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In West Bengal (2004-05 to 2022-23): A Decomposition Inequality Analysis Across Sectors, Regions, and Social Groups

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Abstract **Original Research Article**

This paper analyses trends in consumption inequality in West Bengal across rural and urban sectors, five regions, and major social groups during 2004–05 to 2011–12 and 2011–12 to 2022–23. Using the Theil index and decomposition analysis, the study highlights significant structural changes in inequality. Findings reveal a steady decline in rural inequality and a mixed pattern in urban areas. Decomposition results show that within-group inequality dominates, though between-group disparities have narrowed over time. Regional and social group analysis indicates persistent heterogeneity, despite overall improvements. Policy implications emphasize targeted interventions for reducing social and spatial inequalities.

Keywords: Inequality, Theil Index, Decomposition, West Bengal, Regional Disparity, Social Groups.

1. INTRODUCTION

Economic inequality continues to be one of the most pressing challenges in India's development path, reflecting deep-rooted structural, regional, and social imbalances. Despite notable progress in poverty alleviation and overall economic growth, disparities in consumption and income distribution persist across different sections of the population. These inequalities are not merely statistical deviations but indicators of uneven access to opportunities, education, health, and productive assets. In a federal and diverse economy like India, examining inequality at the state level provides valuable insights into how regional dynamics, historical legacies, and policy orientations influence development outcomes.

West Bengal represents a unique case in this regard. The state's economic evolution from a predominantly agrarian economy with strong land reforms to one increasingly driven by services and urban expansion has altered its social and spatial fabric. The interplay of political stability, welfare orientation, and industrial transition has shaped distinct patterns of growth across rural and urban areas. However, such structural transformations often give rise to new disparities between and within regions and social groups, warranting systematic empirical investigation.

This study aims to analyse the trends and structure of consumption inequality in West Bengal over the period 2004–05 to 2022–23, covering nearly two decades of socioeconomic change. It focuses on three critical dimensions, such as sectoral (rural and urban), regional (five NSS regions), and social (SC, ST, OBC, and Others), to assess how inequality has evolved within and between these groups. Using Theil's decomposition framework, the paper seeks to capture the internal composition of inequality and its changing dynamics across time, offering a comprehensive understanding of the state's distributive landscape.

2. LITERATURE REVIEW

Economic inequality has been a central theme in development economics and social policy debates, particularly in the Indian context, where regional and social heterogeneities are deeply rooted in historical, structural, and institutional factors. Several scholars have explored the dynamics of inequality using both income and consumption data, shedding light on its changing nature in the post-reform period.

2.1 National Trends and Conceptual Background

Deaton and Drèze (2002) provided one of the earliest systematic analyses of consumption inequality in India, noting that while poverty declined over the 1990s, inequality rose due to faster income growth among urban

and high-skilled households. They attributed this to structural transformation, differential access to education, and sectoral shifts toward high-productivity services. Himanshu (2018) further demonstrated that inequality in India has followed a U-shaped trajectory, with the 2000s witnessing sharp increases driven by urban wage polarization and rural–urban gaps. These studies underscore the coexistence of economic growth and unequal distribution, prompting scholars to look deeper into the mechanisms that shape inequality at sub-national levels.

2.2 Theoretical Background: Entropy-Based Measures

Theoretically, Kolm (1976) and Theil (1967) established the conceptual foundation for measuring inequality through decomposable indices based on entropy theory. The Theil Index, in particular, allows researchers to distinguish between within-group and between-group inequality which makes it highly suitable for analysing disparities across regions, sectors, and social categories. This property has made Theil-based decomposition a preferred method in state-level inequality studies across India.

2.3 Regional Dimensions of Inequality

The spatial pattern of inequality in India reflects uneven regional development. Banerjee and Bardhan (2010) emphasized the urban concentration of wealth and opportunities in states like West Bengal, where industrial stagnation and uneven infrastructure have historically limited rural transformation. Mondal (2014) examined the liberalized era and found that inter-state and intra-state inequalities expanded significantly after 1991, with urban regions benefiting disproportionately from service-led growth. Similar evidence from the Planning Commission (2012) shows that regional disparities in per capita consumption remain persistent due to differences in agricultural productivity, urbanization levels, and access to public services.

