Distributional Effects of GST in India

Evidence from the 2022–23 Household Consumption Expenditure Survey

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The distributional impact of the goods and services tax is a central concern in public finance. Using data from the National Sample Survey (2022–23) on household consumption, this paper examines GST's progressivity across rural and urban India by fractile classes of monthly per capita expenditure. Four measures—the Progressive Vertical, Kakwani, Reynolds–Smolensky, and Musgrave–Thin indices—show GST to be progressive. In rural areas, the bottom 50% and middle 30% each bear 31% of the burden; the top 20% bear 37%. In urban areas, the shares are 29%, 30%, and 41%. GST modestly reduces post-tax consumption inequality.

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Value added tax (VAT) or goods and services tax (GST) has been widely adopted for its administrative simplicity and effectiveness in raising revenue. However, concerns remain regarding its equity and incidence, particularly its distributional effects, as VAT is often regarded as regressive and disproportionately burdens low-income households (Thomas 2022). The empirical literature is divided: one strand finds VAT to be highly regressive, while the other views it as roughly proportional or moderately progressive. Studies estimating VAT incidence as a share of current income across the distribution consistently report strong regressivity (Leahy et al 2011; O'Donoghue et al 2004).[1] In contrast, Thomas (2022), examining 27 Organisation for Economic Co-operation and Development (OECD) countries, concludes that VAT tends to be proportional or moderately progressive, with reduced rates and exemptions contributing to its progressivity.

The incidence of VAT depends on the extent to which businesses are able to shift the tax burden on to consumers. The effective incidence is shaped not by the statutory design of VAT but by market conditions, notably the price elasticity of demand for consumption and the degree of consumption among suppliers (Ebrill et al 2001). In competitive markets with limited pricing power, firms may absorb part of the tax burden through reduced prices. In less competitive markets characterised by inelastic demand, firms are more likely to pass the tax on to consumers via higher prices (Delipalla and Keen 1998).

To assess the distributional effects of VAT, most studies use cross-sectional household-level consumption data to estimate average VAT rates as a share of total expenditure or household income (Thomas 2022). Income-based analyses, which measure the VAT burden as a percentage of current income across the income distribution, generally find the tax to be regressive (Blasco et al 2023; OECD/KIPF 2014; Gaarder 2019). In contrast, expenditure-based analyses, which assess the burden as a share of current expenditure across the expenditure distribution, tend to find VAT to be roughly proportional or moderately progressive (Bird and Smart 2016; IFS 2011; Metcalf 1994). The distributional outcome varies across methodologies and country contexts, reflecting differences in VAT design and structure.

In the Indian GST regime, harmonisation of tax rates enables the assignment of item-wise GST rates to commodities listed in the National Sample Survey Office's (NSSO) Household Consumption Expenditure Survey (HCES) 2022–23. The literature

on the distributional impact of the Indian GST remains limited. Mukherjee (2024) examines this using the Consumer Pyramids Household Survey (CPHS) of 2021–22, which covers 1,63,204 households (33.5% rural and 66.5% urban) and 123 consumption items. In comparison, the HCES 2022–23 includes 2,61,746 households (59% rural and 41% urban) and 390 items (Table 1). The broader coverage of items in the latter facilitates more accurate GST rate assignment and is therefore expected to yield more robust estimates. However, the HCES 2022–23 does not collect household income data, which precludes an assessment of the GST's distributional impact using the income-based approach.

Table 1: List of Items Covered in the NSSO's HCES 2022–23

Description	No of Items
Total number of items listed in the NSSO's HCES 2022–23 (A)	448
Number of items listed as sub-total and totals (B)	51
Number of items (A-B)	397
Number of items excluded (C)*	7
Number of items considered for average MPCE (D) (A-B-C)	390

*See Table 2 for the list of items.
Source: Computed by the author based on HCES 2022–23.

A major challenge with VAT systems is the existence of multiple tax rates, exemptions, and variations in accounting bases and rules across industries and firms. The application of different rates to goods and services increases complexity for both businesses and tax administrations. Diversity in rates complicates the accurate determination and application of the appropriate rate for each transaction. Classifying goods into tax categories requires detailed knowledge of the tax code, increasing the risk of errors and misclassification. The wider the scope of goods and services subject to concessional rates or exemptions, the greater the likelihood of classification disputes and the higher the compliance burden (Highfield et al 2019).

The main rationale for a single-rate VAT lies in its simplicity, which avoids the numerous technical and compliance complexities associated with multiple rates (van Brederode 2021).[2] A uniform rate preserves the economic neutrality of VAT by leaving relative market prices and factor allocation unchanged, thereby minimising distortions in consumer choices. In contrast, exemptions and multiple rates generate efficiency and welfare losses. Exemptions without input credit result in tax cascading—where taxes are levied on taxed inputs—leading to vertical integration, self-supply bias, competitive distortions, discrimination against exports, and complications in input tax allocation (Ebrill et al 2001). Zero rating (exemptions with credit) and reduced rates can similarly distort consumer and producer behaviour (Ebrill et al 2001; de la Feria and Krever 2013; Cnossen 2022). Most analyses conclude that exemptions without credit should be strictly confined to sectors where taxation is administratively difficult and revenue is based on margins, such as financial services, and that reduced rates should be avoided (Cnossen 2022).

The main rationale for adopting a multiple rate VAT structure is to introduce an element of progressivity. Many countries exempt basic food items and certain merit goods, such as health and education services, which generate positive externalities. Globally, 54% of countries apply a multiple-rate VAT, while 46% operate with a single rate (van Brederode 2021). Of the 78 countries with reduced rates, 38 apply a single reduced rate and 40 apply two or three. Thirteen countries impose rates above the standard level; of these, nine combine higher rates with both standard and reduced rates, while four apply one or two increased rates without any reduced rates. A minority—70 countries—apply only the standard rate. Regionally, reduced rates are used in only five jurisdictions in Asia/Pacific, 14 in Africa/Middle East, 15 in the Americas and the Caribbean, and 43 in Europe.

