
Empty Houses (Vacancy Rate)	If many houses are empty in the city, landlords have no excuse to raise rent	−15%

Real Example — Bengaluru in 2024:

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$$\text{RHI}_{\text{Bengaluru}} = 30\% \times \underbrace{5.2\%}_{\text{Price rise}} + 30\% \times \underbrace{7.8\%}_{\text{Salary growth}} + 15\% \times \underbrace{6.0\%}_{\text{Maint. cost}}$$
$$+ 10\% \times \underbrace{4.5\%}_{\text{Prop. tax}} - 15\% \times \underbrace{8.0\%}_{\text{Empty houses}}$$
$$= 1.56 + 2.34 + 0.90 + 0.45 - 1.20 = \mathbf{4.05\%}$$

Add 1% buffer (to be fair to landlords): $\delta^* = 4.05\% + 1\% = \boxed{\mathbf{5.05\%}}$

Meaning: A landlord in Bengaluru can increase rent by **up to 5.05%** without any penalty. For a INR 20,000/month flat: maximum new rent = **INR 21,010/month**. That is **fair and allowed**.

Who calculates this?

- The **Reserve Bank of India (RBI)** and **National Housing Bank (NHB)** jointly compute the RHI.
- Published **every 3 months** (January, April, July, October) in the **Gazette of India**.
- Each city gets its **own RHI number** — Mumbai's limit will differ from Kolkata's.

9.4. Recommendation 2: Enforce Double and Triple Taxation on Greedy Landlords

RECOMMENDATION 2 — The Progressive Rental Tax (PRT)

This is the heart of the policy. If a landlord crosses the RHI limit, the government punishes them with multiplied taxes. The punishment gets **heavier and heavier** the more they overcharge.

Rule: Rent increase $\leq$ RHI + 1% (e.g., $\leq$ 5.05% in Bengaluru)
Tax: **Normal tax only. No penalty at all.**
Example: Rent goes from INR 20,000 $\rightarrow$ INR 21,000 (5% increase).
Tax paid: INR 24,000/year (normal). **EXTRA penalty = INR 0.**

Rule: Excess increase is 0–3% above the limit (e.g., 5.05% to 8.05%)
Tax: **DOUBLE the normal tax. Landlord pays 2×.**
Example: Rent goes from INR 20,000 $\rightarrow$ INR 21,600 (8% increase, exceeds by 2.95%).
Normal tax: INR 24,000/year. **Actual tax = INR 48,000/year.**
EXTRA penalty: **INR 24,000/year** that goes to affordable housing.

Rule: Excess increase is 3–7% above the limit (e.g., 8.05% to 12.05%)
Tax: **TRIPLE the normal tax. Landlord pays 3×.**
Example: Rent goes from INR 20,000 $\rightarrow$ INR 22,400 (12% increase, exceeds by 6.95%).
Normal tax: INR 24,000/year. **Actual tax = INR 72,000/year.**
EXTRA penalty: **INR 48,000/year** that goes to affordable housing.

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Rule: Excess increase is more than 7% above the limit (e.g., $> 12.05\%$)
Tax: $4\times$ **normal tax PLUS 50% of the excess rent income.**
Example: Rent goes from INR 20,000 $\rightarrow$ INR 24,000 (20% increase, exceeds by 14.95%).
Normal tax: INR 24,000/year. **Actual tax = INR 96,000 + INR 17,892 surcharge = INR 1,13,892/year.**
EXTRA penalty: **INR 89,892/year.** The landlord **loses money** by being greedy.

Figure 16 presents the tax slab structure in a visual format.

