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The inequality-emission dilemma: Predistribution vs. redistribution

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ABSTRACT

This study investigates the relationship between different types of within-country inequality reduction and CO_2 emissions using panel data in 156 countries from 1995 to 2020. Using fixed effects panel and quantile regression techniques, we report estimates that indicate that predistribution (pre-tax inequality reduction) increases carbon emissions less than redistribution (post-tax inequality reduction measured as the difference between pre and post-tax inequality). Moreover, we differentiate between the effect of predistribution and redistribution on production-based and consumption-based emissions. Countries that produce more carbon-intensive products than they consume and low emitting countries face the highest trade-off between predistribution and decarbonization. By contrast, reduction in inequality through predistribution does not affect per capita consumption-based CO_2 emissions among the highest emitting countries. These findings call for international cooperation and public policies aimed at a more equitable primary income distribution to achieve joint inequality and reduction of carbon emissions.

1. Introduction

Mitigating climate change and reducing economic inequality within countries are among the most pressing global challenges of our time (IPCC, 2022; United Nations, 2024). Recent studies have demonstrated the unequal distribution of carbon footprints (Tian et al., 2024; Chancel, 2022; Semieniuk and Yakovenko, 2020), with the poorest contributing the least to climate change, but being most affected by it Ash and Boyce (2018), Cappelli et al. (2021) and Davis et al. (2021). Although these studies highlight the unequal contributions of individuals to climate change across income groups (Zheng et al., 2023), they do not offer insights on the overall impact of inequality reduction on carbon emissions. Scholars have tried to address this issue by assessing the direct relationship between economic inequalities and carbon emissions (Jorgenson et al., 2017; Grunewald et al., 2017; Rojas-Vallejos and Lastuka, 2020). Most empirical investigations postulate a trade-off between income inequality and carbon emissions (Chen et al., 2020; Hübler, 2017; Sager, 2019), suggesting major challenges in achieving together the Sustainable Development Goals. However, existing theoretical and empirical work has yet to assess how different forms of inequality reduction affect emissions. The inequality-emission nexus is also suggested to differ depending on whether a country acts primarily as a net producer or a net importer of emissions (Althouse et al., 2023; Safar, 2022).

The objective of the present study is to assess the effect of two strategies for reducing inequality, namely predistribution (pre-tax inequality reduction) and redistribution (post-tax inequality reduction measured as the difference between pre and post tax inequality) on production and consumption-based CO_2 emissions. We do so by means of quantile and fixed effect panel regression models, using various inequality and CO_2 emissions indicators across 156 countries between 1995 and 2020.

This work presents three main novelties in comparison to the current literature. First, we differentiate between the effect of predistribution and redistribution[1] on CO_2 emissions. When achieved through predistribution, the adverse consumption effects of inequality reduction (Ravallion et al., 2000) can be offset by effects via the political transmission channel (Boyce, 1994). This is because predistribution increases the demand for climate change mitigation policies by reshaping

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[1] An in-depth definition of predistribution and redistribution is provided in Sections 2.4 and 3.2 of the paper.

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the distribution of political power between those who profit and those who are affected by climate change. By contrast, redistribution has limited impact on political power, as taxation and state transfers do not alter social status and political influence.

Second, in this study we compare the impact of inequality reduction on CO_2 emissions stemming from consumption (consumption-based emissions, CBE) and production (production-based emissions, PBE). We find that net exporters of carbon-intensive goods face a greater trade-off between inequality reduction and climate change mitigation than net importers of carbon-intensive goods (Hickel et al., 2022). The effect of inequality reduction on production-based emissions is particularly relevant for net exporters of emissions, which are countries that emit more through production than they consume. For these countries, reducing emissions from production rather than consumption is key to contributing to global decarbonization. Conversely, the effect of inequality reduction on consumption-based emissions is more important to net importers of emissions.

Third, we build a comprehensive dataset based on various sources including the World Inequality Database (WID) and the World Development Indicators (WDI). In particular, by incorporating the recently published inequality and CO_2 emissions estimates from the WID, we are able to include a broader set of low-income countries that were previously excluded from such analyses (Grunewald et al., 2017; Wan et al., 2022). In total, the dataset covers 156 countries over a 26-year period and includes 3848 observations per variable. Earlier analyses often suffered from limited availability of data on inequality and carbon emissions, particularly for low and middle-income countries, which led to either greater uncertainty in estimates or their exclusion from empirical analyses. This issue was especially pronounced in studies focusing on consumption-based emissions (Baležentis et al., 2020; Dorn et al., 2024). In contrast, the present study benefits from an extended dataset that provides improved coverage of inequality and carbon emissions indicators across countries at all income levels. The global scope and enhanced information base strengthen the robustness of the empirical findings across countries.

2. Background

Two main arguments and their related transmission channels have been proposed to explain the relationship between economic inequalities within countries and emissions: the consumption argument and the political argument.

2.1. The consumption argument

The consumption argument, proposed by Ravallion et al. (2000) and Heerink et al. (2001), posits a trade-off between equality and decarbonization, focusing on the marginal propensity to pollute. In fact, an increase in inequality leads to a transfer from poor to rich households. The implications in terms of CO_2 emissions depend on the marginal propensity to pollute of each household, i.e. on the income elasticity of pollution. Ravallion et al. (2000) and Heerink et al. (2001) find that the marginal propensity to consume is higher at the bottom of the income distribution. However, the income elasticity can be still less than one as shown by the recent literature (Pottier, 2022). The focus on the marginal propensity to consume fails to consider the impact of savings on carbon emissions (Berthe and Elie, 2015), a topic that has only recently begun to be investigated (Tian et al., 2025; Chancel and Rehm, 2023).

Nevertheless, what matters is not only individual acts of consumption, but also how inequality shapes the overall composition of goods consumed by the society as a whole. High levels of inequality might increase polluting consumption since they exacerbate status competition and the desire of the poor to emulate the lifestyle of the rich (Cummings, 1899; Veblen, 1992). In addition, income inequality can increase social pressure to consume private goods, prevent the implementation of long-term policies, and undermine social cohesion and trust. Thus, present studies do not account for the holistic effect of income inequality (Angel et al., 2025; Boyce, 2007; Wilkinson and Pickett, 2010). It is possible that the reduction of inequality may initially result in an increase in carbon emissions but that these emissions could subsequently decrease as a consequence of changes in social values (Andersson, 2023).

2.2. The political argument

In contrast, the political argument developed by Boyce (1994) assumes positive synergies between low inequality and reduction of emissions. It postulates that a more equitable distribution of income equals a more equitable distribution of power. Thus, those who bear the costs of pollution can demand more stringent climate change policies. Three main core explanations are at the base of this argument.

First, low-income households face the highest adverse impacts of climate change, while powerful and wealthy groups profit emissions-generating activities. Indeed, it is well established in the literature that low-income households and ethnic minorities are the most affected by adverse impacts of climate change (Cappelli et al., 2021; Méjean et al., 2024). However, most studies do not address the question of how wealthy profit from emissions-generating activities (Boyce, 1994; Roemer, 1993) and only discuss the demand of different income groups for climate change policies (Berthe and Elie, 2015). For carbon emissions, our hypothesis is that those who are financially affluent benefit from carbon-emitting industries in two ways: (1) by owning shares in these industries, and (2) by deriving symbolic capital from increased mobility (for example, air transport) and luxury goods (Bourdieu et al., 1986).

Second, it is not affluent groups that demand climate policies; rather, it is those who are most affected by climate change. Martinez-Alier (2014) points out that impoverished and indigenous communities engaged in resource extraction conflicts are the backbone of environmental justice movements. The support for climate policies is contingent upon three factors: effectiveness, fairness, and one's interest (Dechezleprêtre et al., 2022), which presents challenges to climate policies that are perceived as socially regressive (Douenne and Fabre, 2022; Wier et al., 2005). A counterargument is the one of Scruggs (1998). He argues that once short-term material needs are met, individuals tend to adapt post-materialist values and support for climate policies increases (Inglehart, 1990; Scruggs, 1998).

Third, positive synergies between low inequality and carbon emission reductions are more likely to occur if the most affected individuals have the capacity to use their voice and transform their demands into policies. This highlights the role of democracy (Roemer, 1993). In the present analysis, we account for this channel by using the variable "civil liberties". It allows us to control for the capacity of marginalized households to demand climate change policies.

However, the political argument can be distorted if the costs associated with emission-generating activities are displaced to other countries (Roca, 2003). If this is the case, the outcome of the political argument becomes unclear since those who emit and those who demand climate change policies live in two different countries. We assume that this is the case for CO_2 emissions.

2.3. Empirical studies

In general, there is no consensus in the empirical literature, and the results seem to vary depending on country groups, time frames, indicators, and methods employed. More specifically, a substantial body of research has implicitly linked the impact of inequality on carbon emissions to GDP levels. Typically, the relationship is perceived to be negative (trade-off between inequality reduction and decarbonization) in low and middle-income countries but becomes positive (synergies between inequality reduction and decarbonization) in high-income countries (Grunewald et al., 2017; Jorgenson et al., 2017; Rojas-Vallejos and Lastuka, 2020). Nevertheless, further studies

Table 1
Summary of related empirical studies.

Geographic scale	Time	Emission measure	Inequality measure	Estimation technique	Results	N	Authors
Studies in developed countries							
50 US states	1997–2012	Production-based CO_2 per capita	Gini & top 10% (pre-tax)	Prais-Winsten regression with panel-corrected SE	Insignificant for Gini, positive for top 10%	816	Jorgenson et al. (2017)
US	1997–2012	Household consumption-based CO_2	Household income (post-tax)	IO-Analysis	Negative relationship	–	Sager (2019)
17 OECD countries	1945–2010	Production-based CO_2 per capita	Gini & top 10% (pre-tax)	Dynamic common correlated effects	Negative for Gini, positive for top 10%	1054	Hailemariam et al. (2020)
G7	1870–2014	Production-based CO_2 per capita	Gini (post-tax)	Non-parametric estimation (LLDVE)	Mixed results over time	357	Uddin et al. (2020)
France	1945–2010	Production-based CO_2 per capita	Gini & top 10% (pre/post-tax)	ARDL model	Insignificant or negative	39	Safar (2022)
US	1929–2019	Production-based CO_2 per capita	Gini, top 10% & top 1%	Linear regression with smooth-varying coefficients	Negative until 1980, positive after	91	Andersson (2023)
Studies in developing countries							
ASEAN-5	1985–2015	Production-based CO_2	Gini and Gini (bottom 40%)	Panel regression and granger test	Mixed results	155	Muhammad Mehedi Masud and Saifullah (2018)
Turkey	1963–2011	Production-based CO_2	Gini	ARDL model	Negative long-run, positive short-run	49	Demir et al. (2019)
Turkey	1984–2014	Production-based CO_2	Gini (post-tax)	ARDL model	positive association	31	Uzar and Eyuboglu (2019)
48 SSA countries	2010–2016	Production-based CO_2	Poverty at \$1.90/day	Quantile Regression	Negative relationship	336	Koçak et al. (2019)
46 SSA countries	2010–2016	Ecological Footprint	Poverty at \$1.50/day	D–K regression	Negative relationship	321	Baloch et al. (2020)
18 Asian countries	2006–2011	Ecological Footprint	Gini (post-tax)	D–K regression	Negative relationship	216	Khan et al. (2022)
Studies worldwide							
158 countries	1980–2008	Production-based CO_2 per capita	Gini (post-tax)	(group) FE Panel model	Mixed by income level	2939	Grunewald et al. (2017)
149 countries	1985–2012	Production-based CO_2 per capita	Gini	Quantile Regression	Negative relationship	863	Hübler (2017)
68 countries	1961–2010	Production-based CO_2 per capita	Gini (post-tax)	FE panel estimation	Mixed by income level	615	Rojas-Vallejos and Lastuka (2020)
17 G20 countries	1988–2015	Production-based CO_2 per capita	Gini (post-tax)	Quantile Regression	Mixed by development	472	Chen et al. (2020)
217 countries	1960–2021	Production-based CO_2 per capita	Gini (post-tax)	Instrumental variable	Negative relationship	2795	Wan et al. (2022)
109 countries	1960–2019	Consumption-based CO_2 per capita	Gini (post-tax)	Copula regression	Negative for low-income	2866	Dorn et al. (2024)
109 countries	1990–2014	Consumption-based GHG per capita	Gini (post-tax)	Partially linear regression	Mixed results	801	Baležentis et al. (2020)

have challenged this idea. Among them Sager (2019), who finds a trade-off between inequality and emission reduction for the US as well as Baležentis et al. (2020) and Chen et al. (2020), who find a positive association between the Gini Index and carbon emissions in developing countries. However, it should be noted that none of these studies controlled for the role of the political system. Safar (2022) has recently emphasized the importance of the inequality indicators selected for the analysis. The application of post-tax measures appears to be more likely to yield negative results in the same country (Andersson, 2023; Jorgenson et al., 2017; Sager, 2019). The few studies that have reported the use of pre-tax inequality measures find insignificant effects (Safar, 2022; Jorgenson et al., 2017). Furthermore, the nexus appears to be capable of reversing its sign over time (Andersson, 2023; Uddin et al., 2020). Finally, only a few studies have investigated the nexus between inequality and consumption-based emissions (Baležentis et al., 2020; Dorn et al., 2024). Table 1 provides an overview of the related empirical studies, providing information on the inequality measure used (if reported in the study) and the emission measure considered.

2.4. Research gaps and research hypotheses

Inequality reduction, before or after taxes, is generally assumed to have similar effects on carbon emissions (Baležentis et al., 2020; Dorn et al., 2024). However, Safar (2022) showed that in the case of France, the choice of the inequality indicator (pre or post-tax) can lead to contrasting results. We build on this initial evidence and assess the impact of predistribution and redistribution on two different types of CO_2 emissions.

In accordance with the literature on economic inequality (Blanchet et al., 2024), predistribution is defined as the reduction in income inequality before taxes and after accounting for the social insurance system, i.e. reduction in pre-tax inequality. On the other hand, redistribution is defined as all in-kind and in-cash transfers that lead to a reduction in post-tax inequality (Blanchet et al., 2024). Redistribution is operationalized as the difference between pre and post-tax inequality. This allows us to clearly separate inequality changes through taxes and transfers from pre-tax inequality changes. For example, predistribution can be achieved through union bargaining, minimum wage policy, or improved social insurance policies. These policy affect by definition only the predistribution variable. By contrast, redistribution can entail measures such as tax and dividend policies, a universal basic income (UBI), and other transfer policies. By construction, these policies can only affect the redistribution variable.

Following Berthe and Elie (2015), predistribution is expected to yield better decarbonization outcomes than redistribution because they have different dominant effects. First, predistribution operates more strongly through the political channel, which posits that inequality reduction gives more political power to those most affected by climate change. This is because pre-tax income shapes social status, political influence, and bargaining power (Boyce, 1994). Predistribution can alter policy preferences and reduce resistance to ambitious climate policy (Dechezleprêtre et al., 2022). By contrast, redistribution operates through taxes and transfers (not initial market incomes) and thus does not alter the initial distribution of income and power. For example, income earned through employment or business activity is typically associated with social status, recognition, and political influence. By contrast, income received through state transfers is less likely to confer the same level of social status or influence, as it is perceived as externally provided rather than generated through market participation. As a result, predistribution is more closely linked to social and political influence (Drupp et al., 2025; Beckert, 2022).

Second, redistribution has stronger consumption effects than predistribution, since redistribution determines direct changes in disposable income that is used for final consumption expenditures. By contrast, predistribution can be achieved through public provisioning policies that do not directly affect the income of households. In addition, it dampens status-driven and conspicuous consumption (Pathak et al., 2025; Veblen, 1992; Wilkinson and Pickett, 2010).

According to the theoretical arguments above, we argue that predistribution yields better decarbonization outcomes than redistribution. This is because predistribution affects emissions relatively more via the political channel, while redistribution primarily affects emissions via the consumption channel. Accordingly, we formulate the first hypothesis:

Hypothesis 1. Inequality reduction through predistribution increases CO_2 emissions less than redistribution.

The pivotal role of predistribution policies for a just transition process has been advocated by several international institutions. For example, the International Labour Organisation has suggested predistribution policies as a way to solve *ex-ante* the potential contrasts emerging among social groups with different preferences and unbalanced political bargaining power (ILO, 2023; Rigolini, 2021). In fact, predistribution can facilitate the social acceptance of climate change policies, such as carbon taxation. This can be achieved, for example, by minimizing the adverse distributional effects of climate change policies (Dechezleprêtre et al., 2022; Douenne and Fabre, 2022). In addition, those engaged in brown jobs may be less inclined to support climate change policies, if they fear to potentially loose their employment during the transition to a low carbon economy (Berthe et al., 2022). Indeed, the green transition is not feasible without an overarching economic transformation that must be accompanied by a reduction in economic inequalities to ensure its social acceptance (Carrosio and De Vidovich, 2023).

Furthermore, the reduction of income inequality through predistribution and redistribution may have differential effects on production-based and consumption-based carbon emissions (Büchs, 2021). Production-based emissions measure the emissions produced within the borders of a country independently of where the final good is consumed. By contrast, consumption-based emissions are calculated by correcting for trade as carbon emissions are reallocated to the country where consumption occurs rather than where production takes place (Burq and Chancel, 2021; Chancel, 2022). Accordingly, CO_2 emissions are strictly correlated with the expenditure capacity of the consumers.

We exploit the theoretical differences between these two indicators to explore the differential effect of inequality reduction on *net exporters of emissions* and *net importers of emissions*. Countries that consume more emissions than they produce are *net importers of emissions* and vice versa. The effect of inequality reduction on production-based emissions is particularly relevant for net exporters of emissions, which are countries that emit more through production than they consume (Hickel et al., 2022). For these countries, reducing emissions from production rather than consumption is key to contributing to global decarbonization. By contrast, the effect of inequality reduction on consumption-based emissions is more important to net importers of emissions, Althouse et al. (2023) and Hickel et al. (2024). Net producing countries tend to be more dependent on the export of carbon-intensive goods than net consuming countries. Changes in the primary income distribution are most likely driven by stronger engagement in global value chains and higher production of carbon-intensive goods. Building on this, we formulate the second hypothesis:

Hypothesis 2. Countries whose carbon emissions stemming from production exceed those from consumption face higher challenges regarding joint inequality and emission reduction

3. The database

In this paper, we utilize an unbalanced panel dataset spanning from 1995 to 2020, which contains observations from 156 low to high-income countries. The dataset comprises 4056 observations per variable, with 3848 in the benchmark model. This is a significant increase in coverage compared to previous studies (Dorn et al., 2024; Grunewald et al., 2017; Wan et al., 2022). The core of this extensive dataset comprises various pre and post-tax inequality measures, as well as two measures of carbon emissions (consumption and production-based emissions).

3.1. Dependent variables

Consumption-based CO_2 emissions are measured as the national per capita CO_2 footprint in tons of CO_2 equivalent emissions and are retrieved from the World Inequality Database (WID, 2024). The estimates are calculated by Burq and Chancel (2021) and by Chancel (2022), who primarily rely on the high-quality estimates from the Global Carbon Project (2024) (GCP). However, Burq and Chancel (2021) extend these estimates via Input–Output Modelling (EORA database), thus providing a wider coverage of CBE and their respective institutional sectors. Previous studies have relied on data directly from the GCP or the Global Footprint Network (Baležentis et al., 2020; Dorn et al., 2024; Khan et al., 2022), which contain less detailed information than the data used in this study. Additionally, this study utilizes production-based CO_2 emissions in metric tons per capita from the World Development Indicator Databank (WDI, 2024). This indicator, which is widely used in academic literature, contains annual carbon dioxide emissions stemming from the burning of fossil fuels and the manufacture of cement.

3.2. Key independent variables

The two main independent variables used in this paper are *predistribution* and *redistribution*. Redistribution is defined as the difference between pre-tax and post-tax inequality, equal to the reduction in inequality attributable to taxes and transfers. Consequently, an increase in redistribution corresponds to a reduction in post-tax inequality with respect to pre-tax inequality. Predistribution is defined as a reduction in pre-tax inequality. We operationalize this concept by multiplying pre-tax inequality by −1 so that increases in predistribution correspond to decreases in inequality. The definition of these variables in this way ensures comparability across estimates. In this setup, a reduction of inequality through pre and redistribution corresponds to a change in the same direction, thereby facilitating a consistent interpretation of the results.