This paper assesses the distributional impact of GST in India using data from the NSSO's HCES 2022–23.

Sources of Data

Cleaning of data: We find that the item-wise sum of average monthly per capita consumption expenditure (MPCE) does not align with the sub-totals reported for all groups in the HCES 2022–23. To address this discrepancy, the analysis uses the item-wise sum of average MPCE across the 390 items as an alternative to the reported sub-totals.

The HCES 2022–23 contains 448 item lines, of which 51 are sub-totals and totals. Seven items not subject to GST were excluded from the calculation of average MPCE (Table 2). The analysis thus covers 390 consumption items, for which average MPCE by fractile class is available separately for rural and urban areas at the all-India level.

Table 2: List of Items Not Attracting GST

Item Code	Item Description	Group
281	Cooked meals received free in workplace	289-served processed food: sub-total
282	Cooked meals received as assistance	
401	Books, journals, etc: second-hand	409-education: sub-total
539	House/garage rent (imputed)	
899	Other consumer taxes and cesses	
375	Clothing: second-hand	379-clothing: sub-total
395	Footwear: second-hand	399-footwear: sub-total

Source: Same as Table 1.

Assignment of GST rates: The GST rate structure in India comprises seven schedules for goods, in addition to schedules for "nil rates" and the GST Compensation Cess applied to specific consumption items. Commodities are classified using the Harmonised System of Nomenclature (HSN) at four- to eight-digit levels, while services are categorised under Services Accounting Code (SAC). The seven GST rates are nil, 0.25%, 3%, 5%, 12%, 18%, and 28%. In addition, certain specific rates apply: 1% for tax collection at source and for composition taxpayers in manufacturing; 1.5% for affordable residential apartment construction, diamond cutting and polishing, and diamond job works; 6% for brick kilns under the composition scheme (without input tax credit [ITC] and for composition taxpayers providing services; and 7.5% for construction of residential apartments other than affordable residential apartments. Exports are zero-rated, while goods attracting a "nil rate" are ineligible to claim ITC on inputs and capital goods.

This multi-rate structure is intended to impart progressivity to the GST system.

Assigning GST rates to 390 items of goods and services necessarily involves a degree of subjectivity. Price-based rate determination and classification based on physical or marketing characteristics of commodities, such as packaging, labelling, or material composition, complicate the process of assigning precise rates (Mukherjee 2024). To address this, the GST rate structure is grouped into nine categories: exempt; very low (exempt to 5%); low (5%); lower middle (5% to 12%); middle (12%); upper middle (12% to 18%); upper (18%); high (28%); and very high (above 28%). Certain goods—such as tobacco and tobacco products, aerated waters, carbonated fruit beverages and specified motor vehicles—attract a 28% GST along with a GST compensation cess and are classified under the "very-high" category. Items outside the GST framework, including electricity and alcoholic beverages for human consumption, as well as those for which the GST Council has yet to recommend an implementation date—such as petrol, gasoline, motor spirit, diesel, and natural gas—are classified under the "out-of-GST" category.

The distribution of items across GST rates is summarised in Table 3. Of the 390 items, 154 consumption goods are either exempt or attract a 5% GST; of these, 154 (68%) are food items and the remainder are non-food. Seventy-four items attract GST rates between 5% and 12%, comprising 35 food and 39 non-food items. A total of 136 items are taxed between 12% and 18%, of which 22 are food items. Three of the four items in the 28% GST slab are non-food, as are nine of the 10 items taxed above 28%. Overall, the majority of goods taxed at 12% and above are non-food items.

Table 3: GST Rate Category-wise Distribution of Items of Consumption Available in the NSSO's HCES 2022–23

GST Rate Category	Total		Food		Non-food	
	No of Items	% Share	No of Items	% Share	No of Items	% Share
(i) Exempt	90	23.1	57	34.8	33	14.6
(ii) Very low (Exempt to 5%)	64	16.4	48	29.3	16	7.1
(iii) Low (5%)	40	10.3	34	20.7	6	2.7
(iv) Lower middle (5% to 12%)	34	8.7	1	0.6	33	14.6
(v) Middle (12%)	21	5.4	11	6.7	10	4.4
(vi) Upper middle (12% to 18%)	28	7.2	2	1.2	26	11.5
(vii) Upper (18%)	87	22.3	9	5.5	78	34.5
(viii) High (28%)	4	1.0	1	0.6	3	1.3
(ix) Very high (>28%)	10	2.6	1	0.6	9	4.0
(x) Out of GST	12	3.1	0	0.0	12	5.3
Total	390	100.0	164	100.0	226	100.0

Source: Same as Table 1.

Basic Statistics

Distribution of consumption expenditure across GST rates: The distribution of average MPCE across GST rates indicates that 45% of total expenditures fall under the exempt to very-low (5%) GST category in both rural and urban areas (Tables 4 and 5). Within this category, 64% of rural and 58% of urban food expenditure is concerned, while the corresponding shares for non-food items are 30% and 36%, respectively. In rural areas, one-fourth of total spending—26% on food and 24% on non-food—falls under the 5%–12% GST slab; in urban areas, the corresponding shares are 28% and 19% (23% in total). Expenditure taxed between 12% and 18% accounts for 18% of total spending in rural areas (10% on food and 26% on non-food) and 20% in urban areas (13% on food and 24% on non-food). In both regions, only 1% of total expenditure, largely on non-food items, is taxed at 28%, while 2% again, primarily non-food, attract GST rates above 28%.

