

## CHAPTER 5

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# Climate Justice Implications of the Relationship between Economic Inequality and Carbon Emissions in India

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### Introduction

The carbon emissions of the world's richest 1 per cent are more than double the emissions of the poorest 50 per cent, despite the fact that climate change is expected to disproportionately affect the poor, especially in the warmer parts of the world (Oxfam 2020; Goswami 2020). This suggests that climate and socio-economic justice are intertwined, and understanding the nature of the relationship between carbon emissions and economic inequality can help us arrive at potential pathways to address both.

Climate and socio-economic justice are crucial in the case of India. India is a significant player in the global economy, as its gross domestic product (GDP) is the fifth largest in the world (World Bank 2021). However, the country also experiences staggering levels of economic inequality. It has the third highest number of billionaires, but it also has the largest poor population in the world (Ankel 2020; Roser and Ortiz-Ospina 2019). The wealth of the richest 1 per cent of the Indian population is more than four times the total wealth of the bottom 70 per cent (*Economic Times* 2020). These indicators of economic inequality demonstrate a dire need to enhance socio-economic justice in India.

Three different indicators of carbon emissions are widely used for analytical purposes. The present climate crisis resulted from historically accumulated greenhouse gas emissions, measured in carbon dioxide equivalents. The United States (US) is the largest contributor, accounting for about 25 per cent of the global cumulative carbon emissions between 1751 and 2019, while India contributed about 3 per cent (Ritchie 2019). Hence, India's historical cumulative carbon emission is rather low. The second indicator measures annual carbon emissions, or a country's current emission levels. Based on this indicator, India has the third highest carbon emission levels globally; it trails China and the US by a huge margin.<sup>1</sup> The third indicator is per capita annual emissions, which accounts for differences in the population size of countries. When countries are ranked in descending order of their per capita carbon emissions, India ranked 128 out of 210 countries in 2019 (Crippa et al. 2020). Even though India's per capita carbon emissions and its share in cumulative global emissions is low, its current scale of emissions is a matter of concern (Matthews 2016). Therefore, this analysis focuses on the scale of annual carbon emissions in India.

India's carbon emissions are concerning because despite its low per capita emissions, many Indian cities experience high levels of air pollution. Thirty-five out of the 50 most polluted cities globally are located in India (IQAir 2020). The effects of air pollution are most heavily borne by India's poorest people, who lack relevant protection both at the workplace and at home. Furthermore, since India is located in a warm region and has the largest number of poor globally, the poor in India will be exposed to a disproportionate share of climate change impacts. Technologies that help reduce dependence on fossil fuels, and thereby reduce carbon emissions, face serious obstacles in India, as the high concentration of economic resources in the hands of a few in the top economic strata leave the vast majority of the population with meagre resources to adopt such carbon mitigation technologies (Gill 2021). Therefore, the relationship between carbon emissions and economic inequality has important implications for climate and socio-economic justice in India. And since India has the second largest population globally, socio-economic and climate justice in the country also have consequences for the rest of the globalized world.

This chapter's core argument is that the relationship between annual carbon emissions and economic inequality has undergone a fundamental transformation in the post-liberalization period in India. My research shows that in the pre-liberalization period, economic inequality at the state level had a negative association

<sup>1</sup> In 2020, China's carbon emission was 4.4 times that of India, and the US emitted about twice that of India.

with carbon emissions. However, in the years following the introduction of a wide range of economic liberalization measures, higher economic inequality at the state level came to be associated with higher carbon emissions. This finding resonates with evidence of a positive relationship between carbon emissions and economic inequality in the US and China. This suggests that like the top two emitters, India has an opportunity to adopt a holistic approach towards economic development that mitigates carbon emissions and economic inequality jointly, thereby fostering climate and socio-economic justice.

The rest of the chapter is organized as follows. The following section summarizes the insights from the existing literature on the relationship between carbon emissions and economic inequality. The third section describes the data and methodology of my research. The fourth section discusses the key results. The fifth section discusses the key implications and the final section offers a conclusion.

## Background and past research

The empirical literature on income distribution or income inequality as a driver of carbon emissions is mainly based on international data. Among the international studies, Grunewald et al. (2017) provide the most comprehensive spatial and temporal coverage, with data from 158 countries for the period 1980–2008. Grunewald et al. (2017) find that while higher inequality is associated with lower per capita emissions in lower-income countries, higher inequality is associated with higher per capita emissions in higher-income countries.