Moreover, defining redistribution as the difference between pre-tax and post-tax inequality allows both variables to be included in the same model without multicollinearity issues. This specification avoids double counting of inequality effects, as redistribution captures the change in inequality through taxes and transfers rather than the level of post-tax inequality itself. In this way, we clearly separate inequality changes through taxes and transfers from pre-tax inequality changes. In addition, using post-tax inequality and pre-tax inequality in the same model would mechanically lead to overlapping effects and complicate the interpretation of coefficients. In contrast, the difference-based measure ensures that the variables enter the model as distinct components with clear and separable economic interpretations. Definitions are also provided in the Appendix, Table A.1.

The Gini Index is selected as the main indicator of inequality in this analysis, as it allows the examination of the effect of the average inequality of a country (scale 0–100) on carbon emissions. However, the Gini Index does not provide an indication of the specific location where the changes in inequality occur. Consequently, it can be distorted by variations in earnings between low and middle-income households. In contrast, the top 10% measure is more effective in capturing the nuances of the political economy and Veblen effects, as it is more influenced by the political power of the affluent as well as status competition (Jorgenson et al., 2017). The share of the bottom 50% has not yet been utilized in the existing literature. However, we hypothesize that this measure will account best for the effect of poverty alleviation in highly unequal countries, where the majority of the population lives under poor circumstances. In addition, it proxies the political influence of low-income households. Thus, we verify the robustness of the obtained results with the top 10% and bottom 50%.

One of the main novelties of this study is that we exploit the theoretical differences between the novel pre and post-tax inequality estimates of the WID (2024). With regards to post-tax estimates, previous studies have relied on the post-tax Gini Index from the SWIID (Solt, 2009), which has the disadvantage of employing a multiple imputation algorithm based on the Luxembourg Income Study. In contrast, the WID post-tax estimates allocate the entirety of tax revenue and public expenditure to individuals. This is accomplished by combining household surveys, national accounts, government budgets, tax simulators, and existing fiscal incidence studies within the methodological framework of Distributional National Accounts (DINA) (Blanchet et al., 2024; Fisher-Post and November, 2023). Post-tax indicators are calculated by subtracting all taxes on production, income and wealth, in addition to social assistance benefits in cash from the pre-tax national income. Conversely, pre-tax income inequality is calculated on the basis of the total sum of income flows accruing to owners of production factors (labor & capital), before the effects of the tax- and transfer system, but after the operation of the social insurance system (Blanchet et al., 2024).

Finally, our redistribution variable indicates that six out of 156 countries in our sample exhibit a higher income share of the top 10% after redistribution in at least one year of our time frame. This is the case for Angola, Brazil, the Dominican Republic, Peru, Qatar and Suriname. With regards to the Gini Index, redistribution is regressive only in the case of Angola and Qatar, while the income share of the bottom 50% remains unchanged following transfers. This indicates that in these countries redistribution appears to occur from the middle to the upper class. Separate models for pre and post-tax estimates are provided in Appendix C, Tables C.1–C.16, confirming our results.

3.3. Other control variables

The most relevant control variables of our benchmark model are shown in Table 2. GDP per capita is expressed in purchasing power parity and constant 2017 International Dollars. The variable *civil liberties* is used to account for the political channel proposed by Torras and Boyce (1998). In addition, we control for the weighted average effectively applied tariff rate following Rojas-Vallejos and Lastuka (2020) in the extended model (4), checking the robustness of the previously obtained findings. The results of the extended model (4) are depicted in Appendix B, Figs. B.1–B.5 & Tables B.1–B.8.

4. Model estimation techniques

The present study employs fixed effects (FE) panel and quantile regression estimation techniques, following previous empirical works (Chen et al., 2020; Grunewald et al., 2017; Hübler, 2017; Rojas-Vallejos and Lastuka, 2020).

4.1. Fixed Effects (FE) panel estimation techniques

Fixed effects panel models are static estimation approaches that allow to control for unit and time constant sources of omitted variable bias. We employ country fixed effects to control for time-invariant omitted variables such as cultural norms, persistent institutional frameworks and baseline societal preferences for predistribution and redistribution (Berthe and Elie, 2015; Rojas-Vallejos and Lastuka, 2020). In addition, we employ time fixed effects to control for time-variant shocks that are constant across all countries, such as the Paris Agreement and the financial crisis. Consequently, we ensure that the observed relationship is not driven by country differences or global trends but is identified from within-country variation over time. This is crucial, as our analysis focuses on how changes in inequality within countries affect emissions, which is particularly relevant for policy design. We are confident that the broad range of control variables that we employ can account for the time-invariant factors that affect our estimation. However, we highlight that the estimation can still suffer from omitted variable bias if variables that capture parts of the effect of predistribution or redistribution on CO_2 emissions are omitted.

Following Box and Cox (1964) and Wooldridge (2013), we determine the most reliable function of the fixed effects model as follows:

$$\ln(c_{it}) = \beta_0 + \beta_1\alpha_{it} + \beta_2\sigma_{it} + \beta_3\ln(y_{it}) + \sum_{j=1}^{K}\beta_{j+3}\,x_{it,j} + \delta_i + \lambda_t + \epsilon_{it} \quad (1)$$

where $\ln(c_{it})$ denotes the natural logarithm of per capita CO_2 emissions (either consumption or production-based CO_2 emissions), α_{it} represents predistribution measured by the pre-tax Gini Index and σ_{it} represents the measure of redistribution, defined as the difference between the pre-tax and post-tax Gini Index for country i at time t. GDP per capita for country i at time t is represented by y_{it} in this model while the term $\sum_{j=1}^{K}\beta_{j+3}\,x_{it,j}$ represents all the K control variables. Country fixed effects are represented by δ_i, while time fixed effects are represented by λ_t. The idiosyncratic error term is represented by ϵ_{it}. Logarithms of the carbon emission indicators, GDP per capita and tariffs are calculated to ensure the normality assumption of the Ordinary Least Squares (OLS) estimator. In addition, the correlation table of all variables is presented in the Appendix, Table A.2. As previous studies, this research faces minor problems of auto-correlation. GDP per capita is highly correlated ($\approx$ 0.8) with Agriculture VA (%) and the rate of urbanization (%). However, as shown in Tables 3 & 4, adding or removing these correlated variables from the analysis does not change the model results. Furthermore, we re-estimate our model specification using random effects and pooling models (Croissant and Millo, 2008; Wooldridge, 2013), confirming the main findings of our analysis (Tables A.8–A.10). The OLS estimator only is the best linear unbiased estimator (BLUE) if our model has homoskedastic standard errors. We test this assumption via the Breusch–Pagan test, which indicates the presence of heteroskedasticity. Therefore, apply robust standard errors to all our models following White (1980) and Wooldridge (2013).

Table 2
Descriptive statistics of the main variables (1995–2020).

Variable	Mean	Std. Dev.	Min.	Max.	N.obs.	Source	Studies utilizing similar indicators[a]
Consumption-based per capita CO_2 emissions[b]	5.829	7.890	0.016	92.075	4056	WID	Dorn et al. (2024)
Production-based per capita CO_2 emissions[b]	4.642	5.821	0.022	47.657	4056	WDI	Jorgenson et al. (2017), Grunewald et al. (2017) and Rojas-Vallejos and Lastuka (2020)
Predistribution (Gini)	0.571	0.091	0.322	0.781	4056	WID	Hailemariam et al. (2020), Andersson (2023) and Safar (2022)
Redistribution (Gini)	0.054	0.049	−0.002	0.267	4051	WID	–
GDP per capita[b]	18 629.4	20 092.07	459.9	120 647.8	4027	WDI	Jorgenson et al. (2017), Grunewald et al. (2017) and Rojas-Vallejos and Lastuka (2020)
Population urban (%)	56.917	22.486	7.211	100.000	4056	WDI	Jorgenson et al. (2017), Grunewald et al. (2017) and Dorn et al. (2024)
Renewable energy consumption (%)	34.83	30.735	0.00	98.34	4041	WDI	Demir et al. (2019) and Baloch and Danish (2022)
Civil Liberties	3.414	1.769	1.000	7.000	4034	Freedom House Index	Torras and Boyce (1998), Grunewald et al. (2017) and Rojas-Vallejos and Lastuka (2020)
Industry VA (%)	27.949	11.469	3.243	86.670	3914	WDI	Grunewald et al. (2017), Hübler (2017) and Dorn et al. (2024)
Agriculture VA (%)	12.173	11.801	0.030	79.042	3956	WDI	Grunewald et al. (2017), Hailemariam et al. (2020) and Dorn et al. (2024)

Notes:
[a] The source and definition might differ.
[b] Logarithm taken for the subsequent analysis.

Table 3
The effect of predistribution and redistribution on consumption-based CO_2 emissions.

	(1)	(2)	(3)	(4)
	(Consumption-based CO_2-emissions per capita)			
Predist. (Gini)	0.990**	0.586	0.694	0.670*
	(0.406)	(0.423)	(0.440)	(0.345)
Redist. (Gini)	1.355*	0.877	0.938	1.172**
	(0.758)	(0.632)	(0.664)	(0.577)
GDP pc	0.731***	0.607***	0.573***	0.615***
	(0.107)	(0.113)	(0.114)	(0.118)
Pop. Urban		0.004	0.005	0.006
		(0.006)	(0.005)	(0.005)
Rnew. Energy		−0.016***	−0.014***	−0.013***
		(0.004)	(0.005)	(0.004)
Civil Liberties			−0.014	−0.018
			(0.015)	(0.017)
Industry VA			−0.006**	−0.004
			(0.003)	(0.003)
Agri. VA			−0.015**	−0.023***
			(0.007)	(0.007)
Tariffs				0.020
				(0.026)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	4022	4009	3887	2974
Adjusted R^2	0.171	0.272	0.300	0.333
F Statistic	337.099***	336.580***	231.883***	185.968***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 4
The effect of predistribution and redistribution on production-based CO_2 emissions.

	(1)	(2)	(3)	(4)
	(Production-based CO_2-emissions per capita)			
Predist. (Gini)	1.238***	0.512	0.305	0.560*
	(0.465)	(0.332)	(0.305)	(0.294)
Redist. (Gini)	1.850**	0.987*	0.991*	1.285**
	(0.804)	(0.558)	(0.546)	(0.522)
GDP pc	0.642***	0.421***	0.368***	0.422***
	(0.097)	(0.068)	(0.071)	(0.065)
Pop. Urban		0.008**	0.007**	0.008**
		(0.004)	(0.004)	(0.003)
Rnew. Energy		−0.028***	−0.027***	−0.025***
		(0.002)	(0.002)	(0.002)
Civil Liberties			−0.022*	−0.008
			(0.012)	(0.011)
Industry VA			0.003	0.005**
			(0.002)	(0.002)
Agri. VA			−0.005**	−0.006*
			(0.003)	(0.003)
Tariffs				−0.017
				(0.012)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	4022	4009	3887	2974
Adjusted R^2	0.168	0.560	0.576	0.586
F Statistic	331.984***	1058.883***	682.198***	488.423***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

4.2. Quantile regression estimation techniques

The relationship between inequality and carbon emissions is considered to be non-linear (Andersson, 2023; Hübler, 2017; Uddin et al., 2020). Quantile regression, originally proposed by Koenker and Bassett (1978), assesses the impact of an independent variable on a dependent variable range. Hence, we estimate the effect of pre and redistribution on emissions deciles. Theoretically, analyzing potential policy trade-offs in countries that currently contribute disproportionately to total emissions is important for global emission goals. Methodologically, quantile regression allows us to obtain linear estimators for each decile, while taking into account the information from the whole distribution. This leads to comparable and efficient estimates. Nonetheless, we also split our dataset by country income groups as a robustness check

Table 5
The effect of predistribution and redistribution on consumption-based CO_2 emissions in low, low-middle, upper-middle, and high-income countries.

	Low	Low-middle	Upper-middle	High
	(Consumption-based CO_2-emissions per capita)			
Predist. (Gini)	−0.568	−0.408	1.638*	0.195
	(0.891)	(0.785)	(0.928)	(0.544)
Redist. (Gini)	0.040	3.000*	2.353	1.262
	(1.817)	(1.562)	(1.645)	(0.886)
GDP pc	0.651***	0.420**	0.567***	0.452***
	(0.207)	(0.173)	(0.190)	(0.154)
Pop. Urban	0.022*	0.013	−0.009	−0.0003
	(0.012)	(0.008)	(0.011)	(0.009)
Rnew. Energy	−0.017**	−0.013***	0.006	−0.010**
	(0.008)	(0.005)	(0.015)	(0.005)
Civil Liberties	0.018	−0.020	−0.055	−0.003
	(0.028)	(0.019)	(0.044)	(0.024)
Industry VA	−0.004	−0.003	−0.013**	−0.006
	(0.007)	(0.005)	(0.005)	(0.005)
Agri. VA	−0.001	−0.019***	−0.028	−0.032
	(0.006)	(0.006)	(0.020)	(0.025)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	482	1150	1031	1224
Adjusted R^2	0.214	0.348	0.175	0.161
F Statistic	22.907***	86.453***	36.612***	39.419***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 6
The effect of predistribution and redistribution on production-based CO_2 emissions in low, low-middle, upper-middle, and high-income countries.

	Low	Low-middle	Upper-middle	High
	(Production-based CO_2-emissions per capita)			
Predist. (Gini)	−0.198	−0.149	0.020	1.021**
	(0.725)	(0.603)	(0.466)	(0.510)
Redist. (Gini)	−0.927	2.580**	0.686	1.370*
	(1.419)	(1.168)	(0.561)	(0.806)
GDP pc	0.619***	0.295**	0.418***	0.450***
	(0.138)	(0.131)	(0.127)	(0.124)
Pop. Urban	0.030***	0.009	0.006*	0.010
	(0.011)	(0.008)	(0.004)	(0.007)
Rnew. Energy	−0.042***	−0.025***	−0.021***	−0.026***
	(0.006)	(0.005)	(0.003)	(0.004)
Civil Liberties	0.014	−0.010	−0.069***	0.002
	(0.023)	(0.018)	(0.022)	(0.022)
Industry VA	−0.007	0.007	0.0004	0.004
	(0.004)	(0.005)	(0.001)	(0.004)
Agri. VA	−0.009**	−0.011**	0.003	−0.004
	(0.004)	(0.006)	(0.005)	(0.015)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	482	1150	1031	1224
Adjusted R^2	0.549	0.497	0.511	0.387
F Statistic	79.744***	151.809***	143.780***	106.530***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

(Tables 5 & 6). Moreover, quantile regressions do not impose the conditions of homoskedasticity and normality on the variables (Chen et al., 2020). Indeed, when dealing with non-normally distributed variables, the results obtained from quantile regression are more reliable than those obtained from other regression techniques (Lin and Xu, 2018). We estimate the effect of predistribution and redistribution on quantiles of CO_2 emissions as follows.

First, we utilize the model specification from Eq. (1) without the fixed effects:

$$\ln(c_{it}) = \beta_0 + \beta_1 \alpha_{it} + \beta_2 \sigma_{it} + \beta_3 \ln(y_{it}) + \sum_{j=1}^{K} \beta_{j+3}\, x_{it,j} + u_{it} \quad (2)$$

Here, u_{it} represents the disturbance term for country i at time t, as this model does not account for fixed effects. Otherwise, the notation is the same as in Eq. (1). Following Koenker and Bassett (1978) and Chen et al. (2020), assuming that the population quantile of the conditional distribution of the dependent variables $\ln(c_{it})$ is a linear function of x, the quantiles are obtained as follows:

$$Q_{\ln(c_{it})}(q \mid x_i) = x_i' \beta_q \quad (3)$$

where β_q represents the estimated coefficient of the Q quantile. More specifically, we estimate the effect of predistribution and redistribution on deciles of the dependent variable, using nine cut-off points. The estimators can be determined using linear programming techniques, as proposed by Buchinsky (1995). Two further challenges are imposed on the estimation process. First, the asymptotic variance of the quantile regression estimator is dependent upon the density of the error term. Consequently, the construction of a 95% confidence interval would entail a direct non-parametric density estimation. Secondly, we detect conditional heteroskedasticity via the Breusch–Pagan test in our models. We apply bootstrapping methods as proposed by Hahn (1995) to achieve both objectives simultaneously. The design matrix bootstrap estimator proposed by Koenker and Bassett (1978) allows to circumvent a direct non-parametric density estimation, as confidence intervals obtained by bootstrap percentile methods have asymptotically correct coverage probabilities. Furthermore, bootstrapping generates robust standard errors.

5. Results

Table 3 provides the estimates of four fixed effects (FE) models for consumption-based CO_2 emissions in 156 low to high-income countries between 1995 and 2020. The initial step in the analysis is the estimation of a baseline model (Column 1). It controls solely for predistribution (pre-tax inequality reduction), redistribution (post-tax inequality reduction measured as the difference between pre and post-tax inequality) and GDP per capita. The estimated coefficients support the consumption argument of Ravallion et al. (2000) and Heerink et al. (2001), indicating a trade-off between inequality reduction and climate change mitigation. A 0.01 unit increase in predistribution[2] (measured based on the gini index, varying between 0 to 1) leads to a 0.99% increase in per capita consumption-based emissions. However, redistribution exhibits an even more emission-generating effect: a 0.01 unit increase in redistribution is associated with an increase of consumption-based emissions by 1.35%. To account for the omitted variables bias, we systematically add control variables to the baseline model. The second model (Column 2) additionally accounts for the share of urban population (%) and the share of renewable energy consumption (%), while the third model (Column 3) further expands control variables to the political freedom indicator *civil liberties* and the structure of the economy (share of value added in GDP of Industry and Agriculture). In line with earlier work (Demir et al., 2019; Baloch and Danish, 2022), the results indicate a strong negative association between renewable energy consumption and consumption-based CO_2 emissions. While the benchmark model (Column 3) incorporates all frequently proposed control variables, the fourth model specification (Column 4) additionally controls for the effect of trade barriers in accordance with Rojas-Vallejos and Lastuka (2020). Notably, inequality reduction achieved through redistribution appears to hinder decarbonization efforts more than predistribution. The estimated effect of redistribution on consumption-based per capita CO_2 emissions is 1.75 times higher than the one of predistribution model 4. Although the inequality indicators are not significant in the second and third model, the 95% confidence intervals indicate a clear direction of their effects (Wooldridge, 2013). The lack of significance in these models may

[2] Inequality measures are between 0 and 1 (rather than 0 and 100) to improve the readability of the coefficients in the tables.

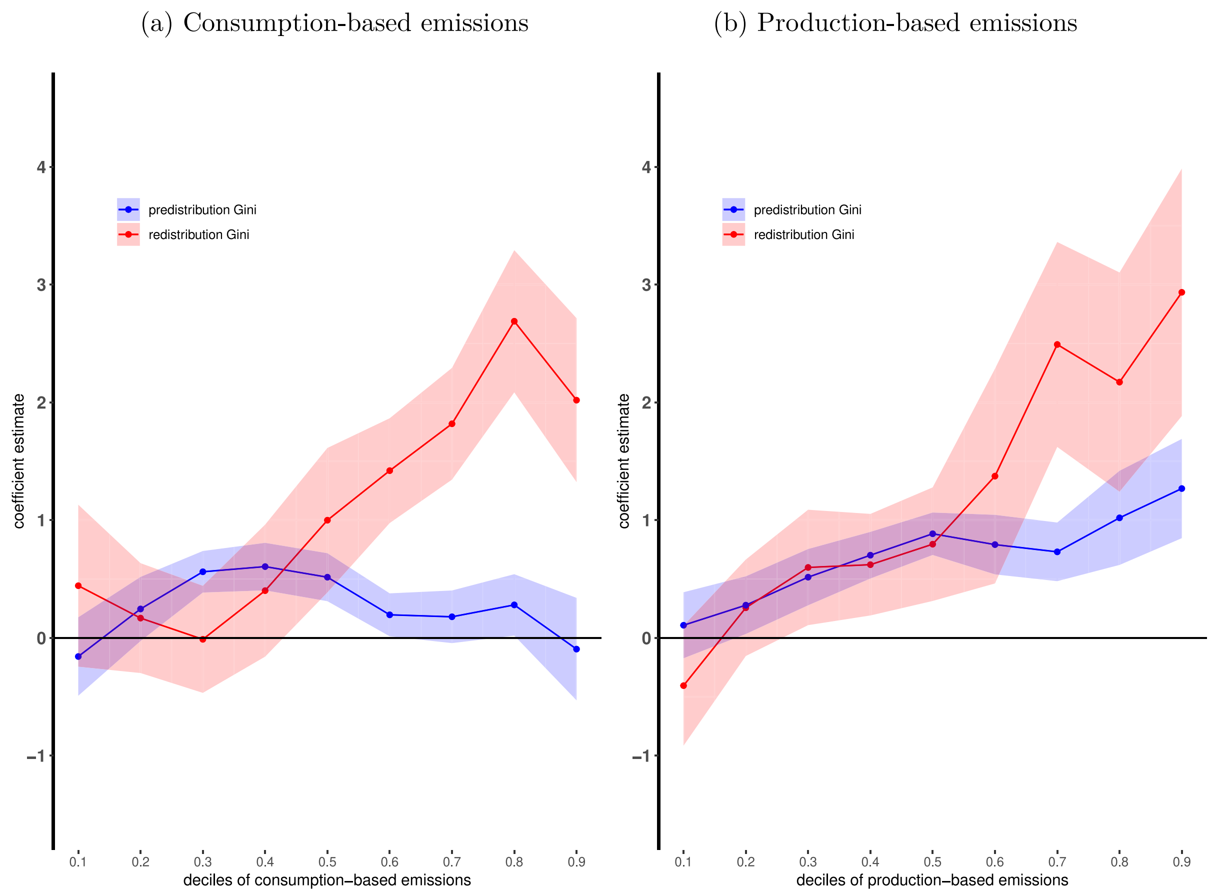


Fig. 1. The effect of inequality reduction through predistribution and redistribution on CO_2 emissions.
Notes: Visualization of the quantile regression models reported in Tables A.11 & A.12; bootstrapped standard errors.

be attributed to non-linearities between the independent variables and consumption-based CO_2 emissions.