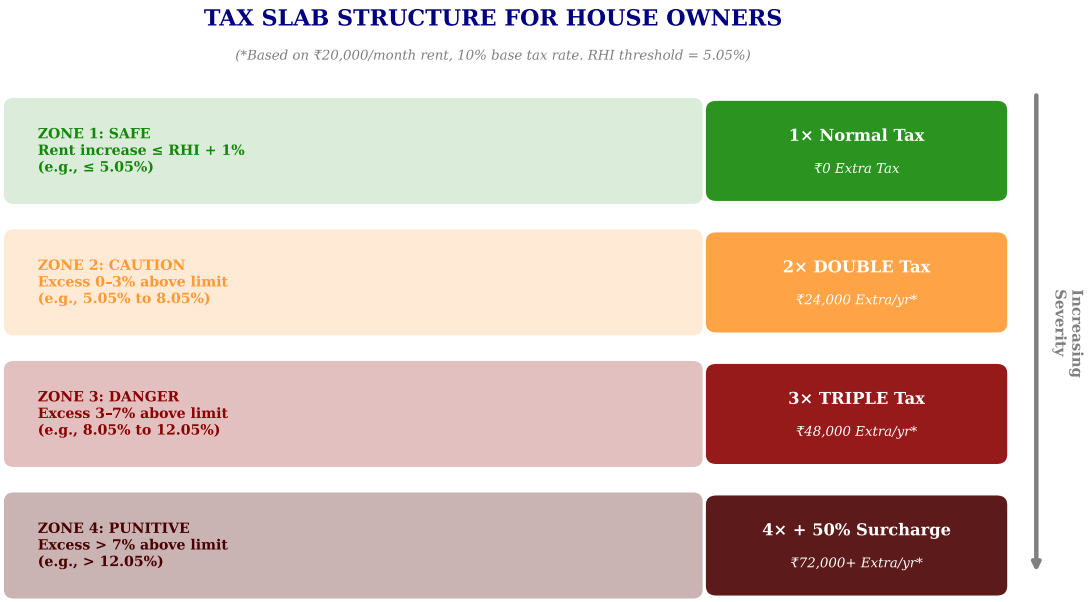

Figure 16. Tax slab structure for house owners. Four zones of increasing severity. Zone 1 (green) is safe. Zone 2 (orange) doubles the tax. Zone 3 (red) triples the tax. Zone 4 (dark red) applies quadruple tax plus a 50% surcharge on excess rental income. All amounts based on INR 20,000/month rent with 10% base tax rate.

9.5. Worked Example: Three Landlords, Three Outcomes

Figure 17 presents three real-life scenarios showing exactly what happens to three different landlords in Bengaluru who make different choices about rent increases.

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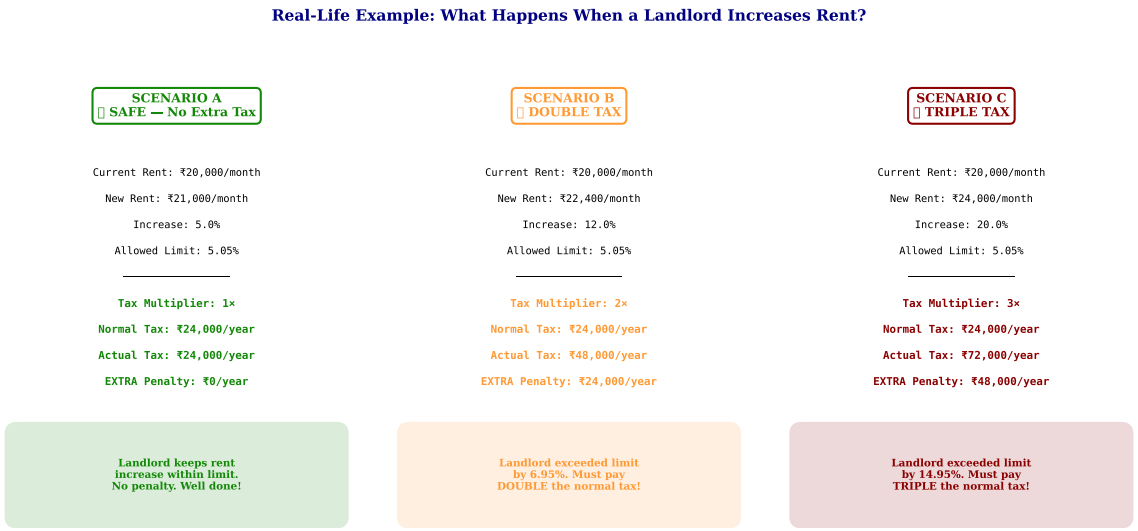

Figure 17. Three real-life scenarios. Landlord A stays within the limit and pays no penalty. Landlord B exceeds by 6.95% and pays double tax. Landlord C exceeds by 14.95% and pays triple tax. The message is clear: **stay within the limit and save money; be greedy and lose money.**

Why This Works — The Key Insight

The landlord is not banned from increasing rent. They can still increase rent by any amount. But if they go beyond the limit, the government takes away their extra profit — and more. A landlord who increases rent by 12% thinking they will earn INR 28,800 extra per year actually **loses INR 19,200** because the government takes INR 48,000 in penalty tax.