Table 4: Distribution of Average MPCE across GST Rate Categories in Rural India

GST Rate Category	Rural					
	Total Expenditure		Expenditure on Food		Expenditure on Non-food	
	Amount	% Share	Amount	% Share	Amount	% Share
Exempt to 5% (i + ii)	1,688.2	45.4	1,092.2	64.2	596.0	29.5
5% to 12% (iii + iv)	916.2	24.6	440.0	25.8	476.2	23.6
12% to 18% (v to vii)	683.9	18.4	163.8	9.6	520.2	25.8
28% (viii)	42.2	1.1	4.4	0.3	37.9	1.9
>28% (ix)	69.5	1.9	2.1	0.1	67.4	3.3
Out of GST	319.70	8.6	–	–	319.70	15.8
All	3,719.71	100.0	1,702.48	100.0	2,017.23	100.0

Source: Same as Table 1.

Table 5: Distribution of Average MPCE across GST Rate Categories in Urban India

GST Rate Category	Urban					
	Total Expenditure		Expenditure on Food		Expenditure on Non-food	
	Amount	% Share	Amount	% Share	Amount	% Share
Exempt to 5% (i+ii)	2,867.6	44.8	1,450.4	58.2	1,417.2	36.2
5% to 12% (iii+iv)	1,440.5	22.5	702.7	28.2	737.9	18.9
12% to 18% (v to vii)	1,265.3	19.8	328.1	13.2	937.2	24.0
28% (viii)	69.7	1.1	7.7	0.3	62.0	1.6
>28% (ix)	114.0	1.8	3.5	0.1	110.5	2.8
Out of GST	646.78	10.10	–	–	646.78	16.53
All	6,403.98	100.00	2,492.33	100.00	3,911.65	100.00

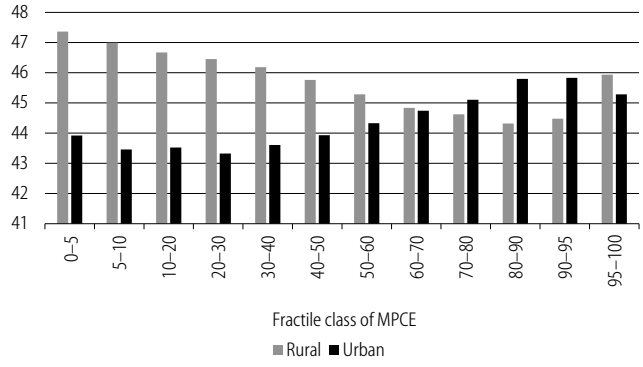
Source: Same as Table 1.

The distribution of consumption expenditure differs between rural and urban areas. Consequently, the GST capacity will depend on the population distribution across these regions as well as on their average MPCE and consumption patterns. Beyond the level of MPCE, its composition across GST rates is crucial in determining the GST base. Hence, variations in the composition of consumption expenditure by GST slab will lead to differences in GST capacity across states.

Appendix Table A1 (p 44) presents the range and average MPCE for each fractile class. After data cleaning, as described earlier, the table reports the adjusted average MPCE for each class.

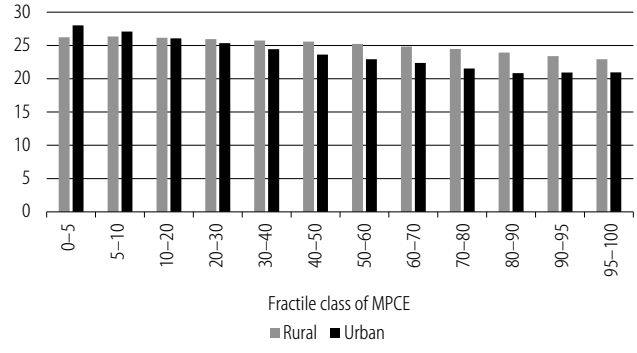
Figure 1 (p 39) shows that, in rural areas, lower fractile classes consume a higher share of goods in the "exempt" and "exempt to 5%" GST categories than higher fractile classes, except the top class (95% to 100%). In urban areas, in contrast, these categories account for a larger share of consumption among higher fractile classes than among lower ones. This pattern suggests that reducing the list of exempt goods or raising the GST rate on items currently exempt or taxed at 5% would disproportionately increase the tax burden on lower fractile classes in rural areas, though the impact in urban areas would be different. Any policy aimed at expanding the GST base by narrowing the exemptions must therefore balance the potential revenue gains against the additional burden it would impose on rural lower-income groups. With some exceptions, the impact of such a policy would differ in urban areas. Any

Figure 1: Fractile Class-wise Share of Average MPCE Falling under the 'Exempt to 5%' GST Rate Category (%)



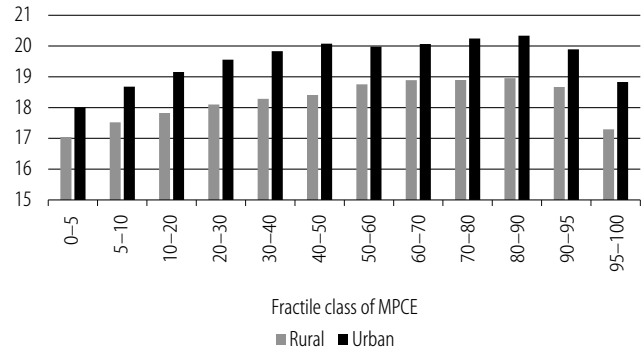
Source: Same as Table 1.

Figure 2: Fractile Class-wise Share of Average MPCE Falls under the '5 to 12%' GST Rate Category (%)



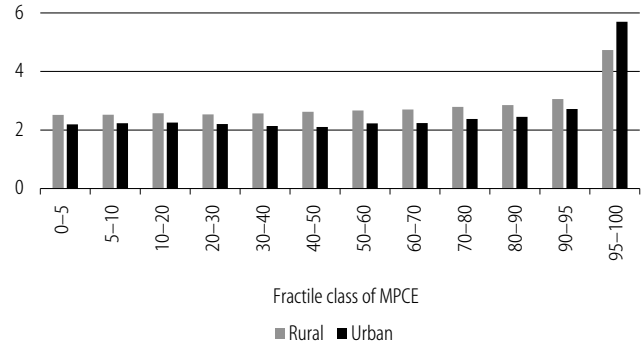
Source: Same as Table 1.