Table 4 presents the analysis of production-based CO_2 emissions. Inequality reduction through predistribution increases per capita production-based CO_2 emissions 3.3 times (column 3) and 2.3 times more (column 4) than redistribution. These results are consistent across all inequality indicators, as reported in the Appendix, Tables A.4–A.7. Furthermore, we present in Tables A.8–A.10 the re-estimation of the benchmark model specification with random effects and pooling models. The direction, magnitude and significance of the explanatory variables are consistent with those observed in the fixed effects model across estimation techniques.

These first results corroborate Hypothesis 1. The reduction of income inequality through predistribution has a smaller impact on the increase of CO_2 emissions than redistribution. We argue that this is because predistribution increases the demand for climate change mitigation policies by reshaping the distribution of political power between those who profit and those who are affected by climate change. By contrast, redistribution has limited impact on political power, as taxation and state transfers do not alter social status and political influence. Therefore, we will proceed to develop the argument that predistribution represents a more effective approach to decarbonization than redistribution and can better facilitate a just transition.

To account for potential non-linearities regarding the effect of predistribution and redistribution on CO_2 emissions, we proceed by estimating the third model presented in Tables 3 & 4 by means of quantile regression. More specifically, we estimate the effect of predistribution and redistribution on conditional deciles of consumption and production-based CO_2 emissions. Fig. 1 depicts the impact of inequality reduction by predistribution and redistribution on consumption-based (left-hand side) and production-based (right-hand side) CO_2 emissions across deciles. Tables A.11 and A.12 in Appendix A provide the underlying quantile regression estimations.

Fig. 1 illustrates that predistribution increases consumption and production-based CO_2 emissions less than redistribution. The effects of predistribution and redistribution on consumption and production-based CO_2 emissions do not differ significantly up to the 5th decile. Predistribution has a low but significantly positive effect on consumption-based emissions for low-emitting countries. This might be because inequality reduction through predistribution operates in low-income countries through income growth, which is often linked to the export of carbon-intensive goods. In addition, the effect of redistribution on consumption-based emissions is not statistically significant in lower deciles. This suggests that for low-income countries the Veblen effect might not materialize (Veblen, 1992), due to suppressed resource consumption (Jorgenson, 2009; Hickel et al., 2022). However, predistribution may still offer more favorable conditions for climate change mitigation in the long run. The establishment of a public provisioning system and the systematic addressing of inequality can increase public support for climate change polices. Also predistribution measures (changes in primary income and social insurance) are harder to abolish politically than redistribution measures once implemented. To evaluate Hypothesis 2, Fig. 2 compares the effects of predistribution and redistribution on consumption-based and production-based emissions. The effect of inequality reduction on production-based emissions is particularly relevant for net exporters of emissions, which are countries that emit more through production than they consume. For these countries, reducing emissions from production rather than consumption is key to contributing to global decarbonization. Conversely, the effect of inequality reduction on consumption-based emissions is more important to net importers of emissions, who consume carbon intensive goods produced by net exporters of emissions (Hickel et al., 2022).

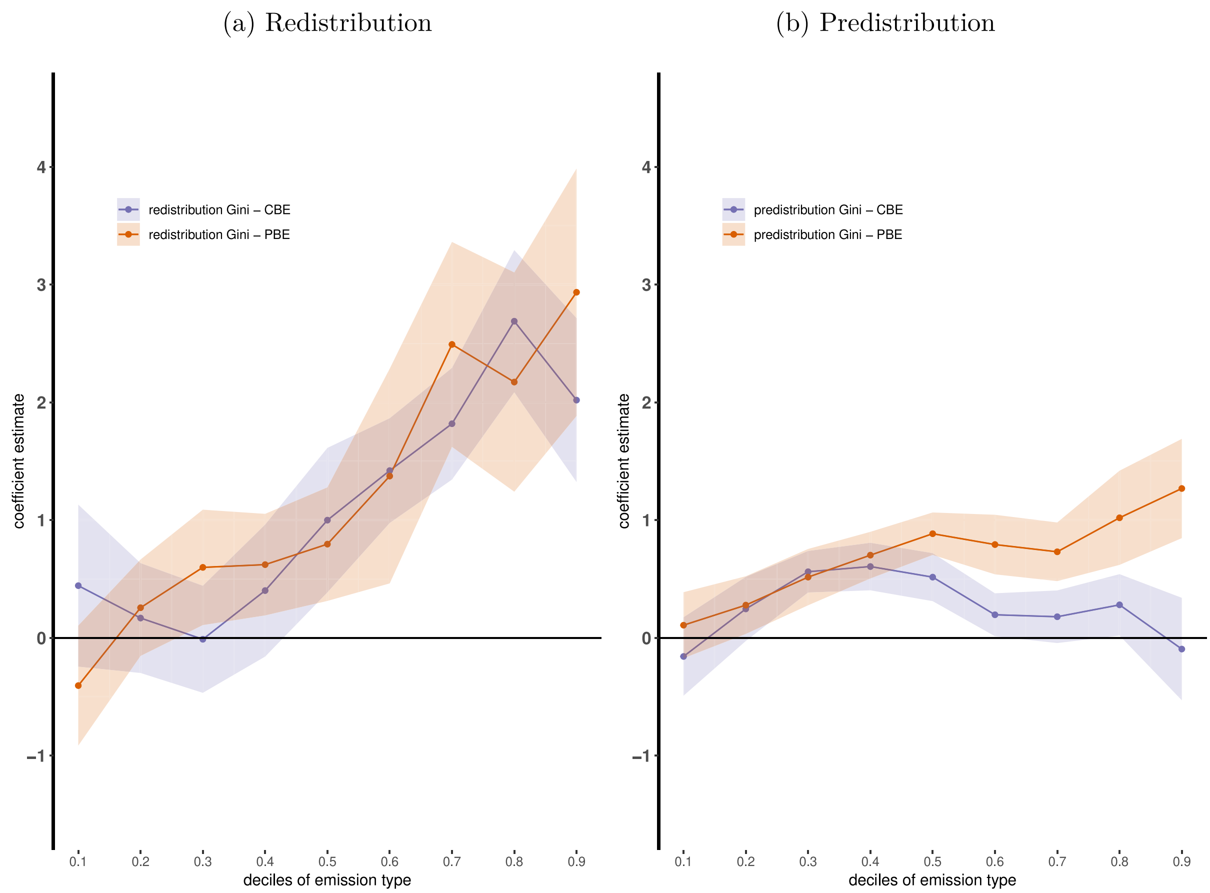


Fig. 2. Comparing the effect of inequality reduction through pre and redistribution on consumption- (CBE) and production-based CO_2 emissions (PBE). *Visualization of the quantile regression models reported in Tables A.11 & A.12; bootstrapped standard errors.*

Fig. 2a shows that the effect of redistribution on consumption and production-based emissions is similar. By contrast, Fig. 2b shows that the effect of predistribution on consumption and production-based emissions differs across deciles . For consumption-based emissions, the effect is statistically insignificant after the 6th quantile. This is because predistribution reduces pre-tax inequalities and thereby weakens status-driven and conspicuous consumption. Such consumption is particularly prevalent in countries with high levels of consumption-based emissions, in line with Fig. 2b (Pathak et al., 2025; Wilkinson and Pickett, 2010). This result suggests that inequality reduction and climate change mitigation are compatible goals in countries with high consumption-based emissions (mostly upper-middle and high-income countries). By contrast, inequality reduction through predistribution is associated with an increase in production-based emissions across all deciles. A statistical significant difference between the effect of predistribution and redistribution on production-based emissions can be observed from the 6th to the 9th quantile. Thus, the findings support Hypothesis 2. Countries that are net exporters of emissions have a reduced capacity to predistribute without increasing their major source of emissions.

Fig. 3 shows the effect of the control variables on consumption-based emissions (Table A.10). They complement the results in Fig. 1 that show the effect of pre and redistribution on consumption-based emissions. GDP per capita exerts a constant and positive effect on consumption-based emissions across all deciles (Dinda, 2004). We emphasize that when looking at deciles of consumption-based emissions, we cannot observe differences in the effect of GDP growth on consumption-based emissions between countries. This suggest the non-existence of the Environmental Kuznets Curve for consumption-based emissions, contrary to parts of the literature (Baležentis et al., 2020).

Furthermore, we want to highlight the impact of civil liberties on consumption-based emissions in Fig. 3. An increase in the civil liberty index (less liberties) is associated with a decrease in consumption-based emissions in low-emitting countries. The effect is insignificant in high-emitting countries. This may be attributed, among others, to trade embargos against autocratic developing countries. Furthermore, urban population (%) is negatively associated with consumption-based emissions only in high income countries, while the share of renewable energy consumption (%) has a constant negative effect across all deciles. The effect of industry VA (%) is associated with an increase in consumption-based emissions, while the effect of agriculture VA (%) is insignificant across deciles. These findings are consistent with the results of the Fixed effects panel regression obtained in Table 3, as well as the quantile regression estimation of the extended model reported in Column 4 (see Figs. B.1 & B.4).

Fig. 4 shows, one by one, the effect of the control variables on production-based emissions. The results in Fig. 4 and Fig. 1b refer to the estimation of the effect of pre and redistribution on production-based emissions in the Table A.12.

The effect of GDP per capita on production-based emissions in Fig. 4 can be described as a downward-pointing slope. As previously observed, similar results were obtained by Hübler (2017) and Rojas-Vallejos and Lastuka (2020). By contrast, we showed that the effect of GDP per capita on consumption-based emissions in Fig. 3 is constant across deciles. We suppose that countries with high levels of production-based emissions can more easily outsource additional carbon-intensive production as their GDP increases (Makarov and Alataş, 2024). This is in line with Hickel et al. (2024). By changing their position in global value chains, they keep high-additive-value steps of production. Carbon intensive steps of production with low

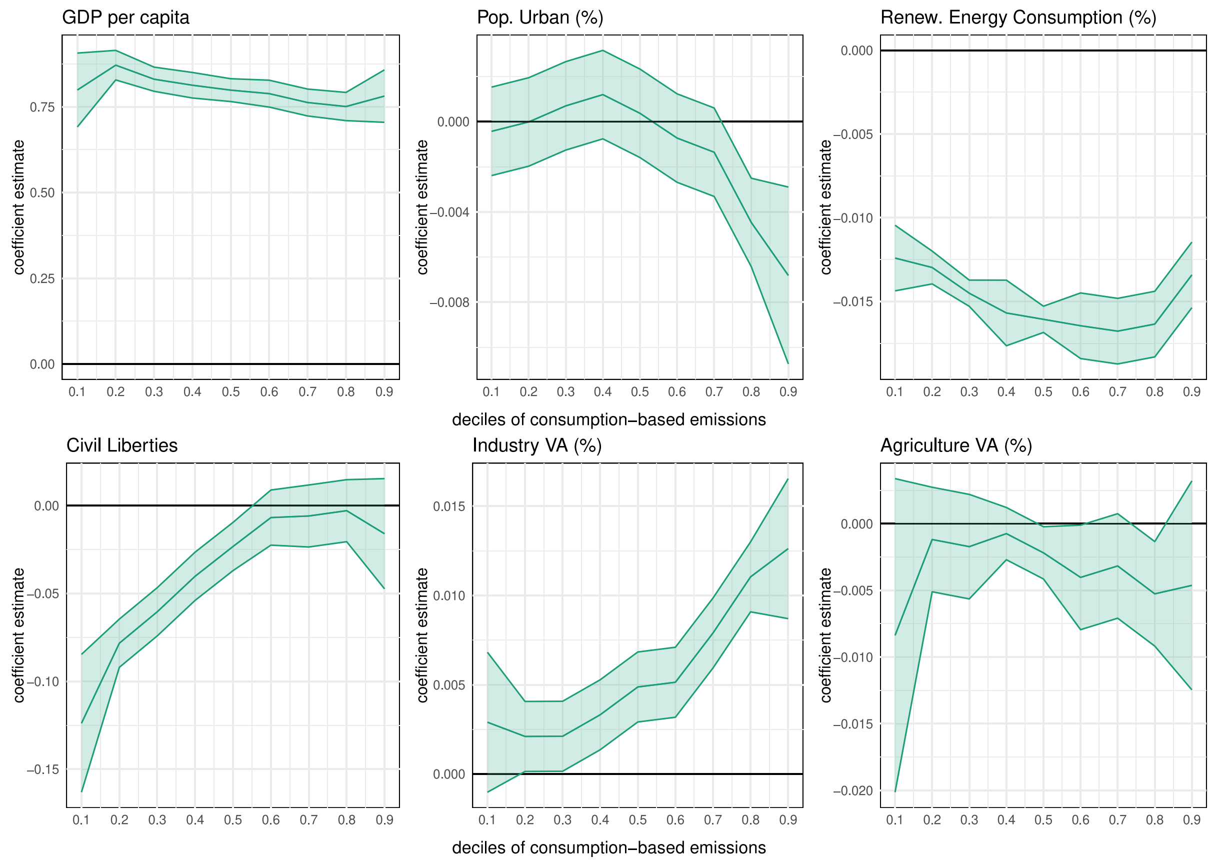


Fig. 3. The non-linear effect of the control variables on consumption-based CO_2 emissions.
Visualization of the quantile regression models reported in Table A.11; bootstrapped standard errors.

value added are carried out in and assigned to developing countries (Althouse et al., 2023).

The effects of renewable energy consumption (%), agriculture VA (%) and industry VA (%) on production-based emissions are comparable to those on consumption-based emissions, previously observed in Fig. 3. The rate of urbanization has a positive influence on carbon emissions, with the exception of a few deciles of production-based emissions. An increase in the civil liberty index (less civil liberties) is associated with higher production-based emissions after the fifth decile. We suppose that more autocratic countries are less engaged in international trade. The results of Figs. 3 and 4 show that less civil liberties lead to less consumption-based but more production-based emissions.

5.1. Robustness checks

We perform a number of robustness checks on our results. Fig. 5 illustrates the estimation of the quantile regression model for predistribution and redistribution measured by three different inequality indicators, namely the previously employed Gini Index, the income share of the top 10% and the income share of the bottom 50%. As mentioned in Section 3.2, these variables allow us to investigate the political argument of Boyce (1994), by identifying the location of the change in income.

Fig. 5(a) illustrates the effect of the three different inequality indicators on consumption-based emissions across deciles, while Fig. 5(b) depicts the same estimations for production-based emissions. The respective tables can be found in the Appendix, Tables A.11–A.16. In general, the effects of inequality reduction through predistribution and redistribution, measured by the income share of the top 10% and the bottom 50%, are similar to those obtained with the Gini Index. However, there are differences across indicators.

Predistribution, measured as the top 10% income share, increases consumption-based emissions less than redistribution (Fig. 5(a)). In contrast to the estimation using the Gini Index, the effect is statistically significant also for lower deciles. However, when utilizing the income share of the bottom 50%, the effect is partly reversed in the low deciles of the distribution. More specifically, for the third decile, predistribution increases CO_2 emissions significantly more than redistribution. A comparable pattern has been observed when employing the Gini Index as an inequality indicator, although to a lesser extent. The existence of this pattern is also supported by the results of our extended fourth model, although with greater uncertainty (Appendix, Fig. B.5).

Furthermore, when predistribution is measured by the top 10% income share, it has a slightly positive effect on CBE for the top 40% emitters. By contrast, the effect is negative when it is measured by the income share of the bottom 50%. These results suggest that increasing the bottom 50% income share in high-income countries is more conducive to decarbonization than only reducing top incomes. This provides support for the political argument by Boyce (1994). The estimation for production-based CO_2 emissions (Fig. 5(b)) suggest similar patterns.

Finally, the dataset was divided into four subgroups: low, lower-middle, upper-middle, and high-income countries in accordance to the World Bank's classification of income groups (World Bank, 2020). In Table 5, we estimate the effect of predistribution and redistribution on consumption-based emissions by subgroups of low, low-middle, upper-middle and high-income countries. Appendix, Table A.3 provides a list

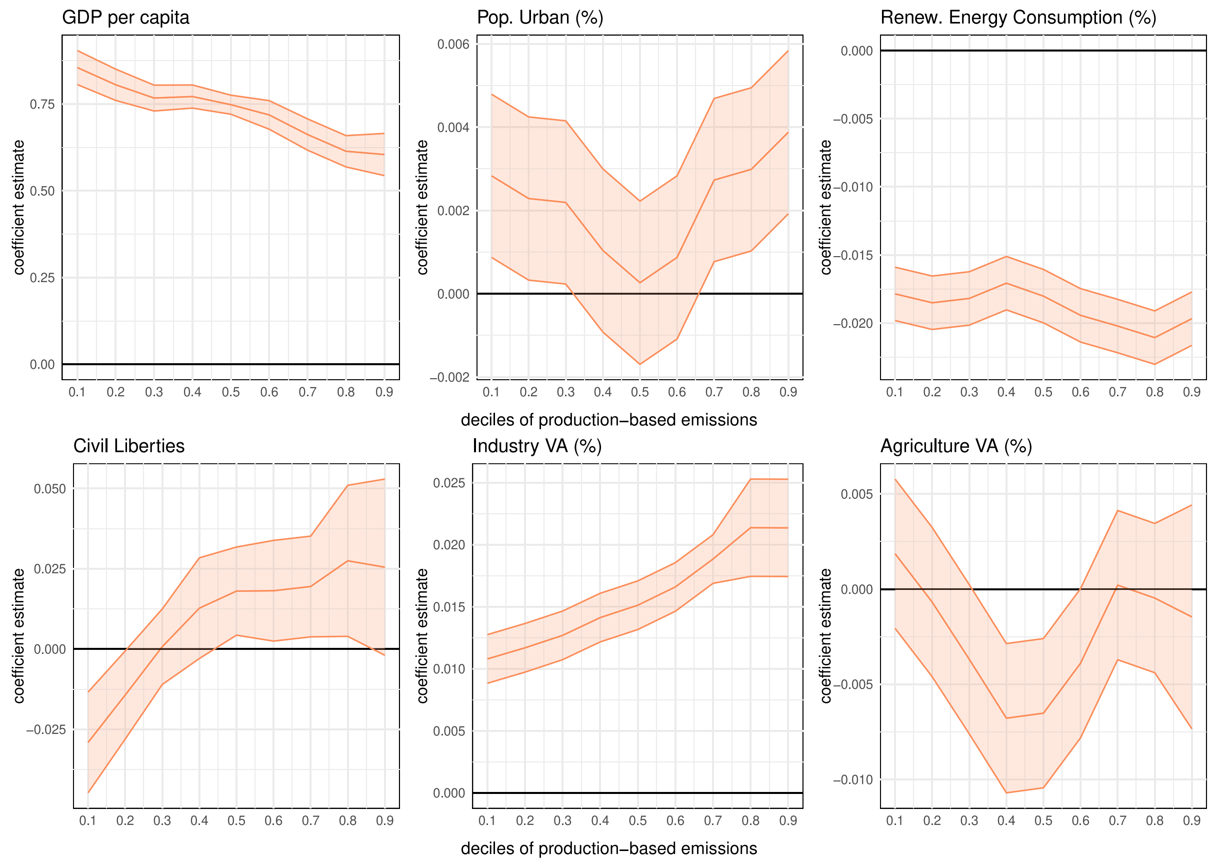


Fig. 4. The non-linear effect of the control variables on production-based CO_2 emissions.
Visualization of the quantile regression model reported in Table A.12; bootstrapped standard errors.

of included countries. Across all income groups, inequality reduction through predistribution is the better policy choice for decarbonization. The reduction of inequality through predistribution has a negligible effect on consumption-based CO_2 emissions in low, low-middle and high-income countries, while it is associated with an increase in carbon emissions in upper-middle income countries at 10% significance level. Conversely, the magnitude of the effect of redistribution on consumption-based emissions is considerably high across all income groups, with the exception of low-income countries. The presented results become stronger when utilizing the top 10% or bottom 50% income share (Appendix, Tables A.17 & A.19).