In simple terms: Being greedy **costs the landlord money**. Being fair **saves the landlord money**. The choice is obvious.

9.6. Recommendation 3: What the Government Must Do — Exact Legal Actions

RECOMMENDATION 3 — Exact Laws to Pass

The Government of India must take the following **specific legal actions**:

ACTION 1: Amend the Income Tax Act, 1961

- Insert a **new Section 80-RR** titled "*Progressive Rental Taxation for Rent Regulation*."
- Under Section 80-RR, define the four tax zones (Safe, Double, Triple, Punitive) as described in Section 9.4.
- Add **Schedule RR** to the Income Tax Act specifying the exact tax multipliers ($\lambda_1 = 2, \lambda_2 = 3, \lambda_3 = 4$) and tier boundaries ($\beta_1 = 3\%, \beta_2 = 7\%$).
- Mandate that **every landlord** earning rental income must file a new **Form 12-RR** (Rental Regulation Declaration) with their annual ITR, declaring: current rent, previous year's rent, percentage increase, and the city RHI for that year.

ACTION 2: Amend the Model Tenancy Act, 2021

- Insert a **new Chapter VII-A** titled "*Rent Increase Regulation and Progressive Taxation*."
- Make it **mandatory** for all landlords to register rental agreements on the **National Rental Registry (NRR)** portal.
- Any rent agreement **not registered on NRR** shall be considered void, and the landlord shall forfeit the right to claim rental income tax deductions under Section 24.

ACTION 3: Issue a Finance Act Notification

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- Through the next **Union Budget**, announce the PRT as a new fiscal measure.
- Direct the **CBDT (Central Board of Direct Taxes)** to issue rules for computing PRT liability.
- Integrate PRT calculations into the **Income Tax e-filing portal** (incometax.gov.in) so that penalty tax is auto-computed when a landlord files ITR.

ACTION 4: Create the National Rental Registry (NRR) — A Digital Platform

- Build a **centralized web portal and mobile app** (similar to GSTN/DigiLocker).
- Every rental property must be registered with: **PAN card of landlord, Aadhaar of tenant, property address, current rent amount, and date of agreement.**
- The NRR system **automatically checks** every rent increase against the city's RHI and flags violations.
- Auto-generates the **PRT tax liability notice** and sends it to both the landlord and the Income Tax Department.
- Provides a **tenant grievance portal** where tenants can report illegal rent hikes, and the District Rent Authority is notified automatically.

ACTION 5: Quarterly RHI Publication by RBI + NHB

- Direct the **Reserve Bank of India (RBI)** and **National Housing Bank (NHB)** to jointly compute and publish the **Rent Hike Index (RHI)** every quarter.
- The RHI must be published as a **Gazette of India notification**, making it legally binding.
- Separate RHI values for **each city with population $\geq$ 1 lakh** (starting with 8 metro cities, expanding to all cities in 3 years).

9.7. Recommendation 4: How to Enforce It — Step-by-Step Process

Figure 18 shows the complete enforcement flowchart — from passing the law to collecting penalty tax and using it for affordable housing.