Figure 3: Fractile Class-wise Share of Average MPCE Falls under the '12% to 18%' GST Rate Category (%)



Source: Same as Table 1.

Figure 4: Fractile Class-wise Share of Average MPCE Falls under the '28% and Above' GST Rate Category (%)



Source: Same as Table 1.

attempt to expand the GST base by reducing exemptions must weigh the potential revenue gains against the additional tax burden on lower-fractile rural consumers.

In rural areas, the share of average MPCE on items in the 5%–12% GST rate categories declines with higher fractile classes (Figure 2). A similar pattern is observed in urban areas. The analysis indicates that consumers in the lower fractile classes spend a higher share of their average MPCE on these items than those in the higher fractile classes. Consequently, raising the tax rate on such items is likely to increase the tax burden on lower fractile consumers across both rural and urban regions.

In rural areas, the share of average MPCE on items in the 12%–18% GST rate category rises with fractile classes up to the 80%–90% group and then declines (Figure 3). In urban areas, the share increases up to the 40%–50% fractile, declines moderately until the 60%–70% fractile, rises again up to the 80%–90% fractile, and then falls for the top two fractile classes. Thus, in rural areas, this GST rate category is progressive except for the top two fractile classes. In urban areas, it is progressive up to the 40%–50% fractile, proportionate between 80% and 90% fractiles, and regressive thereafter. A carefully designed increase in GST rates on these items may avoid regressivity.

In both rural and urban areas, the share of average MPCE on items in the "28% and above" GST rate category is higher among consumers in the upper fractile classes (Figure 4). This suggests that a higher tax on these items is unlikely to be regressive.

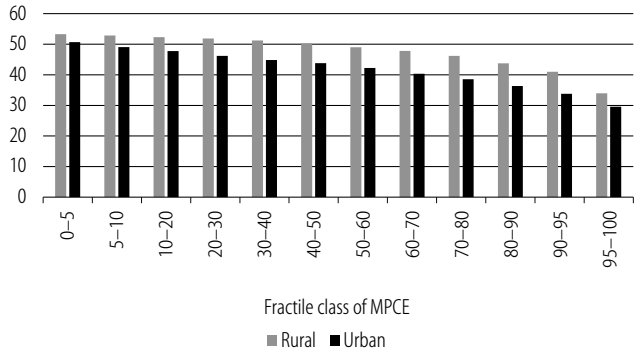
Distribution of consumption expenditure on food and non-food: Table 6 (p 40) presents the distribution of average MPCE across fractile classes for rural and urban areas. In rural areas, the average share of expenditure on food is about 7 percentage points higher than in urban areas, while the share of non-food expenditure is higher in urban areas. Within non-food, the share of consumables is greater in urban areas, whereas the share of durables is higher in rural areas. The share of average MPCE spent on food is higher for the bottom 50% of consumers (up to "40%–50%" fractile) compared to the top 5% (95%–100% fractile). Conversely, the share of non-food consumption is higher for the top 5% than for the bottom 50%. Placing food items in the exempt or lower GST rate categories may be therefore justified, as it supports the consumption levels of lower fractile classes.

The share of average MPCE on food declines with higher fractile classes, reinforcing the view that exemptions and lower GST rates on food contribute to the progressive nature of Indian GST (Figure 5, p 40). Conversely, the share of expenditure on non-food items rises with higher fractile classes, suggesting that higher GST rates on non-food items may enhance the progressivity of GST (Figure 6, p 40).

Results and Discussion

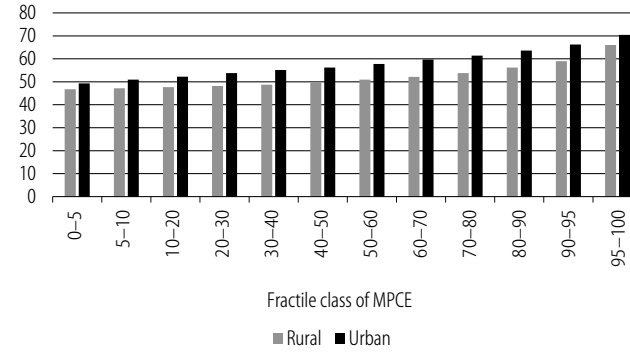
This section assesses the overall progressivity or regressivity of the Indian GST under two scenarios (Table 7, p 40). In scenario 1, items in any tax category are assigned that category's

Figure 5: Share of Expenditure on Foods in Average MPCE across Fractile Classes (%), All India



Source: Same as Table 1.

Figure 6: Share of Expenditure on Non-food (Cosumables and Durables) in Average MPCE across Fractile Classes (%), All India



Source: Same as Table 1.

Table 6: Fractile Class-wise Share of Average MPCE on Food and Non-food for Rural and Urban Areas (%)

Fractile Class of MPCE	Rural				Urban			
	Food (A)	Consumables (B)	Durables (C)	Non-food (B+C)	Food (A)	Consumables (B)	Durables (C)	Non-food (B+C)
0–5	53.2	35.4	11.4	46.8	50.7	38.8	10.5	49.3
5–10	52.8	35.8	11.4	47.2	49.1	40.5	10.5	50.9
10–20	52.3	36.2	11.5	47.7	47.8	41.6	10.6	52.2
20–30	51.8	36.6	11.6	48.2	46.2	43.1	10.7	53.8
30–40	51.2	37.2	11.6	48.8	44.8	44.2	11.0	55.2
40–50	50.2	38.0	11.8	49.8	43.8	45.1	11.1	56.2
50–60	49.0	39.1	11.9	51.0	42.2	46.5	11.3	57.8
60–70	47.8	40.0	12.2	52.2	40.3	48.0	11.7	59.7
70–80	46.1	41.3	12.5	53.9	38.5	49.3	12.2	61.5
80–90	43.7	43.2	13.1	56.3	36.3	50.8	12.8	63.7
90–95	41.0	45.0	14.1	59.0	33.7	52.5	13.8	66.3
95–100	33.9	47.7	18.4	66.1	29.6	53.5	17.0	70.4
All	45.8	41.1	13.2	54.2	38.9	48.4	12.7	61.1
Average share of consumption expenditure of the top 5% of consumers (fractile class 95%–100%)/ average share of consumption expenditure of the bottom 50% of consumers (fractile class up to 40%–50%)	0.65	1.31	1.59	1.37	0.63	1.27	1.58	1.33