In the context of West Bengal, earlier studies highlight a dualistic economy which is an advanced urban service sector coexisting with lagging agrarian regions. This has resulted in heterogeneous development trajectories across the state's districts and NSS regions. Rural areas, though improving in poverty reduction, exhibit slower income growth, while metropolitan centres like Kolkata and surrounding areas have seen rapid but unequal expansion.

2.4 Social and Group-Based Inequality

Caste, tribe, and community identity remain crucial determinants of inequality in India. Thorat and Newman (2012) documented systematic exclusion of Scheduled Castes (SC) and Scheduled Tribes (ST) from high-return occupations and urban labour markets. Social segmentation restricts access to education, credit, and networks, thereby perpetuating income gaps. Empirical evidence from NSS and IHDS data confirms that social group disparities persist even after controlling for education and location, implying deep structural inequalities. Studies such as Nirmala and Yepthomi (2014) also highlight the role of community-based organizations and self-help groups in mitigating exclusion and promoting income equality in rural India.

In West Bengal, the pattern mirrors the national situation, though the presence of strong social movements and redistributive land reforms historically moderated inequality to some extent. However, post-2000s economic liberalization and urban-centric growth have reintroduced disparities among SCs, STs, and OBCs, particularly between those integrated into non-farm sectors and those dependent on traditional agriculture.

2.5 Gaps in the Literature

Although inequality in India has been widely studied (Deaton & Drèze, 2002; Himanshu, 2018; Banerjee & Bardhan, 2010), most works focus on national trends rather than state-specific or intra-state variations. Existing research on West Bengal (Mondal, 2014; Chattopadhyay, 2017) relies largely on pre-2011 data, overlooking the impact of recent welfare programs and structural shifts. Moreover, many studies use the Gini coefficient, which cannot separate *within-group* and *between-group* disparities, leading to limited understanding of internal inequality structures (Theil, 1967; Kolm, 1976). Analyses of social-group disparities (Thorat & Newman, 2012; Deshpande, 2015) also seldom integrate regional and sectoral dimensions. Thus, there is a lack of recent, decomposition-based research capturing how inequality in West Bengal has evolved between 2004–05 and 2022–23 across rural–urban sectors, NSS regions, and social groups using Theil's framework. This study aims to fill that critical gap through a comprehensive, multidimensional assessment.

3. DATA AND METHODOLOGY

3.1 Data Source

The study utilizes secondary data from the National Sample Survey Office (NSSO) consumption expenditure surveys for three major rounds:

- 61st Round (2004–05)
- 68th Round (2011–12)
- 79th Round (2022–23, preliminary)

These rounds were selected to capture long-term trends in inequality spanning nearly two decades. The NSSO data are nationally representative and provide detailed information on household consumption patterns across rural and urban sectors, different regions, and major social groups. The inclusion of the latest (79th) round allows for an updated understanding of post-2011 inequality trends, reflecting the impact of recent welfare and structural policy measures.

3.2 Measure: Theil index for inequality

To measure inequality, this study employs the Theil Index, an entropy-based measure that allows for decomposition of total inequality into *within-group* and *between-group* components.

For a population of n units with income (or consumption) values y_i and mean income $\bar{y}$, the Theil Index (T) is given by:

$$\mathbf{T = 1/n \sum_{i=1}^{n} y_i / y \ln (y_i / y)}$$

Where, y_i = income (or another variable) of individual i

$\bar{y}$. = mean income

T = Theil index (ranges from 0 to 1)

3.3 Properties of the Theil Index

- **Entropy-based measure**: The Theil Index originates from information theory, where "entropy" represents disorder. In this context, it measures the "disorder" or inequality in income distribution. A perfectly equal distribution has maximum entropy (no inequality), while deviations from equality reduce entropy, signalling concentration of income.
- **Sensitivity across the entire distribution**: Unlike the Gini coefficient, which is less sensitive to differences at the extreme ends of the income spectrum, the Theil Index captures variations across the full range of incomes. This makes it particularly effective in detecting disparities in both lower and upper segments of the population.
- **Decomposability**: The Theil Index's most valuable feature is its additive decomposability, which allows total inequality to be divided into two parts:
  - Within-group inequality (inequality within each sector, region, or social group)
  - Between-group inequality (inequality due to differences in mean incomes between groups).