Evidence on how economic inequality influences annual carbon emissions at the intra-country level is relatively sparse. The literature provides intra-country evidence of economic inequality as a driver of carbon emissions for the top two carbon-emitting countries: the US and China. Jorgenson, Schor, and Huang (2017) examined state-level data from the US for 1997–2012 and found that a higher concentration of income among the wealthiest 10 per cent of the population is associated with higher levels of carbon emissions. Using a subnational regional-level panel dataset from China for the period 1995–2010, Zhang and Zhao (2014) found a qualitatively similar result – higher income inequality is associated with higher carbon emissions.

There remains a paucity of evidence on the relationship between the scale of carbon emissions and economic inequality at the subnational level. This creates a major knowledge gap for policymaking in countries with federalism, as policymaking powers and enforcement are divided between national and subnational governments.

In these countries, economic policies are likely to be designed and implemented at the subnational level.

This chapter builds on research published by Bhattacharya (2020), which used state-level panel data from India for 1981–2008. This study examines the influence of a major policy change – India’s 1991 economic liberalization policy – on the relationship between state-level carbon emissions and economic inequality. The results demonstrate that policy changes can completely alter the relationship between carbon emissions and economic inequality. The nature of this relationship has important implications for national and subnational climate action and socio-economic justice for India’s poorest citizens.

## Data and methodology

The empirical analysis focuses on the relationship between carbon emissions and economic inequality based on data from 14 major states in India for the period 1981–2008. These states are Andhra Pradesh (AP), Assam (AS), Bihar (BR), Gujarat (GJ), Karnataka (KA), Kerala (KL), Madhya Pradesh (MP), Maharashtra (MH), Orissa (OR), Punjab (PB), Rajasthan (RJ), Tamil Nadu (TN), Uttar Pradesh (UP), and West Bengal (WB). These states cover a vast majority of India’s geographic area (see Figure 5.1) and are also salient in terms of size of economy and population – factors that no doubt influenced data availability for these states.<sup>2</sup> The data sources and descriptions are provided in Table 5.1.

I used the state-level anthropogenic carbon emissions based on fossil fuel use estimated by Ghoshal and Bhattacharya (2008, 2012) as the outcome variable for this analysis. In India and globally, the largest source of anthropogenic carbon emissions is fossil fuel use (Garg and Shukla, 2002; Ghoshal and Bhattacharya, 2012). I did not include other sources of anthropogenic carbon emissions, like deforestation, land-use changes, soil erosion, and agriculture, due to a lack of adequate data.

I used the state-level Gini index of inequality in consumption expenditure, as estimated by Das, Sinha, and Mitra (2014), as an indicator of economic inequality that is the explanatory variable of primary interest. Economic inequality is usually measured in terms of income inequality, as income encapsulates both consumption expenditure and savings that generate wealth. However, in India, reliable, disaggregated income data is difficult to procure, as over 80 per cent of the workforce is employed in the unorganized informal sector (*The Wire* 2018). Therefore, consumption expenditure data collected by the National Sample Survey Organization is often used to construct indicators of economic inequality in India.

<sup>2</sup> A major state, Haryana, is not included in the analysis due to lack of data on inequality.



**Figure 5.1** Geographical scope (shaded dark) of empirical analysis

*Source:* Created by author using <https://mapchart.net/india.html>.

*Note:* Map not to scale and does not represent authentic international boundaries.

Table 5.2 presents the summary statistics of the variables that I used in my analysis. The measures of variability between states, and the measures of variability within states over time, are substantive for all the variables (see the ‘Between Standard Deviation’ and ‘Within Standard Deviation’ columns). Such variability in the data is desirable for multivariate regression analysis.