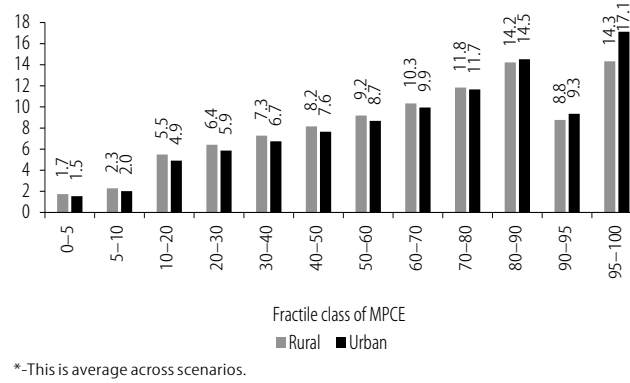
Source: Same as Table 1.

Table 7: GST Rates across Scenarios

Tax Category	Scenario I (Tax Rate)	Scenario II (Tax Rate)
Exempt	Exempt	Exempt
Very low (exempt to 5%)	Exempt	5%
Low (5%)	5%	5%
Lower middle (5% to 12%)	5%	12%
Middle (12%)	12%	12%
Upper middle (12% to 18%)	12%	18%
Upper (18%)	18%	18%
High (28%)	28%	28%
Very high (>28%)	28.5%	30%*

*-This consists of GST Compensation Cess, and a rate higher than 28% results in an analysis similar to the one presented here.
Source: Computed by the author.

Figure 7: Fractile Class-wise Distribution of Tax Burden in the GST (%)*



*-This is average across scenarios.
Source: Computed by the author.

lower-bound rate, yielding a lower-bound estimate of the consumer tax burden. In scenario II, the upper-bound rate is applied, providing the upper-bound estimate. Given the complexities of the GST rate structure, precise assignment of rates to consumption items is difficult. Items outside the GST net are excluded from the analysis, as their inclusion would distort the estimates of the burden borne by consumers. For each fractile class, the average MPCE corresponding to "out-of-GST" items is excluded from the overall average MPCE. It is pertinent to note that the average MPCE reflects the market value of the consumption basket and, therefore, incorporates the GST burden. The tax burden (average tax liability) is estimated using the following methodology:

Market Value of Consumption $(P_m*Q) = P_p*(1+t)*Q$

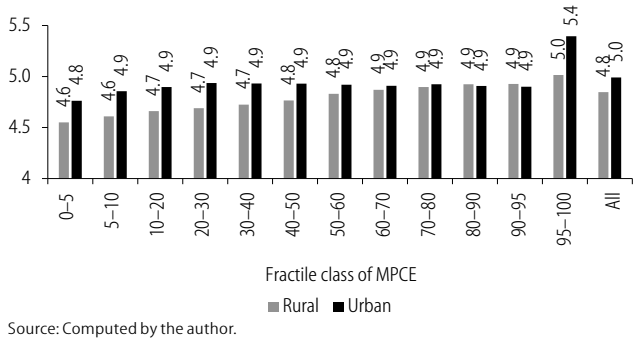
$$\text{Tax Liability} = P_p*Q*t = (P_m*Q*t)/(1+t) \quad \ldots (1)$$

Tax Liability as % of Adjusted Average MPCE = Tax Liability/ Average MPCE excluding Average MPCE on "Out of GST" items where,

P_m is the market price of goods and services
P_p is the producer's price of goods and services
t is the tax rate
Q is the quantity of consumption

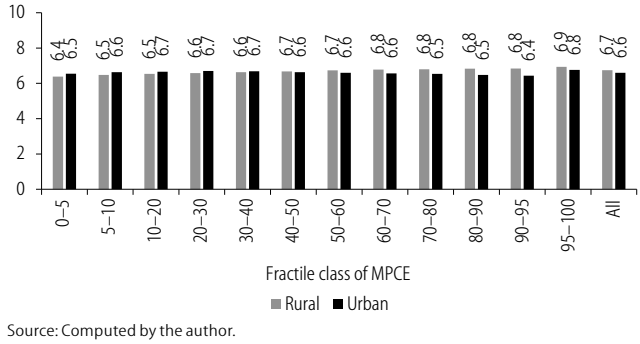
In rural areas, the bottom 50% and middle 30% of consumers each bear 31% of the GST burden, while the top 20% bear 37%. In urban areas, the corresponding shares are 29%, 30% and 41%, respectively (Figure 7).

Figure 8: Fractile Class-wise Average GST Rate (%), Scenario I



Source: Computed by the author.

Figure 9: Fractile Class-wise Average GST Rate (%), Scenario II



Source: Computed by the author.