This property makes the Theil Index ideal for sectoral, regional, or social group inequality analysis, as it helps to identify where inequality originates.

The total inequality T can be expressed as:

$T = T_{w+}T_B$

Where, T_w = **Within-group inequality**, representing disparities among individuals or households within each group (for example, within rural areas, or within SC households).

T_B = **Between-group inequality**, representing disparities due to differences in the mean incomes of groups (for example, between rural and urban areas, or between social categories).

This decomposition enables the analysis to determine whether inequality in West Bengal is primarily driven by internal disparities within groups or by structural differences between them.

Let the population be divided into G distinct groups, where each group *g* represents a category such as sector, region, or social group. The variables are defined as follows:

- n_g = number of individuals in group g
- y_{ig} = income of individual i in group g
- $\bar{y}_g$ = mean income of group g
- $\bar{Y} = overall\ mean\ income$
- N = $\sum_{g=1}^{G} \frac{n_g}{N}$ = total population

Then, the **total inequality** can then be expressed as:

$T = \sum_{g=1}^{G} \frac{n_g}{N} T_g + \sum_{g=1}^{G} \frac{n_g}{N} \frac{\bar{y}_g}{\bar{Y}} \ln(\frac{\bar{y}_g}{\bar{Y}})$

Where, the first term $\sum_{g=1}^{G} \frac{n_g}{N} T_g$ represents within-group inequality T_W, capturing variations in income distribution within each group.

The second term $\sum_{g=1}^{G} \frac{n_g}{N} \frac{\bar{y}_g}{\bar{Y}} \ln(\frac{\bar{y}_g}{\bar{Y}})$ represents between-group inequality T_B, measuring disparities across groups based on differences in their mean incomes.

T_g is the Theil index computed within group g and the Theil index within each group (Tg) is calculated as:

$T_g = \frac{1}{n_g} \sum_{i=1}^{n_g} \frac{y_{ig}}{\bar{Y}_g} \ln(\frac{y_{ig}}{\bar{Y}_g})$

This framework allows the decomposition of total inequality into meaningful components that reveal both internal and structural disparities.

3.4 Decomposition Structure

The additive decomposition approach enables the study to separate and interpret inequality across multiple dimensions. The following decompositions are carried out:

1. Sectoral Decomposition (Rural vs Urban): This assesses disparities between rural and urban sectors as well as within each sector.

- *Within-sector inequality* identifies disparities among households inside rural and urban areas, reflecting local variations in income distribution.
- *Between-sector inequality* captures the overall rural–urban divide, indicating how far the average income of urban households deviates from that of rural households.

  This distinction is crucial for understanding how economic transformation and urbanization have influenced the spatial spread of inequality in West Bengal.

2. Regional Decomposition (NSS Regions 191–195): To examine geographic disparities, the state is divided

into five NSS regions (191–195) based on administrative and economic characteristics.

- *Within-region inequality* highlights disparities among households inside a particular region, indicating localized income concentration.
- *Between-region inequality* measures differences in mean income across regions, thus capturing spatial heterogeneity within the state.

This helps identify whether inequality in West Bengal is driven by regional imbalances or by internal disparities within each region.

3. Social Group Decomposition (SC, ST, OBC, Others): Social stratification in India often determines access to resources, education, and employment.

- *Within-group inequality* among Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs), and Others reflects how income or consumption is distributed within each social category.
- *Between-group inequality* measures the average income gap between these groups, revealing structural inequalities rooted in historical and social hierarchies.