Table 6 presents the results of the effect of predistribution and redistribution on production-based emissions. They indicate that for low-middle and upper-middle and high-income countries, predistribution is more conducive to decarbonization than redistribution. For low-income countries, both ways of inequality reduction insignificantly affect production-based carbon emissions. These findings once again corroborate our previous conclusions that predistribution is more conducive to decarbonization than redistribution. The same estimations have been also carried out with the top 10% and bottom 50% income share. The results depicted in Appendix A, Tables A.17 & A.19 and confirm our findings.

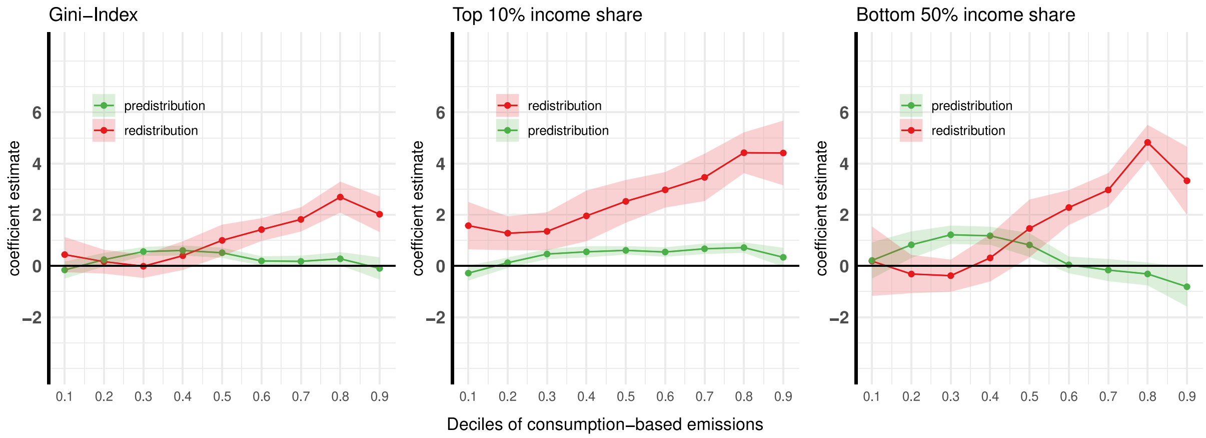
6. Conclusion and policy implications

This study has investigated the relationship between distinct types of inequality and CO_2 emissions using panel data encompassing 156 countries from 1995 to 2020. The findings suggest that predistribution (pre-tax inequality reduction through changes in primary income and social insurance) increases CO_2 emissions less than redistribution (post-tax inequality reduction through taxes and transfers). Moreover, we differentiate between the effect of predistribution and redistribution on production-based and consumption-based emissions. The trade-off between predistribution and consumption-based CO_2 emissions is the highest among low emitting countries. In addition, countries that produce more carbon-intensive products than they consume face higher trade-offs between predistribution and climate change mitigation. By contrast, inequality reduction through predistribution does not affect per capita consumption-based CO_2 emissions among the highest emitting countries. This suggests that, in general, net exporters of emissions face greater challenges in achieving joint inequality and carbon emission reduction, in alignment with the Sustainable Development Goals. Table 7 provides a summary of the results.

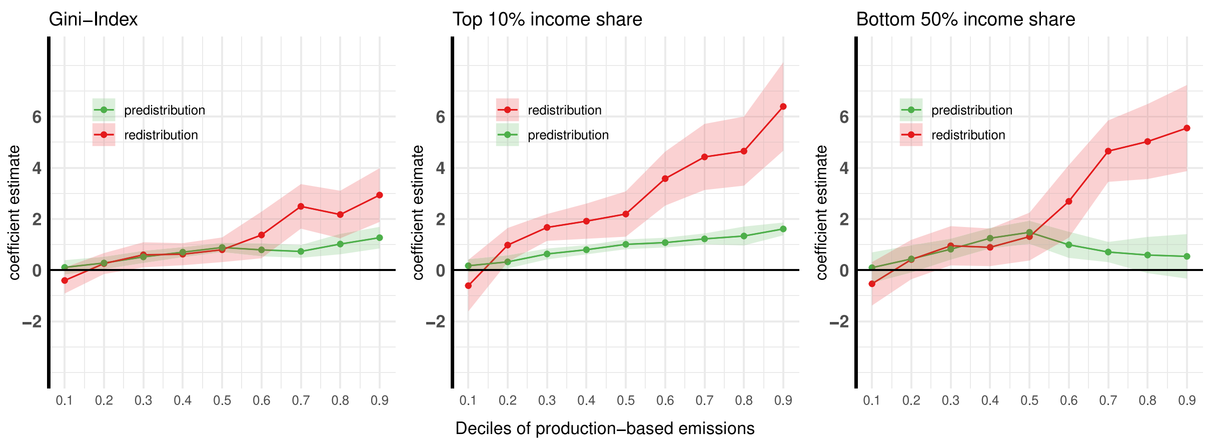
Table 7
Summary: The effect of inequality reduction on CO_2 emissions.

	CBE	PBE
Redistribution	*Strongly increases emissions*, except for the lowest emitters	*Strongly increases emissions*, except for the lowest emitters
Predistribution	*Decreases or does not affect emissions* of the top 40% of global emitters; slightly increases emissions of some low emitting countries	*Increases emissions at low levels* across all country groups.

We build upon two theoretical arguments that revolve around two contrasting effects. The consumption argument suggests that inequality reduction results in an overall increase in CO_2 emissions since the



(a) Consumption-based emissions (CBE).



(b) Production-based emissions (PBE).

Fig. 5. The effect of predistribution and redistribution measured with different inequality indicators on CO_2 emissions.
Notes: Visualization of the quantile regression model reported in (a) Tables A.11, A.13 % A.15 and (b) Tables A.12, A.14 & A.16; bootstrapped standard errors.

marginal propensity to pollute is higher among low-income households (Heerink et al., 2001; Ravallion et al., 2000). By contrast, the political argument posits that reducing inequality results in a decrease in CO_2 emissions due to the diminished capacity of the affluent to influence political decision-making. Our results indicate that predistribution increases CO_2 emissions less than redistribution. The adverse consumption effect of predistribution seems to be partly offset effects via the political transmission channel (Boyce, 1994). This is because predistribution increases the demand for climate change policies by reshaping the distribution of political power between those who profit and those who are affected by climate change. By contrast, redistribution has limited impact on political power, as taxation and state transfers do not alter social status and political influence.

These findings have significant implications for the agendas of the United Nations and the International Labour Organization, as well as the governments working towards the New Green Deal (ILO, 2023; IPCC, 2022; Mastini et al., 2021). First, predistribution can reduce economic inequalities while having limited adverse effects on CO_2 emissions. Second, countries that export more carbon-intensive goods than they consume face significant challenges in regard to joint inequality and emission reduction. This emphasizes the importance of international collaboration for a just transition (Godin et al., 2023; Svartzman and Althouse, 2022). Third, the incompatibility of economic growth and climate change mitigation remains one of the most significant challenges for policymakers. Our findings highlight that reducing inequality and mitigating climate change are interconnected objectives that must be addressed jointly.

The present study is not exempt from limitations that should be addressed in future research. First, we are not able to differentiate between the effect of changes in the primary income distribution and the level of social insurance. While it would be interesting for future research to analyze the emission impact of changes in labor incomes and social insurance systems (Berthe et al., 2022), current data limitations do not allow to address this question in the present analysis (WID, 2024). Furthermore, the current empirical study cannot distinguish individual effects from the holistic effect of inequality reduction on carbon emissions (Angel et al., 2025). In addition, future studies should focus on exploring how factors such as cross-country inequality and unequal exchange impact the nexus between within-country inequality reduction and carbon emissions, including the role of investments in addition to income inequality. In order to achieve the goal of sustaining or enhancing our quality of life while mitigating climate change, it is essential to gain a deeper understanding of the intricate interplay between carbon emissions and economic inequality.

CRediT authorship contribution statement

Tobias Angel: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Alexandre Berthe:** Writing – original draft, Supervision, Methodology, Conceptualization. **Valeria Costantini:** Writing – original draft, Supervision, Project administration, Funding acquisition, Conceptualization. **Mariagrazia D'Angeli:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary materials

See Tables A.1–A.20.

Appendix B. Including tariffs as control variable

See Figs. B.1–B.5 and Tables B.1–B.8.

Appendix C. Seperate models regrading the effect of inequality (pre-, and post-tax) on CBE & PBE

See Tables C.1–C.16.

Table A.1
Definition of the main variables.

Variable	Definition	Source
Consumption-based CO_2 emissions	Per capita National CO_2 footprint in metric tons of CO_2 equivalent emissions	World Inequality Database
Production-based CO_2 emissions	CO_2 emissions (metric tons per capita): annual carbon dioxide emissions stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during the consumption of solid, liquid, and gas fuels and gas flaring.	World Development Indicators
Predistribution (top 10% income share)	Share of percentile 90–100 of pre-tax national income (individuals over 20/equal split between adults). Pre-tax income includes social insurance benefits (and remove corresponding contributions), but exclude other forms of redistribution (income tax, social assistance benefits, etc.)	World Inequality Database
Predistribution (Gini Index)	Gini-coefficient calculated for percentile 0–100 (individuals over 20/equal split between adults). Pre-tax income includes social insurance benefits (and remove corresponding contributions), but exclude other forms of redistribution (income tax, social assistance benefits, etc.)	World Inequality Database
Predistribution (bottom 50% income share)	Share of percentile 0–50 of pre-tax national income (individuals over 20/equal split between adults). Pre-tax income includes social insurance benefits (and remove corresponding contributions), but exclude other forms of redistribution (income tax, social assistance benefits, etc.)	World Inequality Database
Redistribution (top 10% share)	Redistribution is defined as the difference between pre and post-tax inequality. Post-tax national income includes both in kind and in cash redistribution. The top 10% post-tax income share is the share of percentile 90–100 of post-tax national income (individuals over 20/equal split between adults).	World Inequality Database
Redistribution (Gini Index)	Redistribution is defined as the difference between pre and post-tax inequality. Post-tax national income includes both in kind and in cash redistribution. Gini-coefficient of post-tax national income calculated for percentile 0–100 (individuals over 20/equal split between adults).	World Inequality Database
Redistribution (bottom 50% share)	Redistribution is defined as the difference between pre and post-tax inequality. Post-tax national income includes both in kind and in cash redistribution. The bottom 50% post-tax income share is the share of percentile 0–50 of post-tax national income (individuals over 20/equal split between adults).	World Inequality Database
GDP per capita	GDP per capita, PPP (constant 2017 international $)	World Development Indicators
Urban population (%)	Urban population (% of total population)	World Development Indicators
Renewable Energy Consumption (%)	Renewable energy consumption (% of total final energy consumption)	World Development Indicators
Civil Liberties	Index between 1 and 7 with 7 being the lowest and 1 the highest (most liberties). The variable is based on a questionnaire (link): (1) Are there free and independent media? (2) Are individuals free to practice and express their religious faith or nonbelief in public and private? (3) Is there academic freedom, and is the educational system free from extensive political indoctrination? (4) Are individuals free to express their personal views on political or other sensitive topics without fear of surveillance or retribution?	
Industry VA (%)	Industry, value added (% of GDP). Industry (including construction) corresponds to ISIC divisions 5 to 43 and includes manufacturing (ISIC divisions 10 to 33).	World Development Indicators
Agriculture VA (%)	Agriculture, value added (% of GDP). Agriculture, forestry, and fishing corresponds to ISIC divisions 1 to 3.	World Development Indicators
Tariffs	Tariff rate, applied, weighted mean, all products (%) Weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country.	World Development Indicators

Table A.2
Correlation Matrix.

	Pre-tax Gini	Red. Gini	GDP pc	Pop. Urban	R. Energy	CL	Ind. VA	Agri. VA	Tariffs
Pre-tax Gini	1	−0.586	−0.473	−0.288	0.310	0.420	0.150	0.291	0.315
Redist. (Gini)	−0.586	1	0.643	0.490	−0.393	−0.679	−0.202	−0.545	−0.415
GDP pc	−0.473	0.643	1	0.814	−0.742	−0.548	0.173	−0.857	−0.525
Pop. Urban	−0.288	0.490	0.814	1	−0.640	−0.454	0.139	−0.757	−0.407
R. Energy	0.310	−0.393	−0.742	−0.640	1	0.323	−0.195	0.717	0.371
CL	0.420	−0.679	−0.548	−0.454	0.323	1	0.313	0.505	0.333
Ind. VA	0.150	−0.202	0.173	0.139	−0.195	0.313	1	−0.248	−0.012
Agri. VA	0.291	−0.545	−0.857	−0.757	0.717	0.505	−0.248	1	0.437
Tariffs	0.315	−0.415	−0.525	−0.407	0.371	0.333	−0.012	0.437	1

Table A.3
Subgroups of countries according to World Bank Classification.

Income level	N	Countries
Low-Income	20	Afghanistan, Burkina Faso, Burundi, Congo, Dem. Rep., Central African Republic, Ethiopia, Gambia, Guinea, Liberia, Madagascar, Mali, Malawi, Mozambique, Niger, Rwanda, Sudan, Sierra Leone, Chad, Togo, Uganda
Low-middle-Income	45	Angola, Bangladesh, Benin, Bolivia, Bhutan, Belize, Congo, Rep., Cote d'Ivoire, Cameroon, Cabo Verde, Algeria, Egypt, Arab Rep., Ghana, Honduras, Haiti, Indonesia, India. Iran, Islamic Rep., Kenya, Kyrgyz Republic, Cambodia, Lao PDR, Sri Lanka, Lesotho, Morocco, Myanmar, Mongolia, Mauritania, Nigeria, Nicaragua, Nepal, Papua New Guinea, Philippines, Pakistan, Senegal, Sao Tome and Principe, El Salvador, Eswatini, Tajikistan, Tunisia, Tanzania, Ukraine, Uzbekistan, Zambia, Zimbabwe
Upper-middle-Income	42	Albania, Armenia, Argentina, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Brazil, Botswana, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Gabon, Georgia, Guatemala, Guyana, Iraq, Jamaica, Jordan, Kazakhstan, Lebanon, Libya, Moldova, Montenegro, North Macedonia, Mauritius, Maldives, Mexico, Malaysia, Namibia, Panama, Peru, Paraguay, Romania, Serbia, Russian Federation, Suriname, Thailand, Turkmenistan
High-Income	49	United Arab Emirates, Austria, Australia, Belgium, Bahrain, Brunei Darussalam, Bahamas, The, Canada, Switzerland, Chile, Cyprus, Czechia, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Israel, Iceland, Italy, Japan, Korea, Rep., Kuwait, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, New Zealand, Oman, Poland, Portugal, Qatar, Saudi Arabia, Seychelles, Sweden, Singapore, Slovenia, Slovak Republic, Trinidad and Tobago, United States, Uruguay

Table A.4
Model (1): The effect of predistribution and redistribution on CO_2-emissions (different inequality indicators).

	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
Predist. (Gini)	0.990**			1.238***		
	(0.406)			(0.465)		
Redist. (Gini)	1.355*			1.850**		
	(0.758)			(0.804)		
Predist. (Top 10%)		0.845**			1.132***	
		(0.389)			(0.434)	
Redist. (Top 10%)		1.323			2.805***	
		(1.140)			(1.049)	
Predist. (Bot. 50%)			1.961***			2.269***
			(0.757)			(0.848)
(Redist. Bot. 50%)			2.558**			2.702**
			(1.170)			(1.307)
GDP pc	0.731***	0.729***	0.733***	0.642***	0.638***	0.643***
	(0.107)	(0.107)	(0.107)	(0.097)	(0.097)	(0.098)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4022	4022	4022	4022	4022	4022
Adjusted R^2	0.171	0.168	0.173	0.168	0.168	0.167
F Statistic	337.099***	330.762***	341.435***	331.984***	332.515***	328.953***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.5
Model (2): The effect of predistribution and redistribution on CO_2-emissions (different inequality indicators).

	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
Predist. (Gini)	0.586			0.512		
	(0.423)			(0.332)		
Redist. (Gini)	0.877			0.987*		
	(0.632)			(0.558)		
Predist. (Top 10%)		0.529			0.575*	
		(0.356)			(0.310)	
Redist. (Top 10%)		0.533			1.409*	
		(0.954)			(0.726)	
Predist. (Bot. 50%)			1.137			0.772
			(0.870)			(0.587)
Redist. (Bot. 50%)			1.900**			1.497*
			(0.965)			(0.901)
GDP pc	0.607***	0.605***	0.609***	0.421***	0.420***	0.422***
	(0.113)	(0.113)	(0.114)	(0.068)	(0.068)	(0.068)
Pop. Urban	0.004	0.004	0.004	0.008**	0.008**	0.008**
	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
Rnew. Energy	−0.016***	−0.016***	−0.016***	−0.028***	−0.028***	−0.028***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4009	4009	4009	4009	4009	4009
Adjusted R^2	0.272	0.271	0.273	0.560	0.562	0.559
F Statistic	336.580***	334.617***	338.398***	1058.883***	1063.769***	1054.182***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.6
Model (3): The effect of predistribution and redistribution on CO_2-emissions (different inequality indicators).

	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
Predist. (Gini)	0.694			0.305		
	(0.440)			(0.305)		
Redist. (Gini)	0.938			0.991*		
	(0.664)			(0.546)		
Predist. (Top 10%)		0.609*			0.349	
		(0.364)			(0.275)	
Redist. (Top 10%)		1.057			1.488**	
		(0.965)			(0.719)	
Predist. (Bot. 50%)			1.345			0.492
			(0.908)			(0.560)
Redist. (Bot. 50%)			1.761*			1.433
			(1.020)			(0.875)
GDP pc	0.573***	0.571***	0.574***	0.368***	0.367***	0.368***
	(0.114)	(0.112)	(0.114)	(0.071)	(0.071)	(0.071)
Pop. Urban	0.005	0.005	0.005	0.007**	0.007**	0.007**
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
Rnew. Energy	−0.014***	−0.014***	−0.014***	−0.027***	−0.027***	−0.027***
	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)
Civil Liberties	−0.014	−0.014	−0.014	−0.022*	−0.022*	−0.023*
	(0.015)	(0.015)	(0.016)	(0.012)	(0.012)	(0.012)
Industry VA	−0.006**	−0.006**	−0.006**	0.003	0.003	0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Agri. VA	−0.015**	−0.015**	−0.015**	−0.005**	−0.005**	−0.005**
	(0.007)	(0.007)	(0.007)	(0.003)	(0.002)	(0.003)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3887	3887	3887	3887	3887	3887
Adjusted R^2	0.300	0.299	0.301	0.576	0.576	0.575
F Statistic	231.883***	230.766***	232.757***	682.198***	684.659***	680.438***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.7
Model (4): The effect of predistribution and redistribution on CO_2-emissions (different inequality indicators).