Table 8: Fractile Class-wise Average GST Liability on Food and Non-food

(%)

Fractile Class of MPCE	Food						Non-food					
	Rural			Urban			Rural			Urban		
	Average MPCE (₹)	Scenario I	Scenario II	Average MPCE	Scenario I	Scenario II	Average MPCE (₹)*	Scenario I	Scenario II	Average MPCE*	Scenario I	Scenario II
0–5	714	2.2	3.9	1,001	2.4	4.1	535	7.6	9.6	819	7.7	13.0
5–10	922	2.3	4.1	1,264	2.5	4.2	708	7.6	9.6	1,093	7.6	12.9
10–20	1,083	2.3	4.1	1,490	2.6	4.3	849	7.6	9.6	1,349	7.5	12.6
20–30	1,249	2.4	4.2	1,720	2.7	4.5	993	7.6	9.6	1,648	7.3	12.3
30–40	1,395	2.4	4.2	1,931	2.7	4.5	1,133	7.6	9.6	1,946	7.1	12.0
40–50	1,530	2.4	4.2	2,155	2.9	4.6	1,284	7.5	9.6	2,263	6.9	11.7
50–60	1,667	2.5	4.3	2,373	2.9	4.7	1,462	7.5	9.5	2,659	6.7	11.4
60–70	1,830	2.6	4.4	2,609	3.0	4.7	1,664	7.4	9.4	3,179	6.5	11.0
70–80	2,028	2.6	4.4	2,930	3.1	4.8	1,961	7.3	9.3	3,858	6.3	10.7
80–90	2,314	2.7	4.4	3,456	3.3	4.9	2,452	7.0	9.1	5,050	6.0	10.3
90–95	2,688	2.8	4.5	4,152	3.6	5.1	3,187	6.7	8.8	6,846	5.7	10.0
95–100	3,525	3.1	4.6	6,100	4.1	5.3	5,921	6.2	8.3	12,630	6.0	10.6
All	1,702	2.6	4.3	2,492	3.1	4.8	1,698	7.1	9.2	3,265	6.4	11.0

*-This excludes the average MPCE on "Out of GST" items.
Source: Computed by the author

The average MPCE across fractile classes, after adjusting and deducting for the consumption of "out of GST" items, is termed the pre-GST average MPCE. The average GST liability (or average tax rate, ATR) of the *i*th fractile class in the *j*th region (rural or urban) is estimated as follows:

$$\text{Average Tax Rate}_{ij} = \frac{\text{GST Liability}_{ij}}{\text{Pre-GST Average MPCE}_{ij}} * 100 \quad \ldots (2)$$

This analysis rests on three key assumptions. First, it assumes that consumers purchase all taxable goods and services from GST-registered entities. Second, taxpayers pass the entire tax burden to consumers, so there is no difference between statutory and effective GST rates. Third, there is no cascading of taxes in the system. Estimating the extent of tax cascading under the GST regime is beyond the scope of the present paper.[3] Without an estimate of the cascading impact of taxes, this paper captures only the direct effect of GST. The methodology developed by Mukherjee and Rao (2015), however, could help estimate the total (direct and cascading) incidence of GST, if appropriate data are available.

We find that ATR in rural areas is generally lower, or at best comparable, to that in urban areas across all MPCE fractile classes (Table 8; Figure 8). This suggests that, given the composition of their consumption baskets, rural consumers typically face a lower ATR than their urban counterparts. The ATR on food is lower than that on non-food items across all regions fractile classes of MPCE, and scenarios. This suggests that, given the composition of their consumption baskets, rural consumers typically face a lower ATR than their urban counterparts. The ATR on food is lower than that on non-food items across all regions, MPCE fractile classes, and scenarios. As discussed earlier, this pattern contributes to the progressivity of the Indian GST system.

We find that the ATR in rural areas remains unchanged across higher MPCE fractile classes (Figure 8). Overall, the ATR tends to increase with higher fractile classes in rural areas. In urban areas, the ATR rises between P_5 and P_{10}, remains stable from P_{10} to P_{95}, and increases again at P_{100}.[4] A preliminary assessment suggests that the distributional impact of GST is moderately progressive or proportional.

In scenario II, a broad trend shows a rising ATR with higher orders of fractile classes in rural areas (Figure 9). In urban areas, ATR increase up to the fractile class P_{30}; thereafter, it remains unchanged till the fractile class P_{70}. It decreases up to the fractile class P_{95}, and increases for the fractile class P_{100}. The ATR is progressive for the fractile classes up to P_{30}; thereafter, it is proportional until the fractile class P_{70}. Thereafter, it is regressive up to the fractile class P_{95}. The higher ATR is borne by the fractile class P_{100} across all regions.

We employ various measures of tax progressivity to evaluate the Indian GST system. Following Fernandez (2024), we estimate the Progressive Vertical Index (PVI) of tax progressivity. The method of estimation of PVI is explained as follows:[5]

$$\text{Progressive vertical index (PVI)} = \frac{\text{Average tax rate paid by the top 5\% of the consumers}}{\text{Average tax rate paid by the bottom 50\% of the consumers}} \quad \ldots (3)$$

PVI	> 1	Vertical Progressivity
	$= 1$	Vertical Proportionate
	< 1	Vertical Regressivity

According to the PVI, the Indian GST is vertically progressive in both rural and urban areas (Table 9). For non-food items, however, it is vertically regressive, while for food items, it remains vertically progressive. Rationalising the GST rate structure should therefore focus on adjusting the rates for the non-food consumption basket to enhance the progressivity of the system.

Table 9: Progressive Vertical Index of Indian GST

Region	Consumption of	Scenario I			Scenario II		
		Average Tax Rate of Top 5% Consumers	Average Tax Rate of Bottom 50% Consumers	PVI	Average Tax Rate of Top 5% Consumers	Average Tax Rate of Bottom 50% Consumers	PVI
Rural	Food	3.06	2.35	1.30	4.62	4.12	1.12
	Non-food	6.18	7.60	0.81	8.31	9.62	0.86
	Total	5.01	4.67	1.07	6.93	6.55	1.06
Urban	Food	4.11	2.61	1.57	5.32	4.37	1.22
	Non-food	6.01	7.35	0.82	10.62	12.40	0.86
	Total	5.40	4.89	1.10	6.76	6.64	1.02

Source: Computed by the author.