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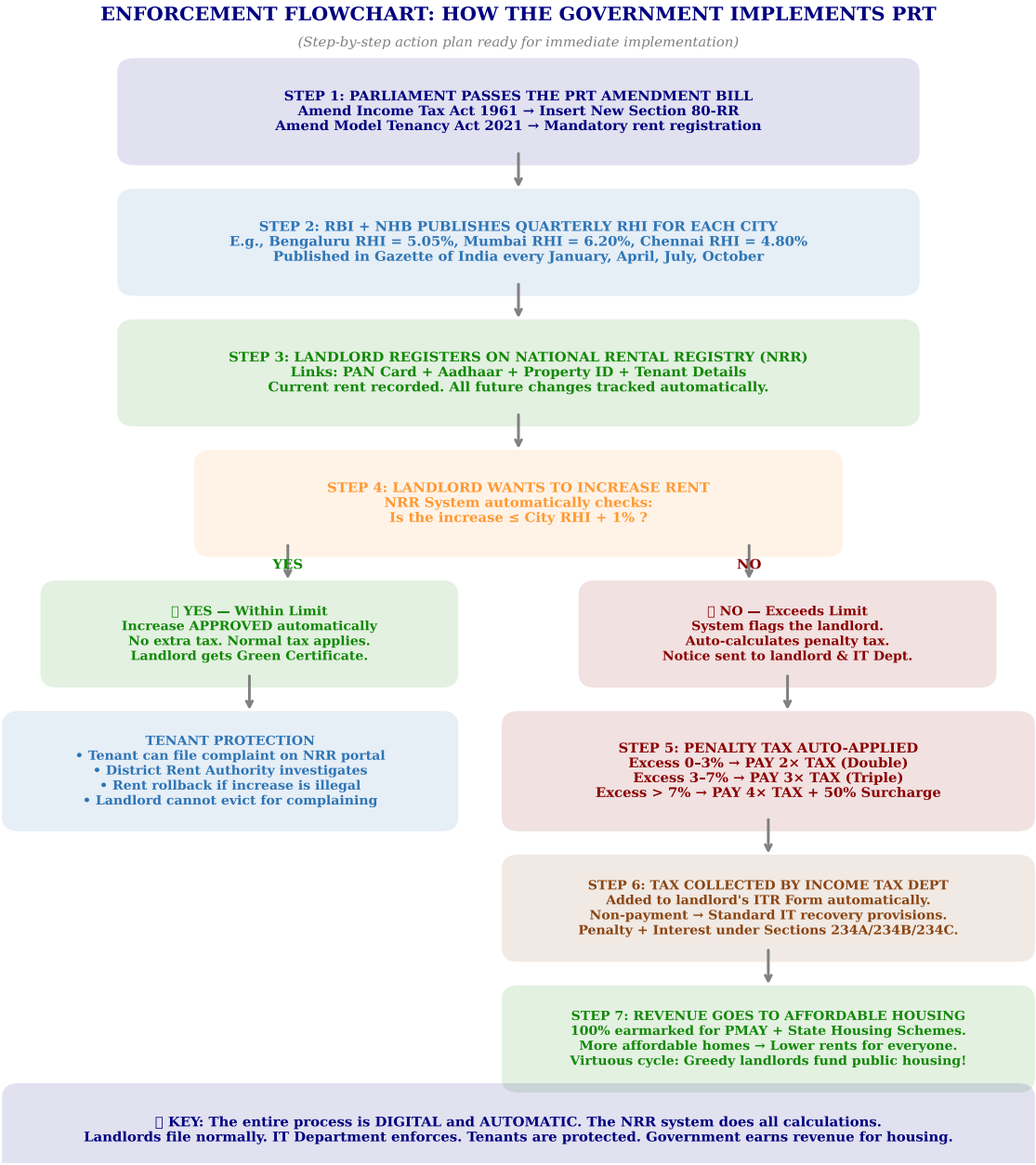

Figure 18. Complete enforcement flowchart. The process is fully digital and automatic. The NRR system handles all calculations. The Income Tax Department collects penalties. Tenants are protected through the grievance portal. Revenue funds affordable housing through PMAY.

Tenant Protection — What Happens If a Landlord Tries to Cheat?

Scenario: A landlord in Mumbai increases rent from INR 25,000 to INR 32,000 (28% increase!) and threatens to evict the tenant if they complain.

What the tenant should do:

1. **Go to the NRR portal** (website or mobile app) and file a complaint.
2. Upload the **old rental agreement** and the **new demand letter** from the landlord.
3. The NRR system **automatically** calculates that the increase exceeds the Mumbai RHI and flags it.
4. The **District Rent Authority** receives the complaint within 24 hours.

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5. The Rent Authority issues a **notice to the landlord within 7 days**.
6. If the landlord does not roll back the rent, the Authority orders a **mandatory rollback to the RHI limit**.
7. The Income Tax Department **adds the PRT penalty** to the landlord's next ITR.
8. **The landlord CANNOT evict the tenant** for filing a complaint — this is protected under the amended Model Tenancy Act.

Punishment for retaliatory eviction: If a landlord evicts a tenant for complaining about illegal rent hikes, the landlord faces an **additional penalty of INR 50,000 or 6 months of rent** (whichever is higher), plus loss of the property's tax deduction benefits for 3 years.