**Table 5.1** Data description

Variable name	Description	Data source
<i>Carbon</i>	Annual state-level carbon-dioxide emissions measured in thousands of metric tons	T. Ghoshal and R. Bhattacharya, 'State-level Carbon Dioxide Emissions of India: 1980–2000', <i>Arthaniti – Journal of Economic Theory and Practice</i> 7, nos. 1–2 (2008): 41–73, and T. Ghoshal and R. Bhattacharya, 'Carbon Dioxide Emissions of Indian States: An Update', 2012, <a href="https://ssrn.com/abstract=2166900">https://ssrn.com/abstract=2166900</a> (accessed 20 April 2019).
<i>Gini</i>	Gini coefficient for state-level economic inequality measured on a scale of 0 to 100	S. Das, G. Sinha, and T. K. Mitra, 'Economic Growth and Income Inequality: Examining the Links in Indian Economy', <i>Journal of Quantitative Economics</i> 12, no. 1 (2014): 86–95.
<i>GSDP</i>	Gross state domestic product at factor cost at 1980–1981 constant prices measured in billions of rupees	Ministry of Statistics and Programme Implementation, Government of India, <a href="http://mospi.nic.in/data">http://mospi.nic.in/data</a> .
<i>Industry</i>	The percentage share of mining, manufacturing, electricity, gas, and water supply in state domestic product	
<i>Service</i>	The percentage share of construction, transport, storage and communication, trade, hotels and restaurant, banking and insurance, real estate, ownership of dwellings and business services, public administration, defence and quasi-govt. bodies, and other services in state domestic product	
<i>Population</i>	Total state population measured in millions	Population estimate = NDSP/per capita NSDP
<i>Urban</i>	Urban population as a percentage of the total state population	Census of India – 1981, 1991, 2001. Assumed linear growth rate to estimate the urban population for non-census years.

**Table 5.2** Statistical summary of the data

Variable	Observations	Mean	Overall Standard Deviation	Between Standard Deviation	Within Standard Deviation	Minimum	Maximum
<i>Carbon</i>	392	16,346.14	13,007.58	10,612.01	8,022.40	622.91	7,6159.89
<i>Gini</i>	392	28.09	4.20	2.99	3.05	16.13	38.24
<i>GSDP</i>	392	170.07	131.78	99.04	90.75	25.16	943.97
<i>Industry</i>	392	17.83	5.97	5.20	3.24	2.35	34.38
<i>Service</i>	392	47.91	9.33	5.26	7.83	29.55	79.06
<i>Population</i>	392	57.47	30.29	29.77	9.61	16.64	174.95
<i>Urban</i>	392	26.09	9.57	9.48	2.81	9.84	47.18

Note: Number of states = 14; number of years = 28.

I used regression analysis to examine how the relationship between carbon emissions and economic inequality evolved over 1981–2008. The literature on drivers of carbon emissions shows that the scale and composition of economic activities and the scale and composition of the human population are significant.<sup>3</sup> Hence, the regression analysis focused on estimating the relationship between carbon emissions and economic inequality, controlled for the scale of the state's economy, the percentage share of different sectors in the state's economy, the size of the state's population, and the share of the urban population in the state.

In these 28 years, 1991 is considered a watershed year, as it marks the emergence of economic liberalization in India. In the pre-liberalization period, India's economic policies constrained market forces due to the restrictions imposed by tariff and non-tariff barriers on trade, restrictions on domestic and foreign private investments, state control of banking and insurance, and public-sector monopolies in several industries. Some economic reforms initiated in the 1980s attempted to reduce these restrictions. However, the 1991 economic liberalization policy that opened the Indian economy to foreign trade and investment is considered the most prominent policy change in India's post-independence history, as it triggered such a substantive increase in India's GDP and trade in the subsequent period that it drew global attention.<sup>4</sup> Figures 5.2 and 5.3 highlight the growth of India's economy (represented by GDP) and trade (represented by imports and exports), respectively, in 1981–2008.

<sup>3</sup> See, for example, Jorgenson, Schor, and Huang (2017); Zhang and Zhao (2014).

<sup>4</sup> See Kotwal, Ramaswami, and Wadhwa (2011) for an overview of the impact of economic liberalization on India's economy.

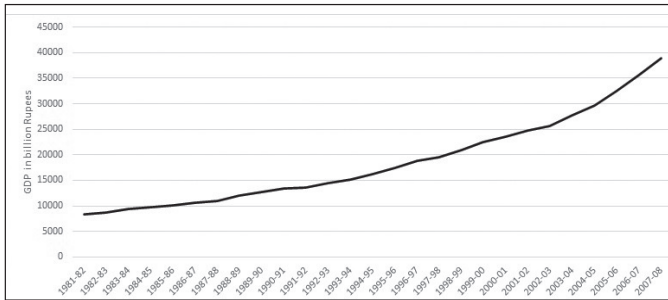


Figure 5.2 GDP of India (at constant 2004–2005 prices)

Data Source: Central Statistical Organization (CSO), India.