Table 10: Fractile Class-wise Average MPCE (₹)

Fractile Classes of MPCE	Average MPCE: Reported		Average MPCE: Adjusted*		Average MPCE: Pre-GST**		Average MPCE: Post-GST (Scenario-I)#		Average MPCE: Post-GST (Scenario-II)#	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
0%–5%	1,373	2,001	1,341	1,975	1,249	1,820	1,192	1,734	1,169	1,701
5%–10%	1,782	2,607	1,745	2,578	1,630	2,357	1,554	2,243	1,524	2,201
10%–20%	2,112	3,157	2,073	3,120	1,932	2,839	1,842	2,700	1,806	2,650
20%–30%	2,454	3,762	2,411	3,725	2,243	3,368	2,138	3,201	2,095	3,142
30%–40%	2,768	4,348	2,724	4,308	2,528	3,877	2,408	3,686	2,360	3,618
40%–50%	3,094	4,963	3,047	4,924	2,814	4,419	2,680	4,201	2,626	4,126
50%–60%	3,455	5,662	3,403	5,625	3,129	5,032	2,978	4,785	2,918	4,700
60%–70%	3,887	6,524	3,829	6,472	3,494	5,788	3,324	5,504	3,258	5,408
70%–80%	4,458	7,673	4,395	7,604	3,989	6,788	3,794	6,454	3,718	6,344
80%–90%	5,356	9,582	5,293	9,513	4,766	8,505	4,532	8,088	4,441	7,955
90%–95%	6,638	12,399	6,558	12,304	5,875	10,998	5,586	10,459	5,474	10,291
95%–100%	10,501	20,824	10,393	20,637	9,446	18,731	8,972	17,720	8,791	17,464
All Classes	3,773	6,459	3,720	6,404	3,400	5,757	3,235	5,470	3,171	5,377
Gini coefficient of consumption expenditure	0.2662	0.3140	0.2677	0.3144	0.2611	0.3129	0.2604	0.3124	0.2604	0.3131

*-This represents the item-wise sum of the average MPCE of consumer groups, distributed across fractile classes of MPCE, after excluding the consumption of items not subject to GST (see footnote 1).
**-This is the item-wise sum of the average MPCE (adjusted) of consumer groups distributed across fractile classes of MPCE after excluding consumption of "Out of GST" items.
#-This is the net of tax liability of pre-GST average MPCE.
Source: Compiled and computed by the author based on HCES 2022–23 data.

Table 11: Assessment of Progressivity of Indian GST

Indicator / Index	Rural		Urban	
	Scenario I	Scenario II	Scenario I	Scenario II
Gini coefficient of consumption expenditure (G_{pre})	0.261118		0.312938	
Concentration index of tax burden (CIT)	0.27456	0.27168	0.32333	0.31103
Kakwani index of progressivity (KI)	0.01345	0.01057	0.01040	-0.00191
Concentration index of consumption (CIC_{post})	0.26043	0.26035	0.31239	0.31307
Average tax rate (in percent)	0.04846	0.06749	0.04991	0.06598
t/(1-t)	0.05093	0.07238	0.05253	0.07064
[t/(1-t)]*KI	0.00068	0.00076	0.00055	-0.00014
Reynolds–Smolensky index (RSI)	0.00068	0.00076	0.00055	-0.00014
Gini coefficient of consumption expenditure (G_{post})	0.26043	0.26035	0.31239	0.31307
Musgrave–Thin index (MTI)	0.00068	0.00076	0.00055	-0.00014

Source: Computed by the author.

As discussed earlier, the average MPCE reflects consumption expenditure at market prices, inclusive of indirect taxes. We estimate the GST liability for each MPCE fractile class and derive the post-tax MPCE. The post-tax is analogous to MPCE disposable income after income tax, as in studies adopting an income-based approach. We then estimate the Gini coefficient of consumption expenditure for both the average MPCE at market prices and the post-tax MPCE.

Post-tax consumption inequality declines under scenario I across all regions (Table 10). Under scenario II, it falls in rural areas but rises marginally in urban areas.

We estimate the Kakwani tax progressivity index, which assesses the progressivity of a tax structure based on the average tax rates across population fractiles. The formula for the Kakwani index (*KI*) is as follows:

$$KI = (CIT - G_{pre}) \quad \ldots (4)$$

G_{pre} denotes the pre-tax Gini coefficient of consumption expenditure, and *CIT* represents the concentration index of the tax burden distribution across consumer groups ranked by pre-tax average MPCE.

The tax system is progressive when the value of *KI* is positive, regressive when it is negative, and proportional when it equals zero.

The concentration index (CI) is computed by using the following formula:

$$CI = (p_1 L_2 - p_2 L_1) + (p_2 L_3 - p_3 L_2) + \ldots + (p_{T-1} L_T - p_T L_{T-1}) \quad \ldots (5)$$

where p is the cumulative share (per cent) of the population ranked by average MPCE, $L(p)$ is the corresponding concentration curve of tax burden, and T is the number of consumer groups.

The Indian GST exhibits a low progressive effect, as the KI values are small and positive (Table 11).

A related indicator, closely aligned to that proposed by Musgrave and Thin (1948), is the Reynolds–Smolensky (1977) index, which measures the overall redistributive effect of a tax. For the Indian GST, this is calculated as the difference between the Gini coefficient of (equivalised) pre-tax consumption and the concentration coefficient of post-GST consumption across consumer groups ranked by pre-tax average MPCE. The Reynolds–Smolensky Index (RSI) thus measures the extent to which post-tax consumption is closer to equality than pre-tax consumption—without altering the ranking of individuals—that is, the reduction in inequality attributable to the tax. It is expressed as follows:

$$RSI = G_{pre} - CIC_{post} = \frac{t}{(1-t)}(CIT - G_{pre}) = \frac{t}{(1-t)}KI \quad \ldots (6)$$

where G_{pre} denotes the pre-tax Gini coefficient of consumption expenditure, CIC_{post} is the post-tax concentration index of consumption, t is the aggregate average tax rate (in percent), *CIT*

represents the concentration index of the tax burden across different consumer groups ranked by pre-tax average MPCE and *KI* is the Kakwani Index of Progressivity. This relationship indicates that redistribution can occur even under a tax system with only a small degree of progressivity, if the average tax is high. Conversely, a tax system with low tax rates must be highly progressive to achieve the same degree of redistribution.