	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
Predist. (Gini)	0.670*			0.560*		
	(0.345)			(0.294)		
Redist. (Gini)	1.172**			1.285**		
	(0.577)			(0.522)		
Predist. (Top 10%)		0.554*			0.557**	
		(0.304)			(0.276)	
Redist. (Top 10%)		1.424			1.501**	
		(0.889)			(0.704)	
Predist. (Bot. 50%)			1.366**			0.939*
			(0.692)			(0.511)
Redist. (Bot. 50%)			2.106**			2.081**
			(0.864)			(0.826)
GDP pc	0.615***	0.608***	0.619***	0.422***	0.418***	0.423***
	(0.118)	(0.116)	(0.119)	(0.065)	(0.065)	(0.065)
Pop. Urban	0.006	0.006	0.006	0.008**	0.008**	0.008**
	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)
Rnew. Energy	−0.013***	−0.013***	−0.013***	−0.025***	−0.025***	−0.025***
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)
Civil Liberties	−0.018	−0.018	−0.019	−0.008	−0.008	−0.008
	(0.017)	(0.017)	(0.017)	(0.011)	(0.011)	(0.011)
Industry VA	−0.004	−0.004	−0.004	0.005**	0.004**	0.005**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Agri. VA	−0.023***	−0.023***	−0.023***	−0.006*	−0.006*	−0.006
	(0.007)	(0.007)	(0.007)	(0.003)	(0.003)	(0.003)
Tariffs	0.020	0.020	0.020	−0.017	−0.017	−0.016
	(0.026)	(0.026)	(0.026)	(0.012)	(0.012)	(0.012)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2974	2974	2974	2974	2974	2974
Adjusted R^2	0.333	0.332	0.335	0.586	0.585	0.585
F Statistic	185.968***	184.800***	187.210***	488.423***	487.050***	487.390***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.8
Model (3) The effect of predistribution and redistribution (Gini Index) on CO_2-emissions (different estimation techniques).

	FE model	RE model	Pooling model	FE model	RE model	Pooling model
	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
Predist. (Gini)	0.694	0.588	−0.586	0.305	0.350	0.617*
	(0.440)	(0.380)	(0.716)	(0.305)	(0.273)	(0.364)
Redist. (Gini)	0.938	0.884	1.800*	0.991*	0.925*	1.122
	(0.664)	(0.611)	(1.017)	(0.546)	(0.512)	(0.964)
GDP pc	0.573***	0.499***	0.836***	0.368***	0.331***	0.709***
	(0.114)	(0.091)	(0.128)	(0.071)	(0.056)	(0.064)
Pop. Urban	0.005	−0.001	−0.003	0.007**	0.005*	0.002
	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)
Rnew. Energy	−0.014***	−0.016***	−0.015***	−0.027***	−0.028***	−0.019***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
Civil Liberties	−0.014	−0.018	−0.061	−0.022*	−0.015	0.010
	(0.015)	(0.013)	(0.040)	(0.012)	(0.011)	(0.025)
Industry VA	−0.006**	−0.003	0.007*	0.003	0.004**	0.015***
	(0.003)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)
Agri. VA	−0.015**	−0.011*	−0.001	−0.005**	−0.003	−0.004
	(0.007)	(0.006)	(0.011)	(0.003)	(0.002)	(0.006)
Constant		−2.598***	−6.550***		−1.601***	−5.441***
		(0.681)	(1.371)		(0.504)	(0.664)
Country FE	Yes	Random	No	Yes	Random	No
Time FE	Yes	No	No	Yes	No	No
Observations	3887	3887	3887	3887	3887	3887
Adjusted R^2	0.300	0.497	0.867	0.576	0.690	0.926
F Statistic	231.883***	3842.411***	3167.185***	682.198***	8637.281***	6071.233***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.9
Model (3) The effect of predistribution and redistribution (top 10% income share) on CO_2-emissions (different estimation techniques).

	FE model	RE model	Pooling model	FE model	RE model	Pooling model
	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
top_10_sptinc	0.609*	0.557*	−0.383	0.349	0.412*	0.880***
	(0.364)	(0.315)	(0.689)	(0.275)	(0.249)	(0.337)
taxation_top10	1.057	0.786	3.643**	1.488**	1.194*	2.744*
	(0.965)	(0.890)	(1.613)	(0.719)	(0.705)	(1.461)
GDP pc	0.571***	0.500***	0.824***	0.367***	0.331***	0.689***
	(0.112)	(0.092)	(0.127)	(0.071)	(0.056)	(0.064)
Pop. Urban	0.005	−0.0003	−0.002	0.007**	0.005*	0.002
	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)
Rnew. Energy	−0.014***	−0.016***	−0.015***	−0.027***	−0.028***	−0.019***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
Civil Liberties	−0.014	−0.019	−0.057	−0.022*	−0.015	0.017
	(0.015)	(0.013)	(0.040)	(0.012)	(0.011)	(0.025)
Industry VA	−0.006**	−0.003	0.007*	0.003	0.004**	0.015***
	(0.003)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)
Agri. VA	−0.015**	−0.012*	−0.001	−0.005**	−0.003	−0.005
	(0.007)	(0.006)	(0.011)	(0.002)	(0.002)	(0.006)
Constant		−2.669***	−6.346***		−1.593***	−5.290***
		(0.743)	(1.301)		(0.511)	(0.663)
Country FE	Yes	Random	No	Yes	Random	No
Time FE	Yes	No	No	Yes	No	No
Observations	3887	3887	3887	3887	3887	3887
Adjusted R^2	0.299	0.497	0.868	0.576	0.691	0.927
F Statistic	230.766***	3839.124***	3188.569***	684.659***	8682.337***	6195.108***
	(df = 8; 3698)		(df = 8; 3878)	(df = 8; 3698)		(df = 8; 3878)

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.10
Model (3) The effect of predistribution and redistribution (bottom 50% income share) on CO_2-emissions (different estimation techniques).

	FE model	RE model	Pooling model	FE model	RE model	Pooling model
	Consumption-based CO_2-emissions per capita			Production-based CO_2-emissions per capita		
bottom50_sptinc	1.345	1.114	−1.230	0.492	0.551	0.666
	(0.908)	(0.799)	(1.368)	(0.560)	(0.503)	(0.744)
redistribution_bottom	1.761*	1.716*	2.704*	1.433	1.451*	2.092
	(1.020)	(0.923)	(1.590)	(0.875)	(0.808)	(1.617)
GDP pc	0.574***	0.499***	0.837***	0.368***	0.332***	0.719***
	(0.114)	(0.090)	(0.127)	(0.071)	(0.056)	(0.063)
Pop. Urban	0.005	−0.0005	−0.003	0.007**	0.005*	0.002
	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)
Rnew. Energy	−0.014***	−0.016***	−0.015***	−0.027***	−0.028***	−0.020***
	(0.005)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
Civil Liberties	−0.014	−0.018	−0.062	−0.023*	−0.016	0.010
	(0.016)	(0.013)	(0.040)	(0.012)	(0.011)	(0.025)
Industry VA	−0.006**	−0.002	0.007*	0.003	0.004**	0.015***
	(0.003)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)
Agri. VA	−0.015**	−0.011*	−0.001	−0.005**	−0.003	−0.004
	(0.007)	(0.006)	(0.011)	(0.003)	(0.002)	(0.006)
Constant		−3.114***	−6.059***		−1.897***	−5.990***
		(0.822)	(0.965)		(0.529)	(0.611)
Country FE	Yes	Random	No	Yes	Random	No
Time FE	Yes	No	No	Yes	No	No
Observations	3887	3887	3887	3887	3887	3887
Adjusted R^2	0.301	0.497	0.867	0.575	0.689	0.925
F Statistic	232.757***	3848.458***	3160.745***	680.438***	8613.866***	6031.817***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.11
Quantile regression: The effect of pre- and redistribution (Gini) on consumption-based CO_2-emissions per capita.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist (Gini)	−.158	.245*	.561***	.605***	.515***	.196**	.179	.280**	−.096
	(.170)	(.139)	(.090)	(.103)	(.104)	(.093)	(.114)	(.133)	(.222)
Redist (Gini)	.443	.168	−.012	.401	.999***	1.420***	1.818***	2.689***	2.019***
	(.351)	(.238)	(.232)	(.286)	(.313)	(.227)	(.242)	(.308)	(.355)
GDP pc	.799***	.872***	.831***	.813***	.799***	.789***	.763***	.751***	.781***

(*continued on next page*)

Table A.11 (*continued*).

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
	(.055)	(.022)	(.018)	(.019)	(.017)	(.020)	(.020)	(.021)	(.039)
Pop. Urban	−.0004	−.00001	.001	.001**	.0004	−.001	−.001*	−.004***	−.007***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.015***	−.016***	−.016***	−.016***	−.017***	−.016***	−.013***
	(.001)	(.0005)	(.0004)	(.001)	(.0004)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.124***	−.078***	−.060***	−.040***	−.023***	−.007	−.006	−.003	−.016
	(.020)	(.007)	(.007)	(.007)	(.007)	(.008)	(.009)	(.009)	(.016)
Industry VA	.003	.002**	.002*	.003***	.005***	.005***	.008***	.011***	.013***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Agri. VA	−.008	−.001	−.002	−.001	−.002	−.004**	−.003	−.005**	−.005
	(.006)	(.002)	(.002)	(.001)	(.001)	(.002)	(.002)	(.002)	(.004)
Constant	−6.254***	−6.713***	−6.073***	−5.911***	−5.793***	−5.752***	−5.486***	−5.124***	−5.307***
	(.601)	(.275)	(.199)	(.197)	(.162)	(.204)	(.211)	(.209)	(.345)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.12
Quantile regression: The effect of pre- and redistribution (Gini) on production-based CO_2-emissions per capita.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist (Gini)	.107	.278**	.515***	.702***	.884***	.792***	.731***	1.019***	1.268***
	(.143)	(.125)	(.122)	(.101)	(.092)	(.129)	(.127)	(.204)	(.215)
Redist (Gini)	−.406	.256	.598**	.622***	.796***	1.374***	2.492***	2.172***	2.935***
	(.260)	(.209)	(.250)	(.220)	(.246)	(.465)	(.444)	(.475)	(.536)
GDP pc	.855***	.805***	.767***	.771***	.748***	.718***	.662***	.614***	.604***
	(.025)	(.023)	(.019)	(.017)	(.014)	(.021)	(.023)	(.023)	(.031)
Pop. Urban	.003***	.002***	.002***	.001	.0003	.001	.003***	.003***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.019***	−.018***	−.017***	−.018***	−.019***	−.020***	−.021***	−.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.029***	−.014**	.001	.013	.018**	.018**	.019**	.027**	.025*
	(.008)	(.007)	(.006)	(.008)	(.007)	(.008)	(.008)	(.012)	(.014)
Industry VA	.011***	.012***	.013***	.014***	.015***	.017***	.019***	.021***	.021***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.002	−.001	−.004**	−.007***	−.007***	−.004**	.0002	−.0005	−.001
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.003)
Constant	−7.421***	−6.759***	−6.223***	−6.066***	−5.633***	−5.403***	−5.051***	−4.331***	−4.004***
	(.280)	(.263)	(.214)	(.199)	(.195)	(.206)	(.215)	(.248)	(.284)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.13
Quantile regression: The effect of pre- and redistribution (top 10% income share) on consumption-based CO_2-emissions per capita.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist (Top 10%)	−.281*	.125	.466***	.552***	.609***	.545***	.671***	.717***	.338*
	(.148)	(.104)	(.101)	(.111)	(.085)	(.094)	(.105)	(.105)	(.189)
Redist (Top 10%)	1.574***	1.278***	1.352***	1.955***	2.523***	2.973***	3.459***	4.422***	4.412***
	(.472)	(.337)	(.380)	(.505)	(.426)	(.354)	(.472)	(.407)	(.644)
GDP pc	.795***	.863***	.816***	.803***	.780***	.760***	.741***	.743***	.785***
	(.052)	(.024)	(.019)	(.020)	(.018)	(.023)	(.022)	(.021)	(.036)
Pop. Urban	.0001	.0002	.001	.001**	.001	−.00005	−.001	−.004***	−.007***
	(.001)	(.0004)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.013***	−.013***	−.014***	−.015***	−.016***	−.016***	−.017***	−.016***	−.013***
	(.001)	(.0005)	(.001)	(.001)	(.0004)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.119***	−.074***	−.054***	−.034***	−.019***	−.004	.002	.001	.002
	(.016)	(.007)	(.007)	(.008)	(.007)	(.007)	(.008)	(.010)	(.015)
Industry VA	.003	.002*	.002**	.004***	.005***	.006***	.008***	.011***	.012***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.007	−.001	−.002	−.001	−.003*	−.005**	−.004*	−.005**	−.005
	(.006)	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)	(.002)	(.003)
Constant	−6.327***	−6.772***	−6.115***	−5.989***	−5.700***	−5.425***	−5.139***	−4.937***	−5.232***
	(.558)	(.269)	(.212)	(.210)	(.178)	(.224)	(.231)	(.199)	(.313)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.14
Quantile regression: The effect of pre- and redistribution (top 10% income share) on production-based CO_2-emissions per capita.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist (Top 10%)	.170	.322**	.632***	.797***	1.007***	1.076***	1.221***	1.333***	1.610***
	(.131)	(.131)	(.108)	(.092)	(.097)	(.097)	(.109)	(.188)	(.128)
Redist (Top 10%)	−.608	.979***	1.669***	1.914***	2.193***	3.578***	4.425***	4.652***	6.397***
	(.513)	(.341)	(.268)	(.351)	(.452)	(.538)	(.659)	(.689)	(.882)
GDP pc	.848***	.791***	.745***	.754***	.736***	.700***	.627***	.599***	.603***
	(.023)	(.023)	(.022)	(.017)	(.015)	(.021)	(.027)	(.025)	(.023)
Pop. Urban	.003***	.002***	.002***	.001	.001	.001**	.004***	.004***	.003***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.019***	−.018***	−.017***	−.018***	−.019***	−.020***	−.020***	−.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.0005)	(.001)	(.001)	(.001)
Civil Liberties	−.028***	−.011	.006	.017**	.024***	.027***	.029***	.037***	.040**
	(.008)	(.007)	(.006)	(.008)	(.007)	(.008)	(.009)	(.012)	(.016)
Industry VA	.011***	.012***	.013***	.015***	.015***	.017***	.019***	.021***	.022***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.002	−.001	−.005**	−.007***	−.006***	−.004**	−.003	−.001	−.001
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
Constant	−7.342***	−6.651***	−6.076***	−6.008***	−5.636***	−5.279***	−4.664***	−4.299***	−4.102***
	(.268)	(.271)	(.240)	(.178)	(.187)	(.212)	(.257)	(.261)	(.209)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.15
Quantile regression: The effect of pre- and redistribution (bottom 50% income share) on consumption-based CO_2-emissions per capita.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist (Bot. 50%)	.216	.826***	1.218***	1.178***	.820***	.042	−.161	−.312	−.812**
	(.365)	(.267)	(.183)	(.182)	(.240)	(.166)	(.221)	(.228)	(.395)
Redist (Bot. 50%)	.188	−.315	−.380	.314	1.464**	2.282***	2.968***	4.825***	3.326***
	(.692)	(.381)	(.321)	(.470)	(.576)	(.348)	(.337)	(.350)	(.680)
GDP pc	.790***	.868***	.840***	.821***	.808***	.797***	.767***	.756***	.780***
	(.056)	(.022)	(.018)	(.022)	(.018)	(.019)	(.019)	(.016)	(.038)
Pop. Urban	−.00003	.0005	.001	.001*	.0001	−.001*	−.002**	−.005***	−.006***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.0005)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.014***	−.016***	−.016***	−.017***	−.017***	−.017***	−.013***
	(.001)	(.0004)	(.0004)	(.001)	(.0005)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.126***	−.081***	−.060***	−.041***	−.025***	−.011	−.011	−.008	−.015
	(.018)	(.007)	(.006)	(.007)	(.008)	(.007)	(.008)	(.007)	(.018)
Industry VA	.003*	.002**	.002	.003**	.005***	.005***	.008***	.012***	.012***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Agri. VA	−.010	−.001	−.002	−.001	−.001	−.003*	−.003	−.005**	−.005
	(.007)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.004)
Constant	−6.111***	−6.928***	−6.628***	−6.468***	−6.272***	−5.942***	−5.598***	−5.324***	−5.167***
	(.539)	(.205)	(.182)	(.192)	(.165)	(.177)	(.181)	(.169)	(.280)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A.16
Quantile regression: The effect of pre- and redistribution (bottom 50% income share) on production-based CO_2-emissions per capita.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist (Bot. 50%)	.095	.437	.816***	1.248***	1.477***	.990***	.706***	.590	.537
	(.305)	(.272)	(.210)	(.205)	(.231)	(.261)	(.202)	(.361)	(.444)
Redist (Bot. 50%)	−.535	.414	.951**	.891**	1.310***	2.687***	4.652***	5.027***	5.554***
	(.433)	(.393)	(.391)	(.375)	(.477)	(.724)	(.613)	(.748)	(.859)
GDP pc	.863***	.811***	.773***	.777***	.757***	.722***	.664***	.620***	.594***
	(.022)	(.023)	(.021)	(.018)	(.015)	(.023)	(.023)	(.024)	(.029)
Pop. Urban	.003***	.002***	.002***	.001	.0002	.001	.002***	.003***	.005***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.020***	−.021***	−.022***	−.019***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.027***	−.014*	.0004	.011	.018**	.016**	.020***	.031**	.030**
	(.008)	(.007)	(.007)	(.008)	(.008)	(.007)	(.008)	(.013)	(.014)
Industry VA	.011***	.011***	.013***	.014***	.015***	.017***	.019***	.021***	.021***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.003	−.0005	−.003	−.006***	−.006***	−.003**	.001	.001	−.002

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Table A.16 (*continued*).

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
	(.002)	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.002)	(.003)
Constant	−7.581***	−7.029***	−6.697***	−6.704***	−6.430***	−6.043***	−5.616***	−5.138***	−4.791***
	(.221)	(.205)	(.197)	(.164)	(.170)	(.211)	(.218)	(.244)	(.318)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.17
The effect of predistribution and redistribution on consumption-based CO_2 emissions in low-, low-middle- upper-middle-, and high-income countries (Top 10% income share).

	Low	Low-middle	Upper-middle	High
	(Consumption-based CO_2-emissions per capita)			
top_10_sptinc	−0.329	−0.238	1.293	0.258
	(0.776)	(0.687)	(0.810)	(0.649)
taxation_top10	2.026	2.839	2.169	1.819
	(3.235)	(1.911)	(2.274)	(1.297)
GDP pc	0.638***	0.416**	0.556***	0.448***
	(0.202)	(0.174)	(0.187)	(0.154)
Pop. Urban	0.022*	0.013	−0.010	0.0004
	(0.012)	(0.008)	(0.012)	(0.009)
Rnew. Energy	−0.017**	−0.013***	0.005	−0.010**
	(0.008)	(0.005)	(0.015)	(0.005)
Civil Liberties	0.021	−0.021	−0.051	−0.006
	(0.028)	(0.019)	(0.044)	(0.024)
Industry VA	−0.004	−0.003	−0.013**	−0.006
	(0.007)	(0.005)	(0.005)	(0.005)
Agri. VA	−0.001	−0.019***	−0.028	−0.033
	(0.006)	(0.006)	(0.020)	(0.025)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	482	1150	1031	1224
Adjusted R^2	0.215	0.343	0.168	0.163
F Statistic	22.995***	84.642***	35.243***	39.830***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.18
The effect of predistribution and redistribution on production-based CO_2 emissions in low-, low-middle- upper-middle-, and high-income countries (Top 10% income share).

	Low	Low-middle	Upper-middle	High
	(Production-based CO_2-emissions per capita)			
top_10_sptinc	−0.094	−0.035	0.084	1.229**
	(0.633)	(0.485)	(0.368)	(0.586)
taxation_top10	−0.364	2.831*	0.985	1.868
	(2.191)	(1.469)	(0.824)	(1.142)
GDP pc	0.617***	0.292**	0.418***	0.449***
	(0.144)	(0.130)	(0.128)	(0.123)
Pop. Urban	0.029***	0.009	0.006*	0.010
	(0.011)	(0.008)	(0.004)	(0.007)
Rnew. Energy	−0.042***	−0.025***	−0.021***	−0.026***
	(0.006)	(0.005)	(0.003)	(0.004)
Civil Liberties	0.015	−0.010	−0.069***	−0.002
	(0.023)	(0.018)	(0.022)	(0.022)
Industry VA	−0.007	0.007	0.0004	0.004
	(0.005)	(0.005)	(0.001)	(0.004)
Agri. VA	−0.009**	−0.011**	0.002	−0.003
	(0.004)	(0.006)	(0.005)	(0.015)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	482	1150	1031	1224
Adjusted R^2	0.548	0.496	0.511	0.389
F Statistic	79.396***	150.814***	143.966***	107.632***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.19
The effect of predistribution and redistribution on consumption-based CO_2 emissions in low-, low-middle- upper-middle-, and high-income countries (Bot 50% income share).