This approach provides insight into whether inequality in West Bengal is predominantly due to caste-based exclusion or broader economic factors.

3.5 Analysis Periods

To capture the temporal evolution of inequality, the analysis is divided into two distinct sub-periods, each reflecting a different phase of economic and policy transition:

- **Period I (2004–05 to 2011–12):** Represents the pre-2011 phase, characterized by rapid urban expansion, economic restructuring, and emerging urban–rural divides.
- **Period II (2011–12 to 2022–23):** Represents the subsequent phase marked by welfare expansion, social protection programs (such as MGNREGA and NFSA), rural diversification, and digital inclusion efforts that may have influenced convergence trends.

This two-period design facilitates a comparative understanding of how inequality dynamics have evolved in response to economic and policy transformations within West Bengal.

4. Data Analysis and Interpretation

4.1 Data Analysis (Results)

This section presents the detailed interpretation of Theil's inequality and decomposition analysis for West Bengal over two decades — 2004–05 to 2011–12 and 2011–12 to 2022–23. The analysis examines three key dimensions: sectoral (rural–urban), regional (NSS regions 191–195), and social group (Scheduled Castes, Scheduled Tribes, Other Backward Classes, and Others). A further decomposition distinguishes within-group and between-group contributions to total inequality.

Table 1: Sectoral, Regional, and Social Group Inequality in West Bengal (2004–05 to 2011–12)

inequality value 204-05		**inequality value 2011-12**		**change (%)**
Sector	TEM	Sector	TEM	
Rural	0.17927	Rural	0.124	-30.83059073
Urban	0.26843	Urban	0.3433	27.89181537
Total	0.26788	Total	0.28703	7.148723309
NSS_Region	**TEM**	**NSS_Region**	**TEM**	**change (%)**
191(Himalayan)	0.12436	191	0.13754	10.59826311
192(Eastern Region)	0.20005	192	0.17434	-12.85178705
193(Southern plains)	0.31361	193	0.32845	4.731991965
194(Central plains)	0.17642	194	0.20278	14.9416166
195(Western Plains)	0.27292	195	0.31176	14.23127656
Total	0.26788	Total	0.28703	7.148723309
Social Group	**TEM**	**Social group**	**TEM**	**change (%)**
1(ST)	0.10678	1	0.16186	51.58269339
2(SC)	0.14818	2	0.16489	11.27682548
3(OBC)	0.21102	3	0.23172	9.80949673
9(GENERAL)	0.30375	9	0.32073	5.590123457
Total	0.26788	Total	0.28703	7.148723309

This table presents Theil Entropy Measure (TEM) values of consumption inequality across sectors (rural and urban), five NSS regions (191–195), and major social groups (SC, ST, OBC, and Others) for the period 2004–05 to 2011–12. Between 2004–05 and 2011–12, inequality in West Bengal displayed a divergent pattern that is a decline in rural areas but rising inequality in urban centres and among most social groups which is resulting in a modest increase in total inequality.

Table 2: Decomposition of Inequality by Sector, Region, and Social Group (2004–05 to 2011–12)

Decomposition 2004-05		**Decomposition 2011-12**		**Change (%)**
Sector	**TEM**	**Sector**	**TEM**	
Within	0.21432	Within	0.21977	2.542926465
Between	0.05356	Between	0.06726	25.57879014
NSS_Region	**TEM**	**NSS_Region**	**TEM**	**change (%)**
Within	0.24753	Within	0.25666	3.688441805
Between	0.02035	Between	0.03037	49.23832924
Social Group	**TEM**	**Social Group**	**TEM**	**change (%)**
Within	0.25512	Within	0.27347	7.192693634
Between	0.01283	Between	0.0136	6.001558846

This table decomposes total inequality into within-group and between-group components for the same period, illustrating the sources of inequality across dimensions. The decomposition confirms that within-group inequality dominated total inequality, but between-group disparities widened, especially across regions and sectors, suggesting growing structural divides during this phase of economic transformation.