Musgrave and Thin (1948) compared income inequality before and after taxation. A progressive tax system reduces income inequality, whereas an increase in inequality reflects regressive tax rates. The tax system is proportional when before-tax and after-tax income inequalities are identical.

We also estimate the Musgrave–Thin Index (MTI), defined as the difference between the Gini coefficient on pre-tax consumption and that of post-tax consumption. It is expressed as $MTI = G_{pre} - G_{post}$, where G_{post} denotes the post-tax Gini coefficient of consumption expenditure across consumer groups ranked by pre-tax average MPCE. The results indicate that the Indian GST system is moderately progressive or proportional (Table 11), and that its redistributive effect is positive, as post-tax consumption inequality declines.

Conclusions

Taxes on commodities and services account for over three-fifths (62.3%) of India's general government tax revenue. Consequently, consumption taxes bear a larger share of the overall tax burden than taxes on income, property, capital or other transactions. GST contributes about half of the total tax collection from commodities and services; it is therefore essential to assess its distributional impact across consumer groups. Literature on the distributive impact of taxes in India is limited, and the harmonisation of the tax structure under the GST regime has enabled the assignment of tax rates to individual consumption items.

Based on the NSSO's HCES 2022–23, we assess the distributional impact of the Indian GST separately for rural and urban areas across fractile classes of average MPCE. The survey covers 2,61,746 households (59% rural and 41% urban) and 390 consumption items. Data on average MPCE across these 390 items, by fractile class, of average MPCE, is available for rural and urban areas at the all-India level. However, the survey does not capture household income, limiting the scope to assess the distributional impact of the GST using an income-based approach.

The results indicate that Indian GST is progressive across various measures of progressivity, including the Progressive Vertical Index, Kakwani Index of Progressivity, RSI and MTI. In rural areas, the bottom 50% and the middle 30% of consumers each bear 31% of the tax burden, while the top 20% bear 37%. In urban areas, the bottom 50% bear 29%, the middle 30% bear 30%, and the top 20% bear 41%. Changes in the GST rate structure may have distributional implications, depending on the consumption patterns across different GST rate categories. The redistributive effect of Indian GST is positive, as post-tax consumption inequality declines.

NOTES

1 "The degree of regressivity is closely linked to the saving ration: VAT becomes more regressive as the saving ratio rises with income Where t is the tax rate, this relationship can be expressed as $t(C/Y)=t[1-(S/Y)]$." where C denotes consumption, Y income, and S savings (van Brederode 2021: 83). Explanation: $C=(Y-S)$, $tC/Y = t[(Y-S)/Y) = t[1-(S/Y)]$.

2 There exist four main reasons to justify a multiple rate structure for VAT: (i) the need to provide preferential treatment for gaining societal support at the introduction of the tax; (ii) to support distributional equality by combating the (alleged) regressivity of VAT; (iii) to respond to externalities produced by some goods and services through Pigouvian taxes or subsidies; and (iv) to realise specific economic cyclical policy objectives.

3 Cascading of taxes in the GST regime arises because primary energy sources—petrol, diesel, aviation turbine fuel [ATF], natural gas, crude petroleum, and electricity—are kept out of the purview of GST, either temporarily or permanently. The exemption of selected goods and services and annual turnover-based thresholds for GST registration also contribute to cascading. With tax cascading, producer prices are higher than under a non-cascading regime; this given Q and t in equation (1), consumer's tax liability will also be higher.

4 P_k (for $k = 10, 20, 30, \ldots, 80, 90, 100$) denotes the kth percentile of the distribution of persons by average MPCE, that is, the average MPCE level below which k% of the population lies.

5 Fernandez (2024) examines the average tax rate paid by the top 1% of consumers; however, the NSSO's HCES 2022–23 reports data for the top 5%.

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Appendix

Table A1: Fractile Classes of Average MPCE for 2022–23 (₹)

Fractile Class of MPCE	Rural				Urban			
	Lower Limit (₹)	Upper Limit (₹)	Average MPCE (₹)-Reported	Average MPCE (₹): Adjusted	Lower Limit (₹)	Upper Limit (₹)	Average MPCE (₹)-Reported	Average MPCE (₹): Adjusted
0%–5%	≤1,638		1,373	1,341	≤2,382		2,001	1,975
5%–10%	1,638	1,912	1,782	1,745	2,382	2,813	2,607	2,578
10%–20%	1,912	2,289	2,112	2,073	2,813	3,467	3,157	3,120
20%–30%	2,289	2,612	2,454	2,411	3,467	4,043	3,762	3,725
30%–40%	2,612	2,927	2,768	2,724	4,043	4,647	4,348	4,308
40%–50%	2,927	3,268	3,094	3,047	4,647	5,286	4,963	4,924
50%–60%	3,268	3,657	3,455	3,403	5,286	6,061	5,662	5,625
60%–70%	3,657	4,138	3,887	3,829	6,061	7,036	6,524	6,472
70%–80%	4,138	4,819	4,458	4,395	7,036	8,425	7,673	7,604
80%–90%	4,819	6,043	5,356	5,293	8,425	11,089	9,582	9,513
90%–95%	6,043	7,411	6,638	6,558	11,089	14,189	12,399	12,304
95%–100%		>7,411	10,501	10,393		>14,189	20,824	20,637
All Classes			3,773	3,720			6,459	6,404

Source: Computed and compiled from HCES 2022–23 data.