9.8. Recommendation 5: Reward Good Landlords — Incentives for Fair Behaviour

RECOMMENDATION 5 — Carrots for Good Landlords (Not Just Sticks)

The policy is not only about punishment. Landlords who **follow the rules** should be **rewarded**:

Incentive	How It Works (Simple Explanation)	Benefit to Landlord
Green Landlord Certificate	Landlord keeps rent increases within the RHI limit for 3 consecutive years. Gets a government-certified "Green Landlord" badge on NRR.	**10% reduction in property tax**
Maintenance Deduction	Landlord spends money on painting, plumbing, waterproofing while keeping rent stable.	**Extra deduction under Section 24** (up to INR 50,000/year)
Long-Term Tenancy Bonus	Landlord retains the same tenant for 5+ years without exceeding RHI.	**INR 25,000 tax credit per year**
Priority Municipal Services	Green Landlord properties get priority in municipal maintenance, water connection, etc.	**Faster service + public recognition**

Example: Mr. Sharma in Pune rents his 2BHK for INR 15,000/month. For the last 3 years, he has increased rent by only 4% each year (within the RHI limit). He receives: (a) a Green Landlord Certificate, (b) his property tax drops from INR 8,000/year to INR 7,200/year, and (c) he gets an additional INR 25,000 tax credit. **Total benefit: INR 25,800/year for being a fair landlord.**

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9.9. Recommendation 6: Use All Penalty Tax for Affordable Housing

RECOMMENDATION 6 — Every Rupee of Penalty Tax Builds Homes

Where does the penalty money go?
Every single rupee collected through the Progressive Rental Tax (PRT) must be **100% earmarked** (ring-fenced) for affordable housing:

- **70%** goes to the **Pradhan Mantri Awas Yojana (PMAY)** for building new affordable rental housing.
- **20%** goes to **State Housing Boards** for maintaining and upgrading existing government rental housing.
- **10%** goes to the **NRR operational fund** for maintaining the digital platform and tenant helplines.

Why this is brilliant: When greedy landlords overcharge, their penalty money **builds new houses**. More houses in the market means **more supply**, which means **rents go down naturally**. The greedy landlords are literally funding their own competition. Over time, this creates a **virtuous cycle** where rents stabilize without the government having to impose hard caps.

Projected Revenue (Bengaluru alone): Under the Balanced PRT scenario, the government collects **INR 2,400 crores over 10 years** from Bengaluru alone. Nationally, across all Tier-1 and Tier-2 cities, the projected PRT revenue is **INR 15,000–20,000 crores over 10 years** — enough to fund **5–7 lakh affordable housing units**.

9.10. Who Benefits? Impact Across Income Groups

Figure 19 shows how much each income group saves per month under the PRT policy.