	Low	Low-middle	Upper-middle	High
	(Consumption-based CO_2-emissions per capita)			
bottom50_sptinc	−1.542	−1.230	3.456*	0.413
	(1.992)	(1.634)	(2.018)	(0.736)
redistribution_bottom	−1.164	5.556**	4.567*	1.893
	(2.624)	(2.598)	(2.769)	(1.326)
GDP pc	0.649***	0.423**	0.570***	0.453***
	(0.209)	(0.174)	(0.192)	(0.153)
Pop. Urban	0.022*	0.013	−0.008	−0.0004
	(0.012)	(0.008)	(0.011)	(0.009)
Rnew. Energy	−0.018**	−0.013***	0.006	−0.010**
	(0.008)	(0.005)	(0.015)	(0.005)
Civil Liberties	0.015	−0.019	−0.058	−0.003
	(0.028)	(0.019)	(0.044)	(0.024)
Industry VA	−0.005	−0.003	−0.013**	−0.006
	(0.007)	(0.005)	(0.005)	(0.005)
Agri. VA	−0.001	−0.019***	−0.029	−0.033
	(0.006)	(0.006)	(0.020)	(0.025)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	482	1150	1031	1224
Adjusted R^2	0.217	0.351	0.181	0.160
F Statistic	23.204***	87.253***	37.621***	39.179***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

Table A.20
The effect of predistribution and redistribution on production-based CO_2 emissions in low-, low-middle- upper-middle-, and high-income countries (Bot 50% income share).

	Low	Low-middle	Upper-middle	High
	(Production-based CO_2-emissions per capita)			
bottom50_sptinc	−0.680	−0.591	0.049	1.424*
	(1.615)	(1.401)	(0.999)	(0.737)
redistribution_bottom	−1.880	4.429**	0.944	2.233*
	(2.365)	(2.017)	(0.942)	(1.294)
GDP pc	0.613***	0.297**	0.418***	0.444***
	(0.136)	(0.131)	(0.128)	(0.124)
Pop. Urban	0.030***	0.009	0.006*	0.009
	(0.011)	(0.008)	(0.004)	(0.007)
Rnew. Energy	−0.042***	−0.025***	−0.021***	−0.025***
	(0.005)	(0.005)	(0.003)	(0.004)
Civil Liberties	0.013	−0.009	−0.069***	0.003
	(0.022)	(0.018)	(0.021)	(0.022)
Industry VA	−0.007	0.007	0.0005	0.004
	(0.005)	(0.005)	(0.001)	(0.004)
Agri. VA	−0.009**	−0.011*	0.003	−0.005
	(0.004)	(0.006)	(0.005)	(0.015)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	482	1150	1031	1224
Adjusted R^2	0.551	0.498	0.510	0.381
F Statistic	80.136***	151.825***	143.494***	104.323***

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.

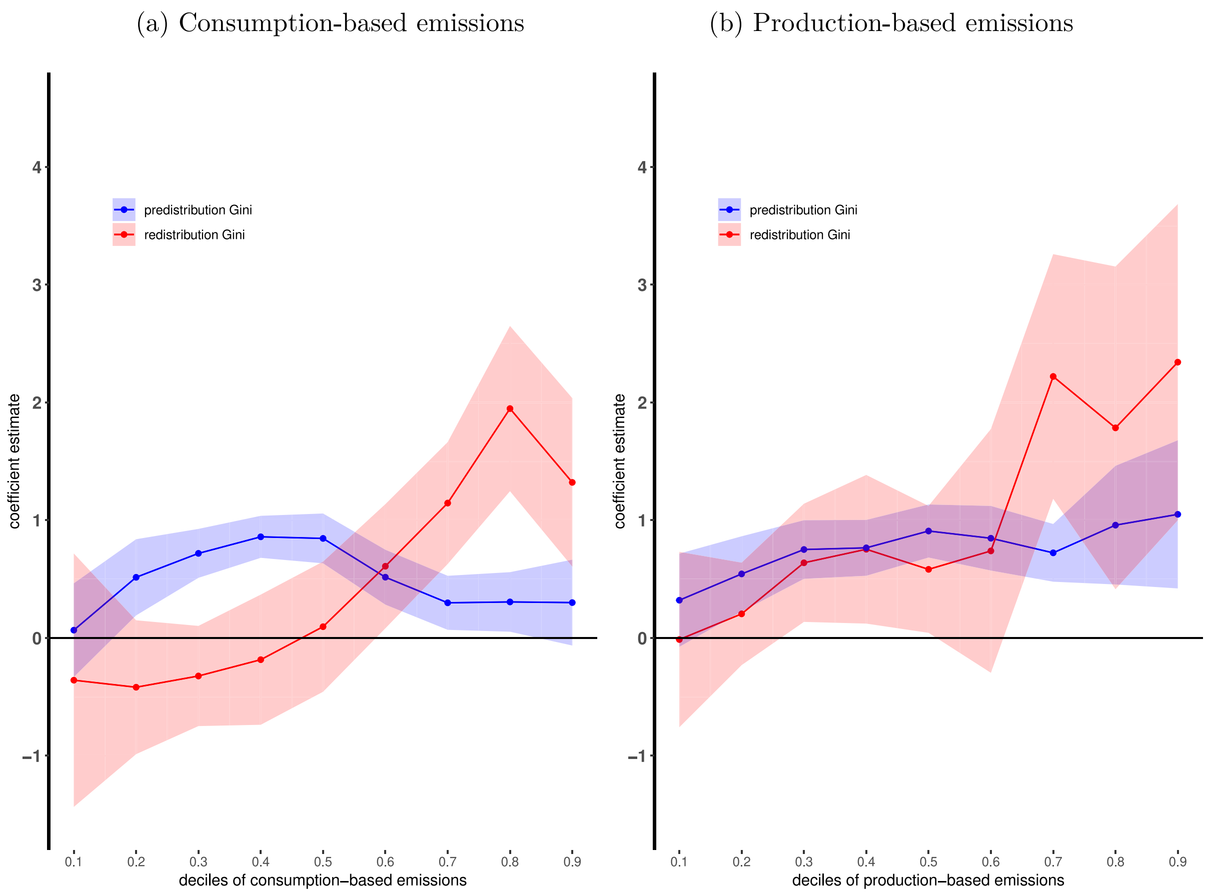


Fig. B.1. Model (4): The effect of inequality reduction through predistribution and redistribution on CO_2 emissions.*Notes:* bootstrapped standard errors.

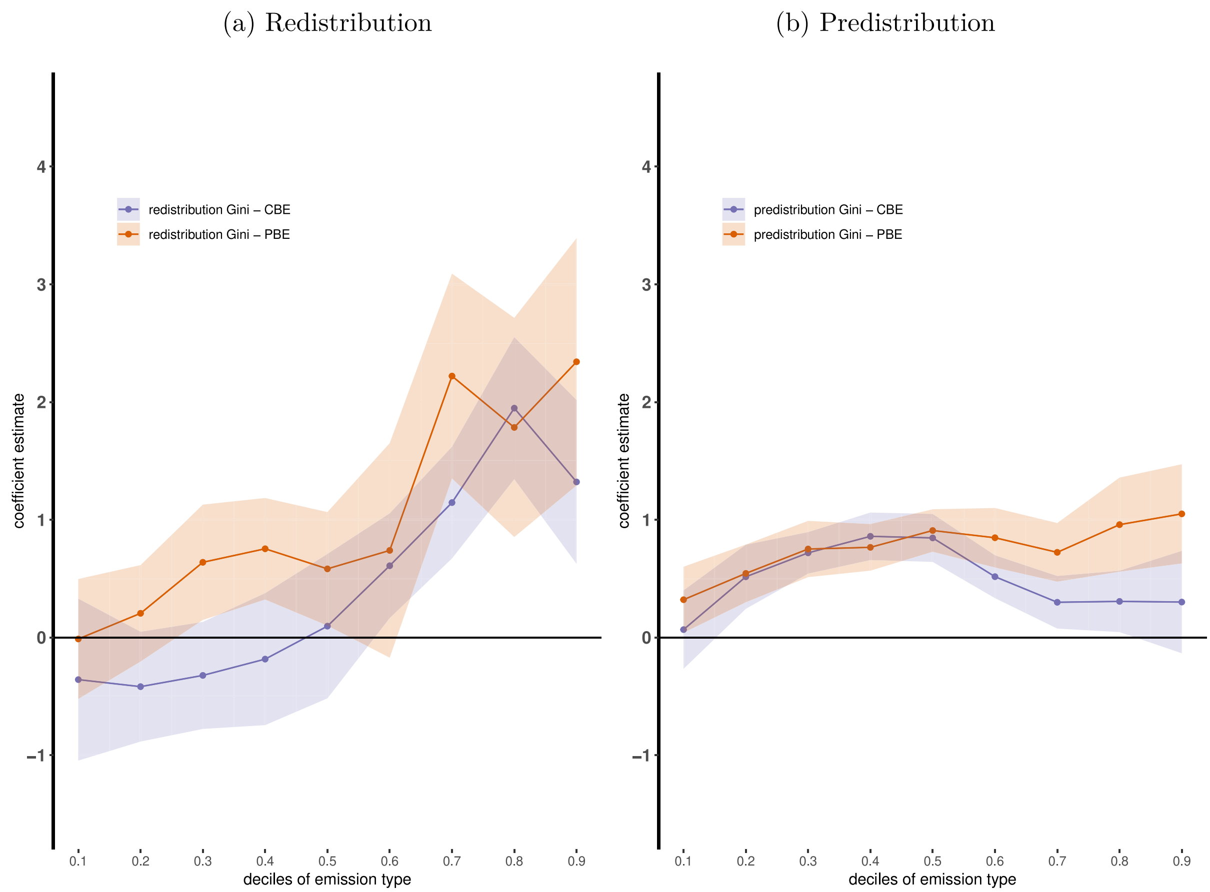


Fig. B.2. Model (4): Comparing the effect of inequality reduction through pre and redistribution on consumption- (CBE) and production-based CO_2 emissions (PBE).
Notes: bootstrapped standard errors.

Table B.1
Model (4), quantile regression: The effect of pre- and redistribution (Gini Index) on consumption-based CO_2-emissions per capita.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist. (Gini)	.066	.515***	.718***	.859***	.845***	.516***	.299**	.306**	.300
	(.203)	(.165)	(.106)	(.091)	(.108)	(.119)	(.117)	(.129)	(.186)
Redist. (Gini)	−.359	−.418	−.323	−.184	.096	.609**	1.146***	1.948***	1.321***
	(.549)	(.290)	(.217)	(.282)	(.282)	(.269)	(.264)	(.358)	(.365)
GDP pc	.892***	.893***	.859***	.824***	.810***	.808***	.771***	.739***	.775***
	(.041)	(.027)	(.020)	(.026)	(.025)	(.026)	(.027)	(.030)	(.041)
Pop. Urban	−.0004	.0002	.001	.001*	.001	−.001	−.001**	−.004***	−.005***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.011***	−.012***	−.013***	−.014***	−.014***	−.015***	−.015***	−.015***	−.010***
	(.001)	(.0004)	(.0004)	(.0004)	(.0004)	(.0005)	(.001)	(.001)	(.001)
Civil Liberties	−.115***	−.077***	−.064***	−.043***	−.031***	−.009	−.006	−.010	−.013
	(.018)	(.009)	(.007)	(.009)	(.007)	(.009)	(.009)	(.011)	(.013)
Industry VA	.004*	.003***	.003**	.004***	.005***	.004***	.006***	.010***	.012***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.007	−.001	−.002	−.003	−.004**	−.006***	−.008***	−.010***	−.008*
	(.005)	(.003)	(.002)	(.002)	(.002)	(.002)	(.002)	(.003)	(.005)
Tariffs	.029	.001	.006	−.012	−.014	−.016	−.029*	−.077***	−.078***
	(.027)	(.012)	(.012)	(.014)	(.011)	(.015)	(.016)	(.012)	(.009)
Constant	−7.103***	−6.796***	−6.319***	−5.884***	−5.675***	−5.699***	−5.386***	−4.835***	−5.045***
	(.464)	(.318)	(.226)	(.259)	(.238)	(.248)	(.284)	(.300)	(.403)
Observations	2974	2974	2974	2974	2974	2974	2974	2974	2974

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table B.2
Model (4), quantile regression: The effect of pre- and redistribution (Gini Index) on production-based CO_2-emissions per capita.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist. (Gini)	.320	.544***	.751***	.765***	.908***	.847***	.723***	.958***	1.050***
	(.202)	(.163)	(.127)	(.121)	(.115)	(.140)	(.125)	(.257)	(.321)
Redist. (Gini)	−.013	.205	.638**	.753**	.583**	.739	2.221***	1.784**	2.342***
	(.380)	(.222)	(.256)	(.322)	(.275)	(.528)	(.530)	(.699)	(.685)
GDP pc	.820***	.791***	.757***	.780***	.774***	.750***	.679***	.653***	.657***
	(.035)	(.036)	(.025)	(.019)	(.021)	(.028)	(.032)	(.039)	(.030)
Pop. Urban	.002***	.002***	.002***	.001	.0001	.001	.002***	.003**	.003**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.017***	−.018***	−.019***	−.020***	−.018***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.038***	−.021**	−.003	.006	.012	.008	.013	.015	.015
	(.014)	(.009)	(.007)	(.008)	(.009)	(.010)	(.010)	(.013)	(.017)
Industry VA	.012***	.014***	.015***	.015***	.015***	.015***	.017***	.018***	.020***
	(.002)	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.003)
Agri. VA	−.002	−.003	−.005**	−.008***	−.008***	−.006***	−.002	−.003	−.003
	(.003)	(.003)	(.003)	(.002)	(.002)	(.002)	(.003)	(.003)	(.003)
Tariffs	.047***	.027***	.043***	.047***	.031**	.026*	.020	.036	.017
	(.018)	(.009)	(.009)	(.016)	(.015)	(.015)	(.014)	(.024)	(.038)
Constant	−7.026***	−6.521***	−6.134***	−6.200***	−5.894***	−5.613***	−5.150***	−4.672***	−4.550***
	(.434)	(.394)	(.250)	(.208)	(.253)	(.283)	(.280)	(.361)	(.382)
Observations	2974	2974	2974	2974	2974	2974	2974	2974	2974

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

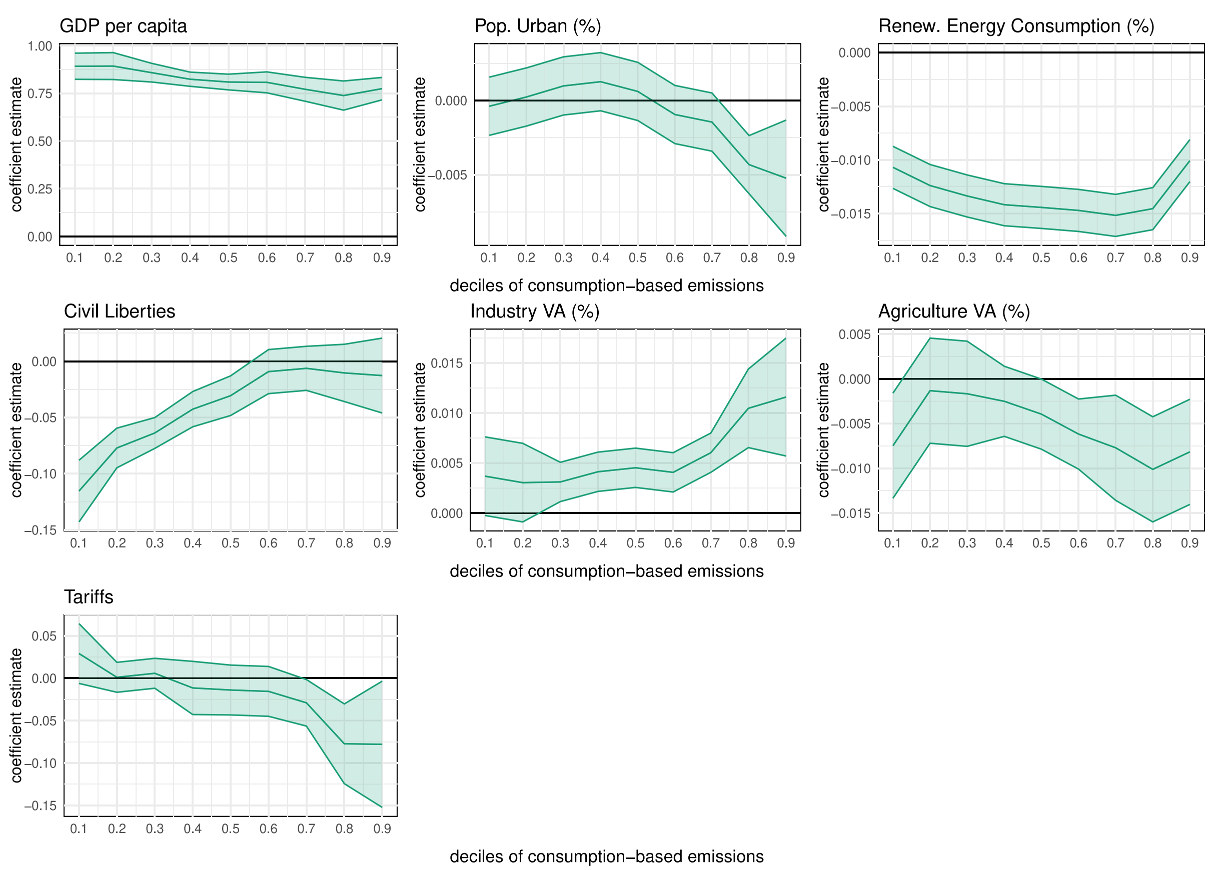


Fig. B.3. Model (4): The non-linear effect of the control variables on consumption-based CO_2 emissions.*Notes:* bootstrapped standard errors.

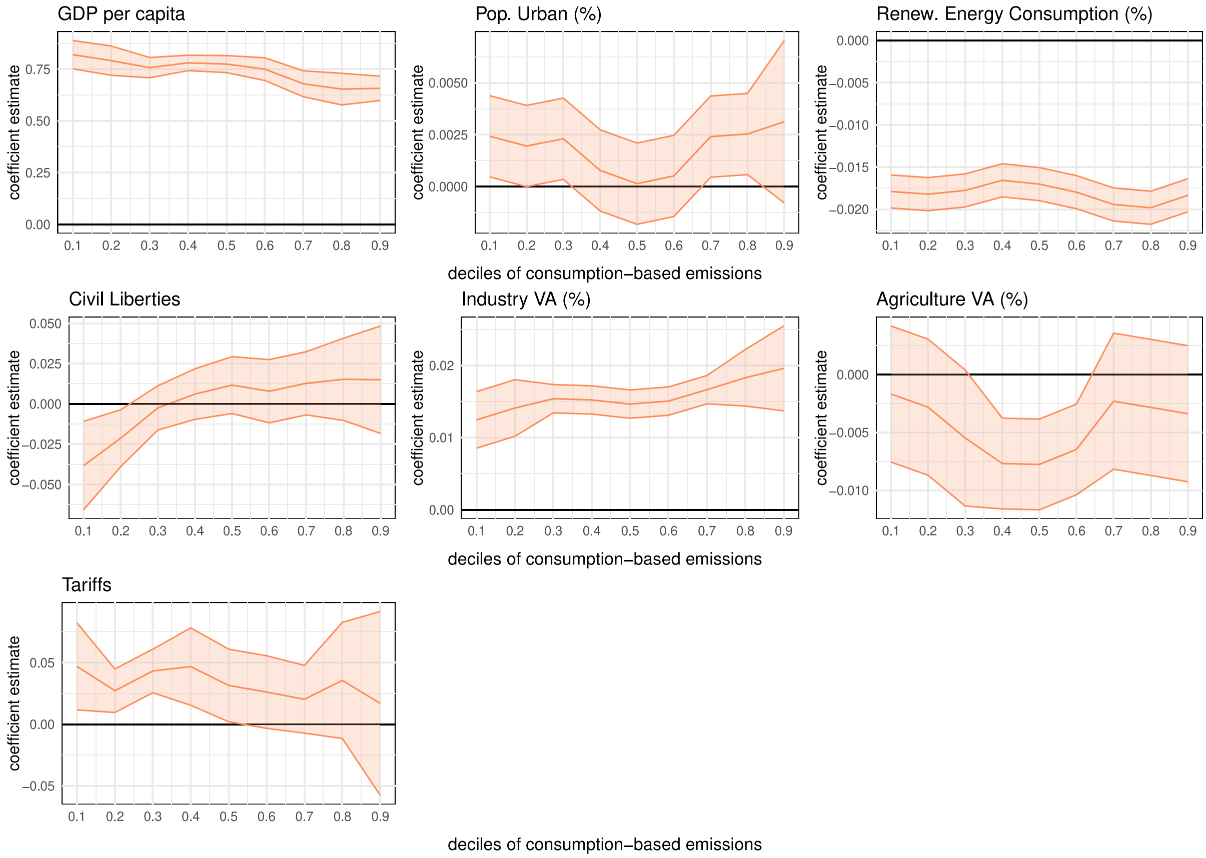
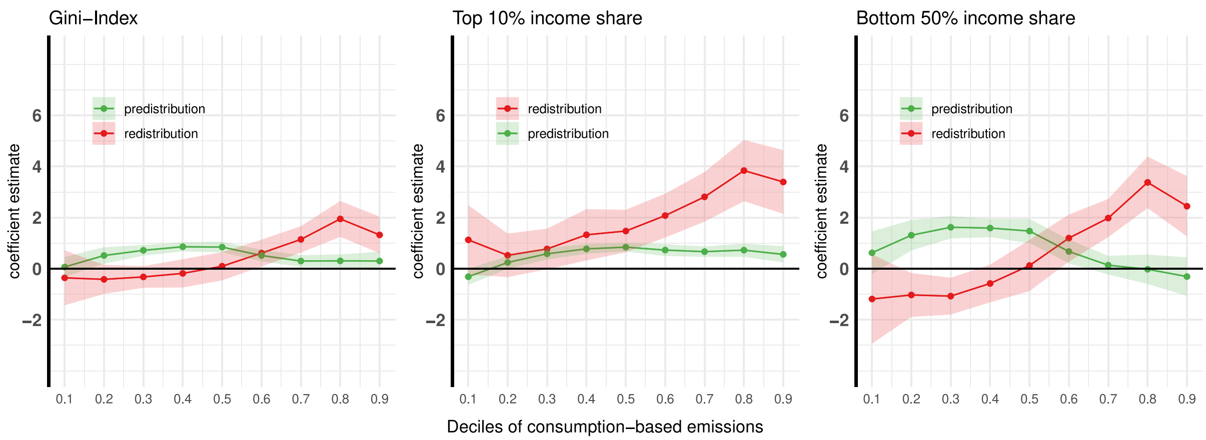


Fig. B.4. Model (4): The non-linear effect of the control variables on production-based CO_2 emissions.*Notes:* bootstrapped standard errors.