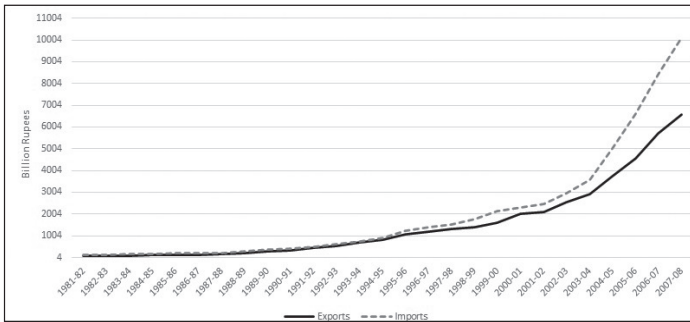


Figure 5.3 Monetary value of exports and imports of India

Data Source: Planning Commission, India.

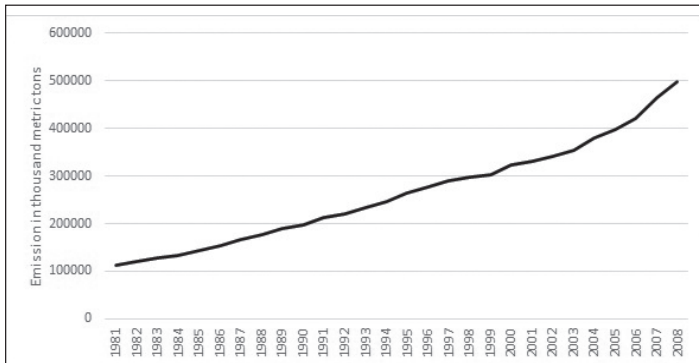
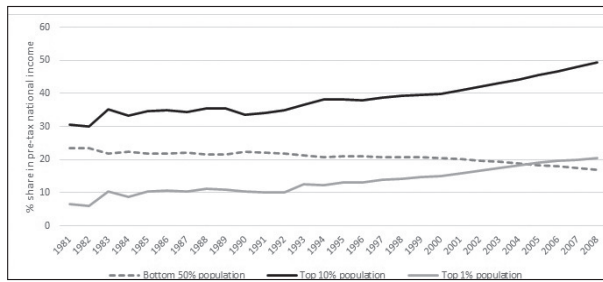


Figure 5.4 Carbon emissions in India

Data Source: Ghoshal and Bhattacharyya (2012).





**Figure 5.5** Economic inequality indicators for India

*Data Source:* World Inequality Database (wid.world).

If we look at India's carbon emissions in 1981–2008 (Figure 5.4), we observe an increasing trend that rises steeply during the post-liberalization period. Figure 5.5 presents the trend in economic inequality as reflected by the share of national income held by the top 1 per cent, the top 10 per cent, and the bottom 50 per cent of the population, organized by economic strata. Since the share of the top 1 per cent and the top 10 per cent has steadily increased, while the share of the bottom 50 per cent has continued to decrease in the post-liberalization period, we can deduce that there is rising economic inequality in the country. When juxtaposed with India's sharply rising GDP in the post-liberalization period, this diverging economic distribution pattern implies that larger slices of the fast-growing economic pie went to the upper economic strata (top 10 per cent or top 1 per cent), while for the vast majority in the lower strata (bottom 50 per cent), their share is shrinking. Against this backdrop, it is imperative to examine whether the relationship between carbon emissions and economic inequality in India changed in the post-liberalization period.

The impact of a major policy change usually becomes more evident after a time gap, and this also holds true for India's liberalization policy. We observe a steeper increase in GDP, trade, carbon emissions, and inequality in the 2000s compared to the 1990s (see Figures 5.2, 5.3, 5.4, and 5.5, respectively). Therefore, I further segmented the post-liberalization period into two decadal categories, 1992–1999 and 2000–2008, to evaluate whether the emissions and inequality relationship differed in these post-liberalization phases.