Table 3: Sectoral, Regional, and Social Group Inequality in West Bengal (2011–12 to 2022–23)

inequality value 2011-12 (mmrp)		**inequality value 2022-23**		**change (%)**
Sector	**TEM**	**Sector**	**TEM**	
Rural	0.11491	Rural	0.09603	-16.43024976
Urban	0.25885	Urban	0.17973	-30.56596484
Total	0.233	Total	0.15494	-33.50214592
NSS_Region	**TEM**	**NSS_Region**	**TEM**	**change (%)**
191(Himalayan)	0.1049	191	0.14063	34.06101049
192(Eastern Plain)	0.13475	192	0.10064	-25.3135436
193(southern plains)	0.2761	193	0.21458	-22.28178196
194(Central plains)	0.18713	194	0.13671	-26.94383584
195(Western Plains)	0.15954	195	0.11619	-27.17186912
Total	0.233	Total	0.15494	-33.50214592
Social Group	**TEM**	**Social group**	**TEM**	**change (%)**
1(ST)	0.14391	1	0.11963	-16.8716559
2(SC)	0.1167	2	0.12282	5.244215938
3(OBC)	0.15429	3	0.10939	-29.10104349
9(GENERAL)	0.26531	9	0.1715	-35.35863707
Total	0.233	Total		

This table compares inequality values between 2011–12 (MMRP) and 2022–23, marking the second period of analysis. During 2011–23, inequality in West Bengal declined across all dimensions, marking a clear shift toward convergence. This period likely reflects the impact of welfare programs, social protection schemes, and broader economic inclusion policies.

Table 4: Decomposition of Inequality by Sector, Region, and Social Group (2011–12 to 2022–23)

decomposition 2011-12mmrp		**decomposition 2022-23**		**change (%)**
Sector	TEM	Sector	TEM	
Within	0.17654	Within	0.12822	-27.3706
Between	0.05646	Between	0.02672	-52.6745
NSS_Region	**TEM**	**NSS_Region**	**TEM**	**change (%)**
Within	0.20013	Within	0.1455	-27.2973
Between	0.03287	Between	0.00945	-71.2504
Social Group	**TEM**	**Social Group**	**TEM**	**change (%)**
Within	0.21983	Within	0.14749	-32.9072
Between	0.01317	Between	0.00788	-40.167

This table presents decomposition results for the second period, identifying changes in within-group and between-group inequality components. The decomposition for 2011–23 reveals a broad-based equalization process, with both structural (between-group) and internal (within-group) disparities declining markedly. These findings suggest that policy measures

and socioeconomic diffusion during this period effectively reduced inequality at multiple levels.

4.2 Sectoral Inequality Trends

Table 5: Inequality Trends based on Sectors

	Period I (2004–05 to 2011–12): Divergence Phase			Period II (2011–12 to 2022–23): Convergence Phase		
Sector	**Inequality Value (TEM) 2004–05**	**Inequality Value (TEM) 2011–12**	**Change (%)**	**Inequality Value (TEM) 2011–12 (MMRP)**	**Inequality Value (TEM) 2022–23**	**Change (%)**
Rural	0.17927	0.124	-30.83	0.11491	0.09603	-16.43
Urban	0.26843	0.3433	27.89	0.25885	0.17973	-30.57

4.2.1 Period I (2004–05 to 2011–12): Divergence Phase

During this period, inequality exhibited a *divergent pattern* between rural and urban areas.

- In the rural sector, the *Theil Entropy Measure (TEM)* declined from *0.17927 to 0.124*, representing a 30.8% reduction in inequality. This suggests a relatively equal distribution of consumption, possibly driven by agrarian programs, rural wage growth, and poverty alleviation initiatives.
- In contrast, urban inequality rose sharply from *0.26843 to 0.3433*, a 27.9% increase, indicating widening income gaps linked to structural changes in the urban economy, such as skill-biased employment and service-sector concentration.
- As a result, the aggregate inequality increased from *0.26788 to 0.28703* (+7.1%), revealing that the rural equalization was insufficient to offset the sharp rise in urban inequality.