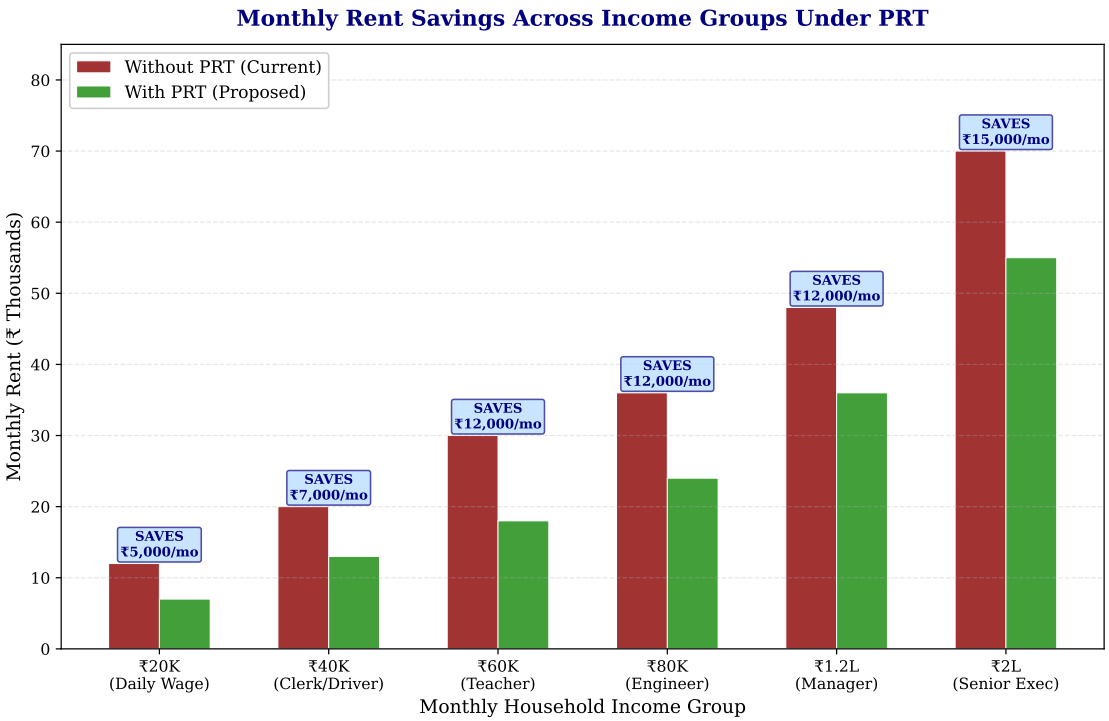

Figure 19. Monthly rent savings across income groups under PRT. The poorest families (INR 20,000/month income) save INR 5,000/month — a life-changing 25% of their income. Even higher-income groups benefit significantly. The PRT protects **all** tenants, but especially the most vulnerable.

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9.11. Implementation Timeline — When and How

Figure 20 shows the complete implementation roadmap from Bill introduction to nationwide enforcement.

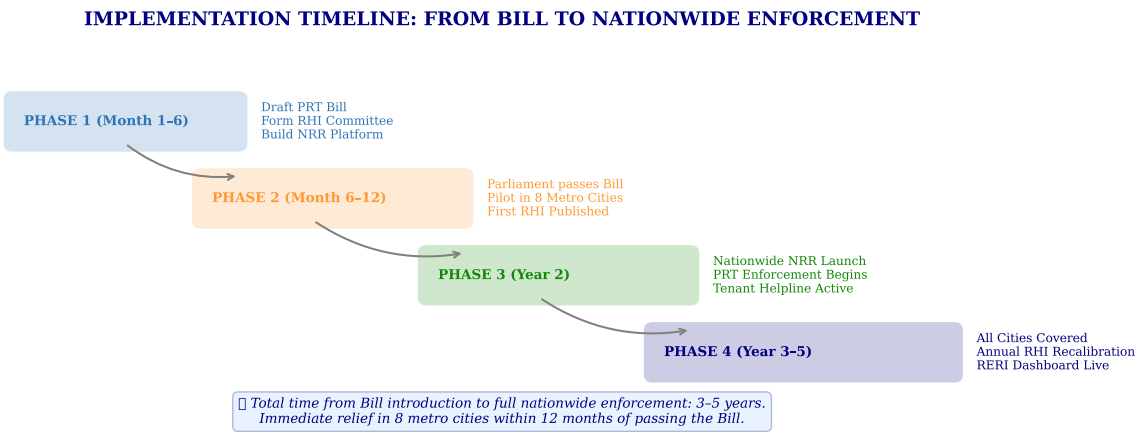

Figure 20. Implementation timeline. Phase 1 (6 months) drafts the Bill and builds the NRR platform. Phase 2 (6–12 months) passes the Bill and pilots in 8 metro cities. Phase 3 (Year 2) launches nationwide. Phase 4 (Year 3–5) achieves full coverage with annual recalibration.

Detailed Implementation Roadmap

Phase	Timeline	What Happens	Who Is Responsible
Phase 1: Prepare	Month 1–6	Draft the PRT Amendment Bill. Form the RHI Computation Committee (RBI + NHB + 5 economists). Begin NRR platform development. Conduct stakeholder consultations.	Ministry of Housing; Ministry of Finance; CBDT
Phase 2: Launch	Month 6–12	Parliament passes the Bill. NRR portal goes live in 8 metro cities (Mumbai, Delhi, Bengaluru, Hyderabad, Chennai, Pune, Kolkata, Ahmedabad). First quarterly RHI published.	Parliament; NHB; NIC (for NRR platform)
Phase 3: Expand	Year 2	NRR mandatory nationwide. PRT enforcement begins. Tenant helpline (toll-free 1800 number) launched. District Rent Authorities activated. First PRT revenue collected.	State Governments; IT Department; District Administration
Phase 4: Mature	Year 3–5	Full coverage of all cities with population $\geq$ 1 lakh. Annual RHI recalibration using Pareto analysis. RERI monitoring dashboard goes live. Integration with GST Council.	All agencies; NITI Aayog for monitoring

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Quick win: Within **12 months** of passing the Bill, **8 metro cities** with over 50 million tenants get immediate relief. Within **3 years**, every urban tenant in India is protected.