## Results

Table 5.3 provides the measure of correlations between the variables used in the analysis. It shows that at the state level, carbon emissions are positively related with the Gini index of inequality, gross state domestic product, share of the industry sector, share

of the service sector, population, and share of the urban population (see the 'carbon' column in Table 5.3). The scale of economic activity (state domestic product) and population size show the strongest correlation with the scale of carbon emissions. These positive correlation measures indicate that carbon emissions increased with each of these economic and demographic drivers. However, a simple correlation measure does not give us a clear understanding of the relationship between emissions and inequality. Several other factors or variables may influence the relationship between emissions and inequality, and it is important to account for those relevant drivers of carbon emissions. This can be accomplished through the method of multivariate regressions.

Table 5.4 presents the regression estimates. All the regressions use log-log specifications. Hence, the estimated coefficient represents the elasticity of carbon emissions with respect to the explanatory variable. In other words, the estimated coefficient of economic inequality measured the percentage change in carbon emissions on average when the economic inequality measure increased by 1 per cent. The regression estimates demonstrate that if we consider the carbon emissions and economic inequality relationship for the 1981–2008 period as a whole, there is no evidence of a significant relationship between the two (see column [1] in Table 5.4). In other words, the elasticity of carbon emissions with respect to economic inequality was statistically equivalent to zero for 1981–2008 as a whole.

However, a more disaggregated investigation, which compared the pre-liberalization (1981–1991) and post-liberalization (1992–2008) periods, offers insightful results. We find that the carbon emissions and economic inequality relationship was negative in the pre-liberalization period but positive in the post-liberalization period (see column [2] in Table 5.4).<sup>5</sup> These estimates imply that a 1 per cent increase in economic inequality was associated with an approximately 0.7 per cent decline in state-level carbon emissions on average in the pre-liberalization period (1981–1991). However,

**Table 5.3** Measures of Correlation between Variables

	<i>Carbon</i>	<i>Gini</i>	<i>GSDP</i>	<i>Industry</i>	<i>Service</i>	<i>Population</i>	<i>Urban</i>
<i>Carbon</i>	1						
<i>Gini</i>	0.2241	1					
<i>GSDP</i>	0.7108	0.0917	1				
<i>Industry</i>	0.1183	0.2415	0.2293	1			
<i>Service</i>	0.2685	-0.2346	0.5482	-0.0620	1		
<i>Population</i>	0.7005	0.2226	0.6481	0.0294	0.1552	1	
<i>Urban</i>	0.1431	0.2380	0.5146	0.6139	0.3753	0.0379	1

<sup>5</sup> The elasticity of carbon emission with respect to the Gini index in the post-liberalization period = Coefficient of  $\ln(Gini)$  + Coefficient of  $\ln(Gini) * Post\_liberalization$ .

Table 5.4 Regression results

	$\ln(\text{carbon})$	$\ln(\text{carbon})$	$\ln(\text{carbon})$
	(1)	(2)	(3)
$\ln(\text{Gini})$	0.457 (0.1371)	-0.726* (0.0705)	-0.809** (0.0499)
$\ln(\text{Gini}) * \text{Post\_liberalization}$		1.487*** (0.0000)	
$\ln(\text{Gini}) * \text{Initial\_liberalization}$			1.024*** (0.0000)
$\ln(\text{Gini}) * \text{Later\_liberalization}$			1.741*** (0.0000)
<i>Year</i>	0.008 (0.7373)		
<i>Post_liberalization</i>		-4.866*** (0.0000)	
<i>Initial_liberalization</i>			-3.356*** (0.0000)
<i>Later_liberalization</i>			-5.824*** (0.0000)
F test statistics:			
$H_0$ : coefficient of $\ln(\text{Gini})$ + coefficient of $\ln(\text{Gini}) * \text{Post\_liberalization} = 0$		5.80** (0.0316)	
$H_0$ : coefficient of $\ln(\text{Gini})$ + coefficient of $\ln(\text{Gini}) * \text{Initial\_liberalization} = 0$			0.41 (0.5344)
$H_0$ : coefficient of $\ln(\text{Gini})$ + coefficient of $\ln(\text{Gini}) * \text{Later\_liberalization} = 0$			15.91*** (0.0015)
$H_0$ : coefficient of $\ln(\text{Gini}) * \text{Initial\_liberalization}$ + coefficient of $\ln(\text{Gini}) * \text{Later\_liberalization} = 0$			7.68** (0.0159)

Notes: *Post\_liberalization* is an indicator of the post-liberalization period that takes a value 1 for the years 1992 to 2008 and 0 otherwise.