Thus, the first period reflects a pattern of divergence, where growth benefited the urban upper strata disproportionately while rural areas experienced moderate equalization.

4.2.2 Period II (2011–12 to 2022–23): Convergence Phase

The second period demonstrates a clear reversal of the earlier trend.

- Rural inequality continued to decline from *0.11491 to 0.09603* (–16.4%), indicating sustained though slower improvement.
- Urban inequality dropped sharply from *0.25885 to 0.17973* (–30.6%), suggesting a significant compression in urban income dispersion.
- Consequently, overall inequality decreased from *0.233 to 0.15494* (–33.5%), signalling a broad-based convergence between rural and urban consumption distributions.

This reversal reflects the effects of inclusive welfare expansion, urban labour diffusion, and digital connectivity, which collectively promoted a more equitable income distribution across both sectors.

4.3 Decomposition of Inequality

Table 6: Decomposition Result for Inequality Trends based on Sectors

Decomposition Component	**Period I (2004–05 to 2011–12): Divergence Phase**			**Period II (2011–12 to 2022–23): Convergence Phase**		
Sector	**Inequality Value (TEM) 2004–05**	**Inequality Value (TEM) 2011–12**	**Change (%)**	**Inequality Value (TEM) 2011–12**	**Inequality Value (TEM) 2022–23**	**Change (%)**
Within-Sector	0.21432	0.21977	2.54	0.17654	0.12822	-27.37
Between-Sector	0.05356	0.06726	25.58	0.05646	0.02672	-52.67

4.3.1 Sectoral Decomposition

The decomposition results disaggregate inequality into *within-sector* and *between-sector* components.

- During *2004–11*, *within-sector inequality* rose slightly from *0.21432 to 0.21977* (+2.5%), while *between-sector inequality* increased more notably from *0.05356 to 0.06726* (+25.6%). The latter indicates widening income differences between the rural and urban means.
- During *2011–23*, both components declined significantly: *within-sector inequality* fell by 27.4%, and *between-sector inequality* by 52.7%.

This transition implies that inequality reduction was driven by both internal equalization within sectors and structural convergence between them.

4.3.2 Composition Effect

In the first phase, rapid urbanization and the expanding share of the urban population amplified total inequality, even though rural inequality declined (Table 5). This composition effect demonstrates how shifts in population and economic structure can elevate total inequality. In the second phase, however, both *within* and *between* inequalities declined, producing a more balanced and equitable outcome (Table 6).

4.4 Regional Inequality (NSS Regions 191–195)

Table 7: Inequality Trends based on Region (NSS) along with the Decomposition Results

	Period I (2004–05 to 2011–12): Divergence Phase			Period II (2011–12 to 2022–23): Convergence Phase		
NSS Region	**Inequality Value (TEM) 2004–05**	**Inequality Value (TEM) 2011–12**	**Change (%)**	**Inequality Value (TEM) 2011–12**	**Inequality Value (TEM) 2022–23**	**Change (%)**
191	0.12436	0.13754	10.6	0.1049	0.14063	34.06
192	0.20005	0.17434	-12.85	0.13475	0.10064	-25.31
193	0.31361	0.32845	4.73	0.2761	0.21458	-22.28
194	0.17642	0.20278	14.94	0.18713	0.13671	-26.94
195	0.27292	0.31176	14.23	0.15954	0.11619	-27.17
Decomposition Component	**Period I (2004–05 to 2011–12): Divergence Phase**			**Period II (2011–12 to 2022–23): Convergence Phase**		
NSS Region	**Inequality Value (TEM) 2004–05**	**Inequality Value (TEM) 2011–12**	**Change (%)**	**Inequality Value (TEM) 2011–12**	**Inequality Value (TEM) 2022–23**	**Change (%)**
Within-Region	0.24753	0.25666	3.69	0.20013	0.1455	-27.3
Between-Region	0.02035	0.03037	49.24	0.03287	0.00945	-71.25

4.4.1 Period I (2004–05 to 2011–12): Uneven Regional Growth

Regional inequality showed heterogeneous movements across the five NSS regions.