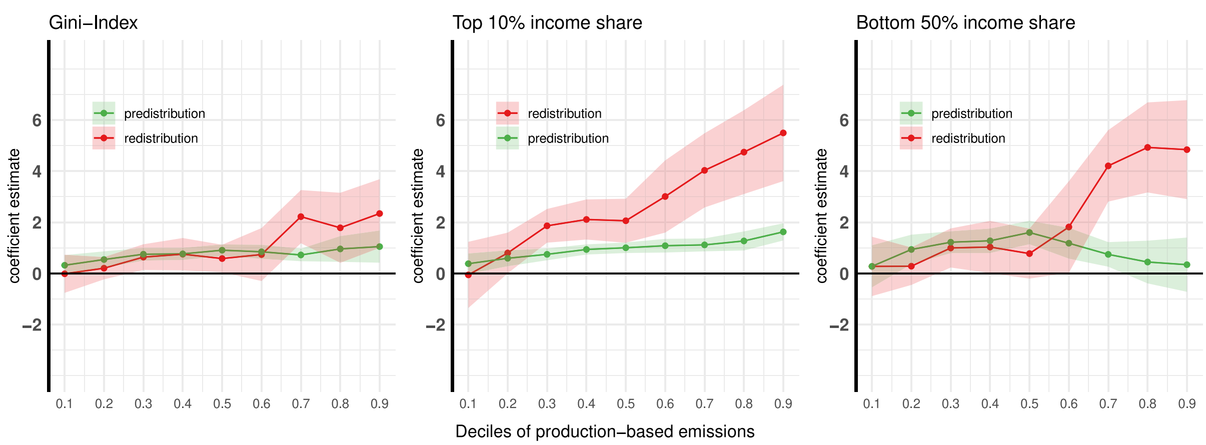
Table B.3
Model (4), quantile regression: The effect of pre- and redistribution (top 10% income share) on consumption-based CO_2-emissions per capita.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist. (Top 10%)	−.315**	.243*	.582***	.775***	.843***	.727***	.666***	.725***	.560***
	(.159)	(.130)	(.116)	(.099)	(.090)	(.118)	(.103)	(.132)	(.163)
Redist. (Top 10%)	1.128	.523	.772*	1.326***	1.473***	2.078***	2.811***	3.840***	3.394***
	(.691)	(.435)	(.406)	(.512)	(.425)	(.438)	(.495)	(.612)	(.636)
GDP pc	.899***	.889***	.848***	.810***	.788***	.774***	.737***	.712***	.767***
	(.036)	(.024)	(.023)	(.023)	(.023)	(.028)	(.030)	(.032)	(.036)
Pop. Urban	−.001	−.0001	.001	.002***	.001	−0.00000	−.001	−.004***	−.005***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.011***	−.013***	−.013***	−.014***	−.015***	−.014***	−.015***	−.014***	−.010***
	(.001)	(.0004)	(.0005)	(.0005)	(.0004)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.109***	−.073***	−.054***	−.033***	−.026***	−.003	.004	−.004	−.005
	(.015)	(.009)	(.007)	(.010)	(.008)	(.009)	(.008)	(.012)	(.012)
Industry VA	.004**	.003***	.004***	.004***	.005***	.005***	.007***	.010***	.012***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.002)	(.001)	(.001)	(.001)
Agri. VA	−.005	−.001	−.003	−.002	−.005**	−.007***	−.009***	−.012***	−.008*
	(.005)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.004)	(.004)
Tariffs	.042**	.003	.002	−.002	−.010	−.010	−.028**	−.071***	−.074***
	(.021)	(.013)	(.012)	(.016)	(.013)	(.014)	(.014)	(.016)	(.009)
Constant	−7.451***	−6.979***	−6.415***	−6.025***	−5.644***	−5.496***	−5.040***	−4.516***	−5.010***
	(.382)	(.272)	(.261)	(.239)	(.217)	(.266)	(.305)	(.320)	(.343)
Observations	2974	2974	2974	2974	2974	2974	2974	2974	2974

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.



(a) Consumption-based emissions (CBE).



(b) Production-based emissions (PBE).

Fig. B.5. Model (4): The effect of predistribution and redistribution measured with different inequality indicators on CO_2 emissions.
Notes: Bootstrapped standard errors.

Table B.4
Model (4), quantile regression: The effect of pre- and redistribution (top 10% income share) on production-based CO_2-emissions per capita.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist. (Top 10%)	.381*	.593***	.747***	.937***	1.004***	1.084***	1.116***	1.271***	1.625***
	(.204)	(.159)	(.118)	(.101)	(.105)	(.136)	(.129)	(.190)	(.171)
Redist. (Top 10%)	−.057	.799**	1.862***	2.110***	2.060***	3.009***	4.030***	4.744***	5.494***
	(.660)	(.406)	(.336)	(.400)	(.439)	(.720)	(.740)	(.836)	(.961)
GDP pc	.812***	.778***	.743***	.762***	.765***	.702***	.639***	.616***	.637***
	(.038)	(.034)	(.023)	(.019)	(.019)	(.028)	(.029)	(.036)	(.031)
Pop. Urban	.002***	.002***	.002***	.001*	.0001	.001	.004***	.004***	.003**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.016***	−.017***	−.018***	−.019***	−.019***	−.019***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.035***	−.021**	.002	.014*	.017*	.019**	.023**	.036***	.034*
	(.014)	(.009)	(.006)	(.008)	(.009)	(.010)	(.011)	(.012)	(.018)
Industry VA	.012***	.014***	.016***	.016***	.015***	.015***	.017***	.018***	.019***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.003)
Agri. VA	−.003	−.004	−.006**	−.008***	−.008***	−.008***	−.006**	−.004	−.003
	(.003)	(.003)	(.003)	(.002)	(.002)	(.002)	(.003)	(.003)	(.003)
Tariffs	.047***	.032***	.041***	.050***	.043***	.026*	.023	.042*	.045
	(.017)	(.010)	(.008)	(.012)	(.016)	(.015)	(.015)	(.021)	(.033)
Constant	−6.954***	−6.469***	−6.128***	−6.136***	−5.956***	−5.257***	−4.763***	−4.530***	−4.374***
	(.462)	(.357)	(.250)	(.199)	(.225)	(.296)	(.273)	(.357)	(.316)
Observations	2974	2974	2974	2974	2974	2974	2974	2974	2974

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table B.5
Model (4), quantile regression: The effect of pre- and redistribution (bottom 50% income share) on consumption-based CO_2-emissions per capita.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist. (Bot. 50%)	.621	1.309***	1.621***	1.591***	1.473***	.672***	.138	−.023	−.309
	(.428)	(.304)	(.223)	(.182)	(.242)	(.239)	(.185)	(.294)	(.385)
Redist. (Bot. 50%)	−1.188	−1.029**	−1.074***	−.579	.122	1.197**	1.980***	3.378***	2.446***
	(.892)	(.438)	(.368)	(.376)	(.512)	(.471)	(.381)	(.515)	(.603)
GDP pc	.891***	.888***	.864***	.841***	.820***	.810***	.778***	.746***	.756***
	(.042)	(.026)	(.021)	(.026)	(.026)	(.027)	(.027)	(.025)	(.041)
Pop. Urban	.0001	.001	.001*	.001*	.001	−.001	−.002**	−.005***	−.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.010***	−.012***	−.013***	−.014***	−.015***	−.015***	−.015***	−.015***	−.010***
	(.001)	(.0004)	(.0004)	(.0005)	(.0005)	(.0005)	(.001)	(.001)	(.001)
Civil Liberties	−.116***	−.080***	−.066***	−.047***	−.033***	−.010	−.007	−.011	−.012
	(.019)	(.009)	(.007)	(.008)	(.008)	(.010)	(.008)	(.009)	(.013)
Industry VA	.003	.003***	.003**	.004***	.004***	.004***	.006***	.010***	.011***
	(.002)	(.001)	(.001)	(.001)	(.002)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.009	−.001	−.001	−.001	−.003	−.005***	−.007***	−.010***	−.009*
	(.006)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.004)	(.005)
Tariffs	.027	.002	.002	−.011	−.010	−.017	−.034**	−.077***	−.081***
	(.028)	(.012)	(.015)	(.013)	(.012)	(.017)	(.015)	(.012)	(.010)
Constant	−7.201***	−7.210***	−6.991***	−6.735***	−6.450***	−6.125***	−5.628***	−5.059***	−5.039***
	(.409)	(.245)	(.203)	(.241)	(.215)	(.238)	(.242)	(.253)	(.354)
Observations	2974	2974	2974	2974	2974	2974	2974	2974	2974

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table B.6
Model (4), quantile regression: The effect of pre- and redistribution (bottom 50% income share) on production-based CO_2-emissions per capita.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Predist. (Bot. 50%)	.278	.937***	1.221***	1.277***	1.600***	1.182***	.745***	.446	.343
	(.420)	(.295)	(.218)	(.244)	(.234)	(.308)	(.245)	(.426)	(.541)
Redist. (Bot. 50%)	.275	.284	.996**	1.033**	.776	1.816**	4.206***	4.927***	4.840***
	(.592)	(.374)	(.390)	(.521)	(.499)	(.912)	(.713)	(.898)	(.987)
GDP pc	.825***	.791***	.764***	.789***	.783***	.748***	.685***	.647***	.636***
	(.035)	(.034)	(.026)	(.018)	(.022)	(.033)	(.030)	(.031)	(.033)
Pop. Urban	.003***	.002***	.002***	.001	.0002	.001	.002**	.002	.005**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.018***	−.018***	−.018***	−.016***	−.017***	−.018***	−.020***	−.021***	−.018***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.037***	−.022**	−.005	.004	.012	.009	.014	.021	.019
	(.013)	(.009)	(.007)	(.009)	(.009)	(.009)	(.009)	(.013)	(.019)
Industry VA	.013***	.014***	.015***	.015***	.014***	.015***	.017***	.019***	.018***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.003)
Agri. VA	−.001	−.003	−.005*	−.008***	−.007***	−.006***	−.002	−.0004	−.005
	(.003)	(.003)	(.003)	(.002)	(.002)	(.002)	(.003)	(.003)	(.003)
Tariffs	.046***	.027***	.042***	.046***	.029*	.024*	.026*	.023	.036
	(.017)	(.010)	(.010)	(.015)	(.016)	(.014)	(.015)	(.024)	(.034)
Constant	−7.329***	−6.973***	−6.789***	−6.863***	−6.706***	−6.287***	−5.731***	−5.313***	−5.115***
	(.346)	(.330)	(.236)	(.142)	(.214)	(.299)	(.274)	(.327)	(.359)
Observations	2974	2974	2974	2974	2974	2974	2974	2974	2974

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table B.7
Model (4): The effect of predistribution and redistribution on consumption-based CO_2 emissions in low-, low-middle- upper-middle-, and high-income countries.

	Low	Low-middle	Upper-middle	High
	(Consumption-based CO_2-emissions per capita)			
Predist. (Gini)	−0.593	−0.279	1.823**	0.140
	(0.703)	(0.700)	(0.715)	(0.507)
Redist. (Gini)	−0.152	1.237	1.901	1.980**
	(2.442)	(1.302)	(1.258)	(0.879)
GDP pc	0.330	0.656***	0.754***	0.537***
	(0.236)	(0.202)	(0.209)	(0.158)
Pop. Urban	0.027*	0.012	−0.010	−0.001
	(0.015)	(0.009)	(0.012)	(0.008)
Rnew. Energy	−0.013*	−0.011**	0.004	−0.009*
	(0.007)	(0.005)	(0.012)	(0.005)

(*continued on next page*)

Table B.7 (*continued*).

	Low	Low-middle	Upper-middle	High
	(Consumption-based CO_2-emissions per capita)			
Civil Liberties	−0.043	−0.024	−0.056	0.001
	(0.028)	(0.021)	(0.045)	(0.020)
Industry VA	−0.002	−0.007	−0.006	−0.008**
	(0.008)	(0.004)	(0.005)	(0.004)
Agri. VA	−0.011	−0.019***	−0.027	−0.015
	(0.007)	(0.007)	(0.020)	(0.023)
Tariffs	0.022	−0.032	0.018	0.035
	(0.018)	(0.038)	(0.019)	(0.061)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	285	787	773	1129
Adjusted R^2	0.036	0.327	0.174	0.203
F Statistic	7.083***	51.096***	26.325***	41.093***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table B.8
Model (4): The effect of predistribution and redistribution on production-based CO_2 emissions in low-, low-middle- upper-middle-, and high-income countries.

	Low	Low-middle	Upper-middle	High
	(Production-based CO_2-emissions per capita)			
Predist. (Gini)	0.168	−0.274	0.686**	0.921*
	(0.767)	(0.647)	(0.286)	(0.484)
Redist. (Gini)	0.119	3.309**	1.151*	1.641**
	(2.385)	(1.348)	(0.674)	(0.791)
GDP pc	0.480***	0.354**	0.508***	0.474***
	(0.181)	(0.163)	(0.091)	(0.134)
Pop. Urban	0.033**	0.005	0.005	0.008
	(0.016)	(0.010)	(0.004)	(0.006)
Rnew. Energy	−0.041***	−0.024***	−0.018***	−0.022***
	(0.006)	(0.005)	(0.003)	(0.004)
Civil Liberties	0.010	−0.012	−0.045**	0.008
	(0.021)	(0.018)	(0.020)	(0.017)
Industry VA	−0.006	0.006	0.001	0.004
	(0.006)	(0.005)	(0.002)	(0.003)
Agri. VA	−0.005	−0.011	0.0001	−0.001
	(0.005)	(0.007)	(0.004)	(0.013)
Tariffs	−0.009	−0.033	−0.008	−0.048***
	(0.014)	(0.039)	(0.010)	(0.011)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	285	787	773	1129
Adjusted R^2	0.474	0.442	0.566	0.414
F Statistic	34.280***	77.915***	120.084***	97.575***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.1
The effect of the post-tax Gini Index on consumption-based CO_2-emissions.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Post-tax Gini	−.007	−.224***	−.441***	−.564***	−.595***	−.477***	−.512***	−.714***	−.439**
	(.127)	(.081)	(.071)	(.077)	(.074)	(.077)	(.091)	(.096)	(.177)
GDP pc	.808***	.871***	.827***	.811***	.807***	.799***	.764***	.755***	.757***
	(.050)	(.020)	(.017)	(.019)	(.016)	(.019)	(.022)	(.024)	(.041)
Pop. Urban	−.0004	−.0001	.0004	.001*	.0003	−.001**	−.001**	−.004***	−.006***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.0005)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.015***	−.016***	−.016***	−.016***	−.017***	−.017***	−.013***
	(.001)	(.0005)	(.001)	(.001)	(.0004)	(.001)	(.0004)	(.001)	(.001)
Civil Liberties	−.129***	−.078***	−.056***	−.039***	−.026***	−.011*	−.012	−.021**	−.027**
	(.019)	(.007)	(.006)	(.006)	(.006)	(.007)	(.010)	(.009)	(.013)
Industry VA	.003*	.002**	.002*	.003***	.005***	.005***	.007***	.010***	.011***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.009	−.001	−.002	−.001	−.002	−.005***	−.005***	−.006***	−.010***
	(.006)	(.002)	(.001)	(.001)	(.002)	(.002)	(.002)	(.002)	(.003)
Constant	−6.220***	−6.722***	−6.132***	−5.922***	−5.786***	−5.609***	−5.180***	−4.741***	−4.578***
	(.559)	(.236)	(.197)	(.191)	(.160)	(.190)	(.227)	(.222)	(.355)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.2
The effect of the pre-tax Gini Index on consumption-based CO_2-emissions.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pre-tax Gini	.037	−.291***	−.553***	−.653***	−.676***	−.395***	−.398***	−.553***	−.169
	(.168)	(.098)	(.080)	(.086)	(.086)	(.092)	(.122)	(.102)	(.208)
GDP pc	.815***	.875***	.834***	.824***	.822***	.822***	.777***	.763***	.769***
	(.053)	(.021)	(.018)	(.018)	(.017)	(.017)	(.023)	(.022)	(.039)
Pop. Urban	−.0005	.0001	.001	.001*	.0001	−.001***	−.001	−.004***	−.006***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.0005)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.014***	−.016***	−.016***	−.016***	−.017***	−.017***	−.013***
	(.001)	(.0005)	(.0004)	(.0005)	(.0004)	(.0004)	(.001)	(.001)	(.001)
Civil Liberties	−.129***	−.080***	−.060***	−.042***	−.031***	−.018***	−.023**	−.027***	−.033***
	(.018)	(.008)	(.006)	(.007)	(.006)	(.006)	(.010)	(.008)	(.013)
Industry VA	.003	.002**	.002*	.003**	.004***	.004***	.007***	.009***	.011***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Agri. VA	−.008	−.001	−.002	−.001	−.002	−.005***	−.005**	−.006***	−.010***
	(.006)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.003)
Constant	−6.300***	−6.719***	−6.112***	−5.928***	−5.819***	−5.795***	−5.302***	−4.815***	−4.814***
	(.627)	(.256)	(.203)	(.205)	(.175)	(.184)	(.233)	(.221)	(.381)
Observations	3892	3892	3892	3892	3892	3892	3892	3892	3892