*Initial\_liberalization* is an indicator of the post-liberalization period that takes a value 1 for the years 1992 to 1999 and 0 otherwise.

*Later\_liberalization* is an indicator of the post-liberalization period that takes a value 1 for the years 2000 to 2008 and 0 otherwise.

Sample size: 392; Number of states: 14; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Fixed effects estimators are reported; p-values based on robust standard errors with state-level clustering reported in parentheses.

All the regression models control for  $\ln(\text{GSDP})$ ,  $\ln(\text{GSDP})^2$ ,  $\ln(\text{Industry})$ ,  $\ln(\text{Service})$ ,  $\ln(\text{Population})$ , and  $\ln(\text{Urban})$ . The estimates are not presented here in the interest of space.

in the post-liberalization period (1991–2008), a 1 per cent increase in economic inequality was associated with an approximately 0.8 per cent increase in state-level carbon emissions on average. It is thus evident that the aggregate analysis, without the classification of the pre- and post-liberalization timeframes, masked a vital qualitative change in the emissions and inequality relationship after 1991.

Further classification of the post-liberalization period into initial liberalization (1992–1999) and later liberalization (2000–2008) phases demonstrates that the positive carbon emissions and economic inequality relationship was statistically insignificant in the initial liberalization (1992–1999) period and gained significant strength in the later liberalization (2000–2008) period (see column [3] in Table 5.4).<sup>6</sup> These estimates imply that while the elasticity of carbon emissions with respect to economic inequality turned from negative in the pre-liberalization period to positive in the post-liberalization period, it was statistically equivalent to zero in the initial post-liberalization (1992–1999) period. However, the elasticity increased significantly to 0.9 in the later post-liberalization (2000–2008) period, that is, a 1 per cent increase in economic inequality was associated with an approximately 0.9 per cent increase in state-level carbon emissions during the 2000s. This intensification of the positive relationship between emissions and economic inequality during the 2000–2008 period qualitatively aligns with the pronounced acceleration in India's GDP and international trade in the 2000s compared to the 1990s as a result of the increase in momentum of economic liberalization.

## Discussion

My finding that the relationship between carbon emissions and economic inequality in India changed to a positive one in the post-liberalization period, and gained significant strength in the 2000s compared to the 1990s, raises the following important questions. First, what is the underlying reason for this positive relationship in the post-liberalization period? Second, what does this positive relationship imply for climate and socio-economic justice in India? This section suggests and discusses plausible answers to these questions.

<sup>6</sup> The elasticity of carbon emission with respect to the Gini index in the initial post-liberalization period = Coefficient of  $\ln(Gini)$  + Coefficient of  $\ln(Gini)$ \**Initial\_liberalization*, and in the later post-liberalization period = Coefficient of  $\ln(Gini)$  + Coefficient of  $\ln(Gini)$ \**Later\_liberalization*.

The positive relationship between emissions and economic inequality needs to be analysed vis-à-vis differences in access to resources and consumption patterns across economic strata. If the carbon footprint of the higher economic strata is much larger than that of the lower economic strata, then an increase in economic inequality, or greater concentration of resources in the upper strata, is expected to increase total carbon emissions. However, if the carbon footprint of the higher economic strata is much smaller than that of the lower economic strata due to the use of more efficient technologies, then an increase in economic inequality could be associated with a decrease in emissions. Hence, an increase in economic inequality may increase or decrease the scale of emissions depending upon differences in consumption patterns and the resulting carbon footprints across economic strata.

Compared to the pre-liberalization period (before 1991), when access to global markets was rather limited for all economic strata in India, the post-liberalization period represents a marked departure, as it opened up access to global products and technology, especially for the upper economic strata. Therefore, the carbon footprint of the upper economic strata increased substantively due to their enhanced access to more carbon-intensive global products and technologies in the post-liberalization period. As a result, an increase in economic inequality – or a higher concentration of resources in the upper economic strata – was linked to an increase in the total state-level carbon emissions in the post-liberalization period due to a spike in the carbon footprint of the upper economic strata.