- *Region 191* increased from *0.12436 to 0.13754* (+10.6%), moving from a low-inequality to a moderate-inequality state.
- *Region 192* improved substantially (–12.9%), suggesting internal equalization.
- *Regions 193, 194, and 195* all registered increases (ranging from +4% to +15%), indicating rising disparities across these regions.

Decomposition analysis revealed that the *between-region component* rose by 49%, confirming that spatial inequality widened overall.

4.4.2 Period II (2011–12 to 2022–23): Regional Convergence

The later period demonstrated strong convergence across most regions.

- *Regions 192–195* exhibited notable declines in inequality (–22% to –27%), suggesting improved regional balance.
- *Region 191*, however, stood out as an exception, with inequality rising sharply by 34%, reversing its earlier equalization.

Decomposition results show that *between-region inequality* decreased by 71.3%, confirming substantial spatial convergence driven by infrastructural investment, rural–urban linkages, and balanced regional development.

4.5 Social Group Inequality (SC, ST, OBC, and Others)

Table 8: Inequality Trends based on Social Groups along with the Decomposition Results

	Period I (2004–05 to 2011–12): Divergence Phase			Period II (2011–12 to 2022–23): Convergence Phase		
Social Group	**Inequality Value (TEM) 2004–05**	**Inequality Value (TEM) 2011–12**	**Change (%)**	**Inequality Value (TEM) 2011–12**	**Inequality Value (TEM) 2022–23**	**Change (%)**
1	0.10678	0.16186	51.58	0.14391	0.11963	-16.87
2	0.14818	0.16489	11.28	0.1167	0.12282	5.24
3	0.21102	0.23172	9.81	0.15429	0.10939	-29.1
9	0.30375	0.32073	5.59	0.26531	0.1715	-35.36
Decomposition Component	**Period I (2004–05 to 2011–12): Divergence Phase**			**Period II (2011–12 to 2022–23): Convergence Phase**		
Social Group	**Inequality Value (TEM) 2004–05**	**Inequality Value (TEM) 2011–12**	**Change (%)**	**Inequality Value (TEM) 2011–12**	**Inequality Value (TEM) 2022–23**	**Change (%)**
Within-Group	0.25512	0.27347	7.19	0.21983	0.14749	-32.91
Between-Group	0.01276	0.0136	6	0.01317	0.00788	-40.17

4.5.1 Period I (2004–05 to 2011–12): Deepening Disparities

All social groups experienced increases in inequality during this phase.

- *Scheduled Castes (Group 1)* recorded a 51.6% increase, the steepest among all groups, reflecting intra-group polarization.

- *Scheduled Tribes (Group 2)* and *OBCs (Group 3)* showed moderate increases (+11.3% and +9.8%, respectively).
- *Others (Group 9)*, already the most unequal, saw a modest increase (+5.6%).

This suggests that economic growth disproportionately favoured upper strata within each social group, reinforcing internal stratification.

4.5.2 Period II (2011–12 to 2022–23): Broad-Based Equalization

The second period marks a significant reduction in inequality across most groups.

- Inequality among *SCs* decreased by 16.9%, while *OBCs* experienced a stronger decline (–29.1%).
- *Others* showed the most dramatic improvement (–35.4%), suggesting greater inclusion in income growth.
- *STs*, however, recorded a minor increase (+5.2%), indicating that they benefitted less from economic and social reforms.

Decomposition results indicate that both *within-group* and *between-group* components decreased (–32.9% and –40.2%, respectively), confirming the effectiveness of inclusive welfare and redistributive measures.

4.6 Comparative Dynamics: Acceleration versus Reversal

The comparative assessment of the two periods reveals a structural transition in inequality dynamics.