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.3
The effect of the post-tax Gini Index on production-based CO_2-emissions.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Post-tax Gini	.038	−.282***	−.551***	−.691***	−.861***	−.897***	−1.063***	−1.278***	−1.576***
	(.102)	(.097)	(.077)	(.080)	(.075)	(.094)	(.092)	(.106)	(.153)
GDP pc	.851***	.805***	.765***	.769***	.748***	.725***	.680***	.624***	.619***
	(.025)	(.026)	(.019)	(.016)	(.015)	(.017)	(.021)	(.024)	(.027)
Pop. Urban	.003***	.002***	.002***	.001	.0002	.001	.003***	.003***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.019***	−.020***	−.021***	−.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.0005)	(.001)	(.001)
Civil Liberties	−.028***	−.014**	.001	.013	.018***	.015**	.008	.020*	.016
	(.010)	(.007)	(.006)	(.008)	(.007)	(.007)	(.009)	(.010)	(.012)
Industry VA	.011***	.012***	.013***	.014***	.015***	.017***	.019***	.021***	.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.002	−.001	−.004*	−.007***	−.006***	−.004**	.001	−.001	−.002
	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)	(.002)
Constant	−7.489***	−6.763***	−6.174***	−6.065***	−5.652***	−5.365***	−4.935***	−4.212***	−3.811***
	(.287)	(.299)	(.213)	(.181)	(.179)	(.189)	(.227)	(.259)	(.290)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.4
The effect of the pre-tax Gini Index on production-based CO_2-emissions.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pre-tax Gini	−.046	−.338***	−.627***	−.816***	−.961***	−.973***	−1.135***	−1.412***	−1.561***
	(.139)	(.116)	(.110)	(.091)	(.097)	(.087)	(.107)	(.121)	(.225)
GDP pc	.844***	.815***	.776***	.777***	.755***	.734***	.706***	.642***	.614***
	(.023)	(.022)	(.017)	(.016)	(.017)	(.018)	(.021)	(.024)	(.027)
Pop. Urban	.003***	.002***	.002***	.001	−.0001	.001	.002***	.004***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.019***	−.020***	−.021***	−.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.029***	−.015**	−.005	.006	.010	.006	−.002	.008	−.002
	(.009)	(.007)	(.007)	(.007)	(.008)	(.006)	(.009)	(.009)	(.013)
Industry VA	.011***	.012***	.013***	.014***	.014***	.016***	.019***	.021***	.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Agri. VA	.002	−.0003	−.003*	−.008***	−.008***	−.005***	−.0003	−.001	−.003
	(.002)	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)
Constant	−7.385***	−6.810***	−6.204***	−5.962***	−5.527***	−5.294***	−4.987***	−4.219***	−3.645***
	(.271)	(.265)	(.197)	(.178)	(.211)	(.193)	(.233)	(.246)	(.260)
Observations	3892	3892	3892	3892	3892	3892	3892	3892	3892

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.5
The effect of the post-tax top 10% income share on consumption-based CO_2-emissions.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Post-tax top 10%	.106	−.274***	−.528***	−.695***	−.757***	−.648***	−.756***	−.887***	−.772***
	(.128)	(.090)	(.081)	(.094)	(.078)	(.108)	(.089)	(.104)	(.219)
GDP pc	.825***	.872***	.828***	.807***	.803***	.794***	.750***	.753***	.745***
	(.048)	(.021)	(.017)	(.018)	(.015)	(.021)	(.023)	(.027)	(.039)
Pop. Urban	−.001	.0001	.001	.001***	.0004	−.001	−.001*	−.004***	−.006***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.014***	−.015***	−.016***	−.016***	−.017***	−.017***	−.013***
	(.001)	(.0005)	(.0005)	(.001)	(.0004)	(.0005)	(.0005)	(.001)	(.001)
Civil Liberties	−.129***	−.077***	−.057***	−.042***	−.027***	−.012*	−.010	−.017*	−.020*
	(.018)	(.007)	(.007)	(.008)	(.005)	(.007)	(.009)	(.009)	(.012)
Industry VA	.003	.002**	.002*	.003***	.005***	.005***	.008***	.010***	.012***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.008	−.001	−.002	−.001	−.003*	−.005***	−.007***	−.007***	−.010***
	(.006)	(.002)	(.002)	(.001)	(.001)	(.002)	(.002)	(.002)	(.003)
Constant	−6.420***	−6.737***	−6.151***	−5.884***	−5.742***	−5.544***	−4.998***	−4.723***	−4.460***
	(.537)	(.238)	(.198)	(.189)	(.156)	(.211)	(.224)	(.243)	(.324)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.6
The effect of the pre-tax top 10% income share on consumption-based CO_2-emissions.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pre-tax top 10%	.247	−.245**	−.526***	−.660***	−.717***	−.473***	−.598***	−.692***	−.295
	(.153)	(.112)	(.079)	(.083)	(.079)	(.090)	(.123)	(.090)	(.208)
GDP pc	.837***	.880***	.836***	.822***	.817***	.819***	.767***	.758***	.762***
	(.047)	(.021)	(.018)	(.017)	(.017)	(.018)	(.022)	(.026)	(.041)
Pop. Urban	−.001	.00004	.001	.001*	.0001	−.001***	−.001*	−.004***	−.005***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.0005)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.014***	−.016***	−.016***	−.016***	−.017***	−.017***	−.013***
	(.001)	(.0005)	(.0005)	(.001)	(.0005)	(.0004)	(.0005)	(.001)	(.001)
Civil Liberties	−.128***	−.079***	−.060***	−.045***	−.031***	−.016***	−.018*	−.027***	−.031**
	(.017)	(.007)	(.007)	(.007)	(.006)	(.006)	(.010)	(.008)	(.013)
Industry VA	.002	.002**	.002*	.003**	.004***	.005***	.007***	.009***	.011***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.007	−.001	−.002	−.001	−.003*	−.005***	−.006***	−.007***	−.010***
	(.005)	(.002)	(.001)	(.001)	(.002)	(.002)	(.002)	(.002)	(.003)
Constant	−6.571***	−6.810***	−6.202***	−5.976***	−5.827***	−5.778***	−5.163***	−4.780***	−4.738***
	(.539)	(.253)	(.194)	(.183)	(.168)	(.187)	(.217)	(.248)	(.372)
Observations	3892	3892	3892	3892	3892	3892	3892	3892	3892

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.7
The effect of the post-tax top 10% income share on production-based CO_2-emissions.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Post-tax top 10%	−.060	−.406***	−.760***	−.903***	−1.073***	−1.177***	−1.382***	−1.713***	−1.922***
	(.121)	(.116)	(.112)	(.082)	(.090)	(.095)	(.104)	(.116)	(.104)
GDP pc	.844***	.800***	.753***	.757***	.740***	.718***	.658***	.606***	.615***
	(.025)	(.024)	(.019)	(.017)	(.015)	(.018)	(.024)	(.025)	(.025)
Pop. Urban	.003***	.002***	.003***	.001	.00004	.001	.004***	.004***	.003***
	(.001)	(.0004)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.019***	−.020***	−.020***	−.019***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.029***	−.014**	.003	.012	.017***	.015*	.009	.021**	.023**
	(.010)	(.006)	(.007)	(.008)	(.006)	(.008)	(.008)	(.009)	(.011)
Industry VA	.011***	.012***	.013***	.014***	.015***	.017***	.019***	.022***	.019***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Agri. VA	.002	−.001	−.005**	−.008***	−.007***	−.005***	−.002	−.003	−.004
	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)	(.002)
Constant	−7.383***	−6.673***	−6.065***	−5.901***	−5.535***	−5.258***	−4.739***	−4.085***	−3.748***
	(.283)	(.281)	(.214)	(.179)	(.177)	(.191)	(.248)	(.237)	(.258)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.8
The effect of the pre-tax top 10% income share on production-based CO_2-emissions.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pre-tax top 10%	−.100	−.388***	−.740***	−.867***	−.994***	−1.042***	−1.242***	−1.585***	−1.717***
	(.131)	(.132)	(.122)	(.098)	(.110)	(.083)	(.087)	(.097)	(.150)
GDP pc	.843***	.808***	.769***	.767***	.753***	.732***	.686***	.638***	.622***
	(.024)	(.024)	(.018)	(.016)	(.017)	(.017)	(.021)	(.022)	(.024)
Pop. Urban	.003***	.002***	.002***	.001	−.0003	.0005	.003***	.004***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.019***	−.020***	−.020***	−.019***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.028***	−.015**	−.002	.005	.009	.006	−.005	.010	.005
	(.009)	(.007)	(.007)	(.006)	(.006)	(.006)	(.009)	(.009)	(.010)
Industry VA	.011***	.012***	.013***	.014***	.014***	.016***	.019***	.021***	.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.002	−.001	−.004**	−.008***	−.008***	−.005***	−.002	−.001	−.004
	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)	(.002)
Constant	−7.349***	−6.737***	−6.169***	−5.925***	−5.576***	−5.352***	−4.908***	−4.303***	−3.849***
	(.276)	(.281)	(.214)	(.176)	(.218)	(.193)	(.235)	(.228)	(.237)
Observations	3892	3892	3892	3892	3892	3892	3892	3892	3892

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table C.9
The effect of the post-tax bottom 50% income share on consumption-based CO_2-emissions.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Post-tax Bot. 50%	.202	.420***	.756***	.895***	1.006***	.724***	.770***	1.098***	.643**
	(.226)	(.140)	(.133)	(.137)	(.127)	(.123)	(.154)	(.178)	(.303)
GDP pc	.792***	.868***	.829***	.819***	.810***	.805***	.765***	.764***	.763***
	(.054)	(.025)	(.018)	(.020)	(.018)	(.016)	(.023)	(.023)	(.036)
Pop. Urban	−.00005	−.0001	.0004	.001	.0003	−.001**	−.001*	−.004***	−.006***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.0004)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.015***	−.016***	−.016***	−.016***	−.017***	−.017***	−.014***
	(.001)	(.001)	(.0005)	(.001)	(.0004)	(.0005)	(.001)	(.001)	(.001)
Civil Liberties	−.126***	−.078***	−.056***	−.039***	−.027***	−.013*	−.018*	−.024***	−.028**
	(.020)	(.007)	(.006)	(.007)	(.007)	(.007)	(.010)	(.008)	(.013)
Industry VA	.003	.002**	.002**	.003***	.005***	.005***	.007***	.010***	.011***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Agri. VA	−.010	−.001	−.001	−.0002	−.002	−.005***	−.005**	−.005**	−.010***
	(.006)	(.002)	(.002)	(.001)	(.002)	(.001)	(.002)	(.002)	(.003)
Constant	−6.127***	−6.879***	−6.509***	−6.426***	−6.301***	−6.020***	−5.591***	−5.368***	−4.955***
	(.528)	(.236)	(.174)	(.174)	(.148)	(.142)	(.204)	(.213)	(.265)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.10
The effect of the pre-tax bottom 50% income share on consumption-based CO_2-emissions.

	Deciles of consumption-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pre-tax Bot. 50%	.250	.721***	1.095***	1.213***	1.210***	.623***	.451*	.705***	.027
	(.339)	(.209)	(.150)	(.159)	(.179)	(.161)	(.246)	(.272)	(.350)
GDP pc	.791***	.865***	.834***	.826***	.824***	.824***	.781***	.777***	.768***
	(.053)	(.022)	(.017)	(.018)	(.017)	(.015)	(.025)	(.026)	(.038)
Pop. Urban	.0001	.0003	.001	.001	.0002	−.001***	−.001	−.004***	−.006***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.0004)	(.001)	(.001)	(.002)
Rnew. Energy	−.012***	−.013***	−.014***	−.016***	−.016***	−.016***	−.017***	−.017***	−.013***
	(.001)	(.0005)	(.0005)	(.001)	(.0005)	(.0004)	(.001)	(.001)	(.001)
Civil Liberties	−.126***	−.079***	−.059***	−.042***	−.032***	−.021***	−.027***	−.027***	−.032**
	(.019)	(.007)	(.006)	(.007)	(.006)	(.006)	(.009)	(.009)	(.013)
Industry VA	.003*	.002**	.002*	.003**	.004***	.004***	.007***	.009***	.010***
	(.002)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Agri. VA	−.010	−.001	−.001	−.001	−.002	−.004***	−.005**	−.006**	−.010***
	(.006)	(.002)	(.002)	(.002)	(.001)	(.001)	(.002)	(.002)	(.003)
Constant	−6.124***	−6.891***	−6.579***	−6.480***	−6.380***	−6.125***	−5.622***	−5.348***	−4.896***
	(.534)	(.201)	(.176)	(.170)	(.151)	(.145)	(.211)	(.244)	(.304)
Observations	3892	3892	3892	3892	3892	3892	3892	3892	3892

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.11
The effect of the post-tax bottom 50% income share on production-based CO_2-emissions.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Post-tax Bot. 50%	−.155	.432***	.857***	1.159***	1.457***	1.408***	1.668***	1.903***	2.215***
	(.192)	(.153)	(.145)	(.145)	(.153)	(.166)	(.173)	(.209)	(.406)
GDP pc	.856***	.811***	.775***	.776***	.756***	.730***	.695***	.643***	.614***
	(.024)	(.020)	(.020)	(.016)	(.014)	(.018)	(.021)	(.024)	(.030)
Pop. Urban	.003***	.002***	.002***	.001	.0003	.001	.002***	.003***	.004***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.019***	−.020***	−.021***	−.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.029***	−.014**	−.0003	.013*	.019***	.011	.006	.015	.015
	(.010)	(.007)	(.007)	(.008)	(.007)	(.007)	(.008)	(.011)	(.013)
Industry VA	.011***	.011***	.013***	.014***	.015***	.016***	.019***	.021***	.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.003	−.0003	−.003	−.006***	−.006***	−.004**	.001	.0004	−.003
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.003)
Constant	−7.476***	−7.038***	−6.714***	−6.693***	−6.435***	−6.109***	−5.853***	−5.379***	−4.987***
	(.239)	(.183)	(.179)	(.139)	(.167)	(.193)	(.206)	(.236)	(.322)
Observations	3887	3887	3887	3887	3887	3887	3887	3887	3887

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.12
The effect of the pre-tax bottom 50% income share on production-based CO_2-emissions.

	Deciles of production-based CO_2-emissions per capita								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Pre-tax Bot. 50%	−.042	.590***	1.122***	1.440***	1.679***	1.645***	1.812***	2.177***	1.868***
	(.302)	(.226)	(.198)	(.187)	(.188)	(.188)	(.234)	(.273)	(.562)
GDP pc	.848***	.816***	.785***	.785***	.762***	.743***	.726***	.659***	.622***
	(.022)	(.020)	(.018)	(.016)	(.017)	(.017)	(.022)	(.027)	(.036)
Pop. Urban	.003***	.002***	.002***	.001	.0001	.001	.002**	.003***	.005***
	(.001)	(.0005)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)
Rnew. Energy	−.018***	−.018***	−.018***	−.017***	−.018***	−.019***	−.020***	−.021***	−.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Civil Liberties	−.029***	−.016**	−.005	.004	.009	.004	−.002	.002	.002
	(.009)	(.007)	(.008)	(.007)	(.006)	(.007)	(.010)	(.011)	(.016)
Industry VA	.011***	.011***	.013***	.014***	.014***	.016***	.018***	.021***	.020***
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.002)	(.002)
Agri. VA	.002	−.0004	−.003	−.007***	−.007***	−.004***	.001	.001	−.004
	(.002)	(.002)	(.002)	(.002)	(.001)	(.002)	(.002)	(.002)	(.003)
Constant	−7.434***	−7.093***	−6.794***	−6.705***	−6.376***	−6.164***	−6.059***	−5.459***	−4.891***
	(.224)	(.186)	(.172)	(.148)	(.184)	(.192)	(.241)	(.249)	(.390)
Observations	3892	3892	3892	3892	3892	3892	3892	3892	3892

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.13
The impact of different inequality indicators on consumption-based CO_2emissions.

	Consumption-based CO_2 emissions per capita					
Post-tax Gini	−0.733*					
	(0.380)					
Pre-tax Gini		−0.665				
		(0.441)				
Post-tax Top 10%			−0.646*			
			(0.342)			
Pre-tax top 10%				−0.577		
				(0.366)		
Post-tax Bot. 50%					1.426*	
					(0.772)	
Pre-tax Bot. 50%						1.275
						(0.908)
GDP pc	0.573***	0.573***	0.571***	0.573***	0.574***	0.572***
	(0.114)	(0.114)	(0.112)	(0.113)	(0.115)	(0.114)
Pop. Urban	0.005	0.005	0.005	0.005	0.005	0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Rnew. Energy	−0.014***	−0.014***	−0.014***	−0.014***	−0.014***	−0.014***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Civil Liberties	−0.014	−0.014	−0.014	−0.013	−0.014	−0.014

(continued on next page)

Table C.13 (*continued*).

	Consumption-based CO_2 emissions per capita					
	(0.016)	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)
Industry VA	−0.006**	−0.006**	−0.006**	−0.006**	−0.006**	−0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Agri. VA	−0.015**	−0.016**	−0.015**	−0.015**	−0.015**	−0.016**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	3887	3892	3887	3892	3887	3892
Adjusted R^2	0.300	0.301	0.299	0.300	0.301	0.301
F Statistic	264.979***	265.988***	263.582***	265.199***	265.973***	266.390***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.14
The impact of different inequality indicators on production-based CO_2 emissions.

	Production-based emissions per capita					
Post-tax Gini	−0.416					
	(0.293)					
Pre-tax Gini		−0.280				
		(0.304)				
Post-tax Top 10%			−0.443			
			(0.279)			
Pre-tax top 10%				−0.305		
				(0.270)		
Post-tax Bot. 50%					0.676	
					(0.527)	
Pre-tax Bot. 50%						0.449
						(0.556)
GDP pc	0.368***	0.364***	0.368***	0.365***	0.367***	0.363***
	(0.072)	(0.071)	(0.071)	(0.071)	(0.072)	(0.071)
Pop. Urban	0.008**	0.008**	0.007**	0.008**	0.008**	0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Rnew. Energy	−0.027***	−0.027***	−0.027***	−0.027***	−0.027***	−0.027***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Civil Liberties	−0.023*	−0.023**	−0.023*	−0.023**	−0.023**	−0.023**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Industry VA	0.003	0.003	0.003	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Agri. VA	−0.005**	−0.005**	−0.005**	−0.005**	−0.005**	−0.005**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Observations	3887	3892	3887	3892	3887	3892
Adjusted R^2	0.575	0.574	0.575	0.574	0.574	0.574
F Statistic	777.194***	775.384***	777.889***	776.045***	776.052***	774.817***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.15
The effect of the pre and post-tax Gini Index on consumption-based CO_2 emissions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Consumption-based emissions per capita							
Post-tax Gini	−1.047***		−0.631*		−0.733*		−0.744**	
	(0.365)		(0.370)		(0.380)		(0.313)	
Pre-tax Gini		−0.955**		−0.555		−0.665		−0.623*
		(0.406)		(0.423)		(0.441)		(0.347)
GDP pc	0.731***	0.733***	0.607***	0.609***	0.573***	0.573***	0.614***	0.609***
	(0.107)	(0.108)	(0.114)	(0.114)	(0.114)	(0.114)	(0.118)	(0.117)
Pop. Urban			0.004	0.005	0.005	0.005	0.006	0.006
			(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Rnew. Energy			−0.016***	−0.016***	−0.014***	−0.014***	−0.013***	−0.013***
			(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)
Civil Liberties					−0.014	−0.014	−0.019	−0.019
					(0.016)	(0.016)	(0.017)	(0.017)
Industry VA					−0.006**	−0.006**	−0.004	−0.004
					(0.003)	(0.003)	(0.003)	(0.003)
Agri. VA					−0.015**	−0.016**	−0.023***	−0.023***
					(0.007)	(0.007)	(0.007)	(0.007)
Tariffs							0.019	0.018
							(0.026)	(0.026)
Observations	4022	4027	4009	4014	3887	3892	2974	2975
Adjusted R^2	0.171	0.170	0.272	0.273	0.300	0.301	0.333	0.331
F Statistic	505.193***	502.680***	420.594***	422.354***	264.979***	265.988***	208.915***	207.662***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C.16
The effect of the pre and post-tax Gini Index on production-based CO_2 emissions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Production-based emissions per capita							
Post-tax Gini	−1.333***		−0.585*		−0.416		−0.667**	
	(0.419)		(0.309)		(0.293)		(0.286)	
Pre-tax Gini		−1.195**		−0.483		−0.280		−0.510*
		(0.465)		(0.330)		(0.304)		(0.294)
GDP pc	0.642***	0.639***	0.421***	0.419***	0.368***	0.364***	0.422***	0.414***
	(0.098)	(0.099)	(0.068)	(0.068)	(0.072)	(0.071)	(0.065)	(0.065)
Pop. Urban			0.008**	0.008**	0.008**	0.008**	0.009**	0.009***
			(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Rnew. Energy			−0.028***	−0.028***	−0.027***	−0.027***	−0.025***	−0.025***
			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Civil Liberties					−0.023*	−0.023**	−0.008	−0.008
					(0.012)	(0.012)	(0.011)	(0.011)
Industry VA					0.003	0.003	0.005**	0.005**
					(0.002)	(0.002)	(0.002)	(0.002)
Agri. VA					−0.005**	−0.005**	−0.006	−0.006
					(0.003)	(0.003)	(0.003)	(0.003)
Tariffs							−0.018	−0.018
							(0.012)	(0.012)
Observations	4022	4027	4009	4014	3887	3892	2974	2975
Adjusted R^2	0.168	0.162	0.560	0.559	0.575	0.574	0.585	0.582
F Statistic	496.094***	479.615***	1321.780***	1316.630***	777.194***	775.384***	547.195***	541.418***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Data availability

Data will be made available on request.

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