

Peer Review

Review of: "Carbon Inequality: Resolving Contradictory Results From Two Different Approaches"

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The manuscript makes a meaningful attempt to reconcile two divergent approaches to carbon inequality, individual-level and country-level assessments of carbon emissions. It does so by critically analyzing underlying assumptions, highlighting methodological differences, and proposing the novel concept of “reasonable vs. excessive consumption” as a possible bridge between them. It further advocates a comprehensive mitigation strategy that includes both reducing overconsumption and stabilizing population growth.

Interesting Points about the study -

Timely and Relevant Topic: The paper engages with ongoing debates around carbon inequality and responsibility, a critical issue for climate policy formulation.

Balanced Approach: The authors are careful not to polarize the debate between rich vs. poor or North vs. South, which enhances the neutrality and policy applicability of their argument.

Novel Integration: Introducing the dichotomy of “reasonable vs. excessive consumption” offers a fresh lens and might help mediate polarized discussions in climate discourse.

Critical Methodological Comparison: The paper effectively contrasts the individual vs. country-level emission approaches, highlighting strengths and limitations.

Clear Writing: The narrative is lucid, accessible, and well-structured.

However, the research study needs major revisions before it could be considered for publication based on

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1. Conceptual Gaps:

- “Excessive vs. Reasonable” Consumption Definition is Vague
 - While the concept is novel, the paper does not offer any quantifiable benchmarks or an illustrative framework for what counts as “reasonable consumption” globally.
 - There is also no empirical application or model of how this concept could be operationalized or measured in climate policy frameworks.

Suggested Improvement:

Include a case study, index, or refer to works like Rao & Min (2018) to propose a working range for what might constitute reasonable living standards or excessive consumption per capita.

2. Data and Methodology Gaps:

- Lack of Original Empirical Analysis:
 - Despite being titled as a reconciliation of two approaches, the paper does not present original datasets or a new model that integrates both approaches systematically.
 - The visualizations (like Figure 1) are informative but based on re-analysis or reinterpretation of existing data.

Suggested Improvement:

Include a synthetic model or hybrid framework using a unified database that simulates outcomes under both approaches.

3. Missing Perspectives in Emissions Attribution:

- Investment Emissions Attribution Debate Underdeveloped
 - The discussion about investment-related emissions is one of the most novel contributions. However, no alternative scenarios are simulated to test how emissions might shift if investments were reattributed to final consumers.

Suggested Improvement:

Provide modeled estimates or scenarios contrasting outcomes under different attribution rules (investor-based vs. consumer-based).

4. Normative and Policy Dimensions Lacking Depth:

- Limited Discussion on Political Feasibility

- Suggestions like reducing population growth and targeting excessive consumption are politically and ethically charged, yet the paper doesn't fully engage with how such recommendations can be implemented fairly or without backlash.

Suggested Improvement:

Acknowledge the ethical sensitivities around reproductive choices, and elaborate more on rights-based voluntary interventions (e.g., education, reproductive healthcare).

5. Literature Review Could Be Expanded:

- Lack of Engagement with Southern Scholarship
 - The article heavily references Western/Northern studies and institutional reports (Oxfam, IPCC), but omits global South scholars' critiques of carbon inequality discourses or green colonialism debates.

Suggested Improvement:

Include references or counterpoints from scholars in the Global South to contextualize how carbon inequality frameworks can be interpreted differently in varied political economies.

Minor Comments and Technical Corrections:

- Abstract Missing: A formal abstract is missing or not clearly marked, which is standard in preprints.
- Typographical Errors: Inconsistent formatting for words like "GHG," "CO2," "GDP-per capita," and hyphenation. Occasional encoding issues with apostrophes (e.g., "bene♦t," "con♦rmed," "consump♦on").
- Graphical Presentation: Figures 1 and 2 could benefit from clearer legends, labels, and color schemes. It's unclear what the actual "emissions per income group" quantities are in numerical terms.

Overall Evaluation and Recommendation:

Criterion	Evaluation
Originality	Moderate – Integrative conceptual reframing, but lacks empirical novelty
Significance	High – Addresses a critical gap in carbon justice debates
Methodological Rigor	Moderate – Relies on reinterpretation of secondary data
Clarity of Writing	High
Policy Relevance	High, but needs elaboration on feasibility
Recommendation	 Accept with Major Revisions

Declarations

Potential competing interests: No potential competing interests to declare.