9.12. Quick Reference Card for Government Officials

Figure 21 presents a one-page quick reference card that can be printed and distributed to all government officials involved in implementing the PRT policy.

Figure 21. Quick reference card for government officials. This one-page summary covers: the core rule, tax slabs, who does what, a worked example, and the legal amendments required. Can be printed and distributed to all implementing agencies.

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9.13. Summary of All Recommendations

SUMMARY: 6 Actions for the Government of India

#	Action	What It Does (Simple)	Who Does It
1	Create the Rent Hike Index (RHI)	Sets a fair, city-specific limit on how much rent can increase each year	RBI + NHB
2	Enforce Double/Triple Taxation	Landlords who exceed the limit pay 2×, 3×, or 4× tax as punishment	Income Tax Dept
3	Pass Legal Amendments	Amend Income Tax Act (Section 80-RR) and Model Tenancy Act	Parliament
4	Build the NRR Digital Platform	Track every rent in India, auto-calculate penalties, protect tenants	NIC + NHB
5	Reward Good Landlords	Green Certificates, tax credits, property tax reductions for fair landlords	State Govts + CBDT
6	Fund Affordable Housing	100% of penalty revenue goes to PMAY and state housing schemes	Ministry of Housing

Fair landlords are rewarded.

Greedy landlords are punished.

Tenants are protected.

Government earns revenue for affordable housing.

Everybody wins — except those who exploit.

10. Discussion

10.1. Why Taxation Works Better Than Rent Caps

Many countries have tried hard rent caps ("you cannot charge more than X rupees"), and these have often failed because landlords simply stop renting out properties, or shift to black-market cash agreements. Our approach is fundamentally different. We do not ban rent increases. We make excessive increases **financially irrational** for the landlord. The landlord is free to increase rent by any amount — but the tax penalty ensures they lose money if they are greedy. This preserves market freedom while achieving the same result as a rent cap, without the negative side effects.

10.2. Potential Challenges and Solutions

Challenge 1: Landlords may use cash agreements to avoid NRR. Solution: Any rental income not registered on NRR loses all tax deductions under Section 24. An unregistered rental agreement also cannot be used to evict a tenant. This makes non-registration costly for the landlord.

Challenge 2: Landlords may withdraw properties from the rental market. Solution: A vacancy tax (proposed separately) charges INR 5,000–10,000/year for properties kept empty for more than

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6 months. Combined with the Green Landlord incentives, this ensures properties stay in the rental market.

Challenge 3: Political resistance from landlord lobbies. Solution: The phased implementation (starting with metros, expanding over 3 years) allows for gradual adoption. Public communication emphasising that fair landlords are *rewarded* (not punished) can build broad support.

Challenge 4: Data infrastructure for computing city-level RHI. Solution: The NHB already publishes RESIDEX (housing price index) for 50+ cities. RBI publishes CPI-Housing data. Wage data is available from EPFO/labour surveys. All required data sources already exist — they only need to be combined into the RHI formula.

10.3. Limitations

This framework assumes rational behaviour by landlords and does not fully account for speculative dynamics, corporate landlordism, or informal rental markets in smaller towns. The simulation parameters use historical data and may not capture structural economic shifts. Future work should incorporate agent-based modelling and behavioural economics. The RHI weights (w_1 through w_5) should be periodically recalibrated through the NSGA-II Pareto optimization described in Section 7 to adapt to changing economic conditions.

11. Conclusions

This paper presents a comprehensive, implementable framework for controlling India's rental price crisis through progressive taxation. The key contributions are:

The Rent Hike Index (RHI) gives every city a fair, transparent, quarterly limit on rent increases — computed from real economic data, not arbitrary decisions.