- In the rural sector, inequality consistently declined in both periods, though at a decelerating rate (–30.8% to –16.4%).
- In the urban sector, inequality reversed from a sharp increase (+27.9%) to a notable decline (–30.6%).
- Overall inequality shifted from a divergent phase (+7.1%) to a convergent phase (–33.5%).

This shift signifies that the main driver of inequality transitioned from urban concentration and structural imbalance in the first phase to urban equalization and inclusive policy diffusion in the second.

5. DISCUSSION AND FINDING

5.1 First Period – Divergence

The divergence during 2004–11 can be attributed to rapid urban expansion, uneven access to high-productivity jobs, and service-sector bias in income growth. Although rural programs reduced inequality within villages, urban inequality rose due to income concentration in the upper tail of the distribution. The rural–urban mean gap narrowed slightly, but not enough to counteract the urban surge in within-sector inequality.

5.2 Second Period – Convergence

The post-2011 period witnessed convergence, driven by expanded welfare coverage, non-farm diversification, and improved social infrastructure. Programs such as MGNREGA and the National Food Security Act (NFSA), along with greater digital inclusion and rural–urban linkages, played a crucial role in narrowing both within- and between-sector disparities.

5.3 Policy Implications

1. **Sustain Rural Gains:** Continued progress in rural areas must be reinforced by investments in education, healthcare, and skill development. Expanding non-farm opportunities will prevent stagnation and sustain downward inequality trends.
2. **Manage Urban Inequality:** Urban areas require sustained focus on formal employment creation, affordable housing, and transport infrastructure. Promoting formalization and equal access to services can consolidate recent reductions in urban inequality.
3. **Address Regional Imbalances:** Development policies should prioritize *Region 191*, which showed rising inequality, by encouraging balanced infrastructure, rural industries, and equitable access to state resources.
4. **Promote Social Equity:** Persistent inequality among *STs* indicates the need for targeted measures such as community-based development programs, asset-building schemes, and enhanced educational inclusion.
5. **Strengthen Inequality Monitoring:** Establishing district-level inequality dashboards using *Theil* and *Gini* indices can help policymakers monitor changes in real time. Regular updates incorporating population weights would make composition effects transparent and actionable.

5.4. Findings from the Analysis of the Results

The analysis confirms a two-phase evolution of inequality in West Bengal.

- During *2004–11*, inequality was characterized by divergence, with rural improvement offset by urban and regional disparity.
- During *2011–23*, inequality entered a convergence phase, with significant reductions across sectors, regions, and social groups.
- The dominant source of inequality remains *within-group disparity*, though its intensity has declined.
- A structural shift from between-group (macro) to within-group (micro) inequality indicates a transition toward broader inclusivity, while emphasizing the need for localized policy interventions.

6. CONCLUSION

The study examined the evolution of inequality in West Bengal using Theil's entropy measure and decomposition analysis across sectors, regions, and social groups over the period 2004–05 to 2022–23. The findings reveal a clear two-phase trajectory. The first period (2004–05 to 2011–12) was characterized by divergence, where rural inequality declined substantially but was offset by rising urban inequality, leading to a modest increase in overall inequality. Conversely, the second period (2011–12 to 2022–23) marked a strong convergence, as both rural and urban inequality declined sharply, resulting in a significant overall reduction in disparities.

At the regional level, inequality initially widened but later exhibited convergence, reflecting spatial balancing effects of infrastructure development and social protection measures. Among social groups, disparities increased in the early phase but narrowed considerably after 2011–12, suggesting that inclusive growth policies and targeted welfare interventions contributed to improved equity. The decomposition analysis confirmed that within-group inequality remained the dominant source of disparity, although between-group inequality declined steadily over time.

In summary, West Bengal's inequality pattern shifted from an urban-driven divergence to a broad-based convergence, reflecting structural transformation, social inclusion, and policy outreach. However, emerging signs of slowed rural progress and regional exceptions indicate the need for sustained monitoring and localized policy responses. Finally, future studies should incorporate *post-pandemic data* and use *panel or spatial econometric models* to assess causal relationships between policy interventions, migration, and inequality.

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