The empirical analysis I have discussed here was based on aggregate state-level data. Therefore, evaluating the differences in the carbon footprints of different economic strata within a state was not feasible. However, evidence from the existing literature demonstrates that the upper economic strata contributed more to carbon emissions in the post-liberalization period, and the upper economic strata's propensity to emit increased substantively relative to the lower economic strata in post-liberalization India. For example, Mukhopadhyay (2008) examined household-level data for the years 1983–1984, 1989–1990, 1993–1994, and 1999–2000 and found that carbon emissions accelerated in the 1990s, and the highest income groups were the prime driver of the increased emissions. Parikh et al. (2009) analysed data from 2003–2004 and found that the urban top 10 per cent income group emitted about 24 times more carbon than the rural bottom 10 per cent. Grunewald et al. (2012) studied data for the years 2004–2005 and 2009–2010 and found that the demand for carbon-intensive goods and services increased disproportionately as household affluence increased. Hence, the positive relationship between emissions and economic inequality during the post-liberalization period can be attributed to the increased carbon footprints of the upper economic strata in India.

Turning to the second question about the implications for climate and socio-economic justice, my finding that the association between economic inequality and carbon emissions turned positive in the post-liberalization period suggests that economic inequality is not only a sustainability concern from the socio-economic perspective but also a challenge for climate justice in India. Since the negative effects of rising carbon emissions are globally projected to have a disproportionate impact on the poor, this finding suggests that rising inequality and carbon emissions may reinforce and exacerbate both these problems while further undermining the well-being of the lower economic strata. In other words, the results suggest that in a business-as-usual world, socio-economic and climate justice will be even harder to realize for the lower economic strata in India. In essence, the positive relationship between carbon emissions and economic inequality in post-liberalization India implies that if left unaddressed, rising carbon emissions and economic inequality can spiral out of control, thereby threatening both environmental and socio-economic sustainability.

However, the positive relationship between carbon emissions and economic inequality also implies that inclusive economic development policies that reduce economic inequality will help mitigate carbon emissions as well. Therefore, a holistic approach towards economic development that leverages potential synergies between environmental and economic distribution policies and collective societal actions can mitigate carbon emissions and economic inequality jointly and foster climate and socio-economic justice. National and state-level policies targeting carbon emissions and economic inequality are often influenced by the upper economic strata, which shapes institutions and policies that govern natural resource use and allocation (see, for example, Boyce 1994). Hence, broad-based socio-political engagements and a willingness to approach these challenges holistically is the key to moving forward sustainably.

## Conclusion

Since economic inequality has wide-ranging adverse effects, like distortions in economic development, lower contribution to public goods, erosion of trust, worse health outcomes, worse education outcomes, increased crime, and increased political instability, and the adverse impacts of carbon emission-driven climate change include loss of infrastructure, increased health risks, loss of livelihoods, food insecurity, migration, and violent conflicts, it is important to mitigate both carbon emissions and economic inequality. The fact that both carbon emissions and economic inequality have been increasing in India, and my finding that the relationship between them turned positive in the post-liberalization period, gives

rise to serious concerns. Yet, the positive relationship between carbon emissions and economic inequality implies that instead of emissions and economic inequality mitigation being seen as conflicting goals, there is a potential to mitigate both jointly.

There is growing evidence that the lower economic strata contributes less to environmental degradation than the upper economic strata, and yet it is the lower economic strata that bears a disproportionate share of the impacts of environmental degradation, which begs for the need to reduce the injustice towards the lower economic strata. For example, Bhattacharya and Innes (2013) show that it is the higher economic strata in rural India that degrades vegetation but benefits more from vegetative resources. Yet, there exists a prevalent view in academic and policy discussions – the ‘poverty–environment nexus’ – that the poor, given their limited resources and inability to adopt environment-friendly technologies, drive environmental degradation. It also assumes that due to their heavy reliance on natural resources for survival, they get poorer when the environment degrades, thereby triggering a vicious downward cycle. It is important to recognize the fallacies in such assumptions in the context of carbon emissions as well so that climate justice is prioritized in policy formulation.

The finding that economic inequality became a key driver of rising carbon emissions in post-liberalization India highlights that the predominant policy focus on aggregate measures of economic health, like GDP, without taking into account the implications of patterns of economic resource distribution, is an inadequate approach to address critical challenges in climate and socio-economic justice. To facilitate the development of a more holistic approach towards sustainable development that fosters climate and socio-economic justice, further research needs to analyse the various pathways through which carbon emissions and economic inequality can be jointly mitigated and which pathways are more efficient.

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