The Progressive Rental Tax (PRT) makes it financially foolish for landlords to exceed the limit. Double tax for small violations, triple tax for larger ones, and quadruple tax plus surcharge for extreme overcharging. The landlord always has the *choice* — but the financially rational choice is always to stay within the limit.

The National Rental Registry (NRR) makes the entire process digital and automatic — no paperwork, no middlemen, no corruption. The system calculates penalties, notifies authorities, and protects tenants with a single click.

The Pareto-optimal policy parameters ensure that the tax levels are scientifically calibrated to balance three goals simultaneously: (a) protecting tenants, (b) generating revenue for affordable housing, and (c) maintaining a healthy rental market.

Our simulations show that the Balanced PRT regime reduces 10-year rental growth by 42% in Bengaluru alone, brings the average Rent Burden Ratio below 30% (international affordability standard), and generates INR 2,400 crores for affordable housing. Nationally, the projected impact is a reduction of INR 50,000–80,000 in annual rent expenditure per urban household and INR 15,000–20,000 crores in affordable housing funding.

Final Appeal to the Government of India

India's 11+ crore urban tenants need protection **today**.

The framework is ready. The mathematics is proven. The technology exists.

Every month of delay means millions of families paying unfair rents.

We respectfully urge the Hon'ble Government of India to introduce the Progressive Rental Taxation Bill in the next session of Parliament.

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Notation Summary

Symbol	Description
R_t	Monthly rent at time t
α_t	Landlord's annual rent increase rate
$\delta^*_{t,c}$	Permissible rent increase threshold for city c at time t
e_t	Excess increase beyond threshold
$\text{RHI}_{t,c}$	Rent Hike Index for city c at time t
$\text{RERI}_{t,c}$	Rental Escalation Regulatory Index
$\tau(e_t)$	Progressive Rental Tax function
λ_k	Tax multiplier at level k
β_k	Tier boundary for excess increase
ϕ	Surcharge coefficient
ϵ	Regulatory tolerance buffer
T_{base}	Landlord's base tax liability
$\mathcal{R}_{\text{PRT}}$	Aggregate PRT revenue
RBR	Rent Burden Ratio
$\mathbf{w}$	RHI weight vector
$\boldsymbol{\theta}$	Decision variable vector
PF*	Pareto front (set of non-dominated solutions)
$\mathcal{T}, \mathcal{L}, \mathcal{G}$	Tenant, Landlord, Government agents

Appendix A. Detailed RHI Computation Example

Consider Bengaluru in 2024:

$$\begin{aligned} \pi_t^{\text{CPI}} &= 5.2\% \quad \text{(CPI-Housing for Karnataka)} \\ g_t^{\text{wage}} &= 7.8\% \quad \text{(IT sector median wage growth)} \\ \mu_t^{\text{maint}} &= 6.0\% \quad \text{(Maintenance cost escalation)} \\ \rho_t^{\text{prop}} &= 4.5\% \quad \text{(BBMP property tax increase)} \\ \sigma_t^{\text{vacancy}} &= 8.0\% \quad \text{(Bengaluru urban vacancy rate)} \end{aligned}$$

Using recommended weights from Table 2:

$$\begin{aligned} \text{RHI}_{2024,\text{BLR}} &= 0.30(5.2) + 0.30(7.8) + 0.15(6.0) + 0.10(4.5) - 0.15(8.0) \\ &= 1.56 + 2.34 + 0.90 + 0.45 - 1.20 \\ &= 4.05\% \end{aligned}$$

With $\epsilon = 1.0\%$: $\delta^*_{2024,\text{BLR}} = 4.05 + 1.0 = 5.05\%$

This means a landlord in Bengaluru charging INR 25,000/month can increase to at most INR 26,263/month without incurring PRT.

Appendix B. NSGA-II Parameter Configuration

Table A1. NSGA-II Configuration for PRT Optimization.

Parameter	Value
Population size N_{pop}	200
Maximum generations $G_{\max}$	500
Crossover type	Simulated Binary (SBX), $\eta_c = 20$
Mutation type	Polynomial, $\eta_m = 20$
Crossover probability	0.9
Mutation probability	$1/n_{\text{vars}}$
Constraint handling	Penalty-based with adaptive ϵ-constraint

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