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An Inconvenient truth: the narrow trade-off between Equity and Climate Security

by

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Abstract

This paper explores the narrow trade-off between climate mitigation policy, growth and income inequality, by examining the empirical evidence on the equity-pollution dilemma faced by policymakers when addressing both climate change and inequality altogether. Initially, a review of the existing literature delineates the evolution of how the relation between climate mitigation policy, growth and inequality is analyzed in research, transitioning from the Environmental Kuznets Curve to the Equity-Pollution Dilemma. The paper then moves to its empirical section, analyzing carbon emission and inequality statistics for a sample of 29 countries that cover industrialized and developing economies. In its concluding remarks, the paper underscores the need for a balanced approach that comprises both climate change mitigation and economic equality in the equation, stating how wealthier nations must pioneer assertive climate initiatives.

Keywords

Climate Mitigation, Inequality, Growth, Trade-off



Introduction

Since the outbreak Almost two decades have passed since then United States' vice president Al-Gore showed himself to the world in *An Inconvenient Truth*, where he tried, with scientific-based evidence, to awaken the public on how climate change was creating a planetary emergency that had near-certain correlation with human activities. In the popular documentary-film, Gore brings up the challenge in spreading the message despite the compelling evidence supporting his claim because, he argues, humans usually cannot bear too much reality. When a truth is uncomfortable and demands a change in regular behavior, it is naturally going to be met with resistance. So well has his argument fared that he released a sequel in the aftermath of the Paris climate accords in 2015, the first international treaty with binding provisions to limit surface mean temperature within the 2°Celsius threshold, where he conveys the urgency to do more lest we bring about sea level rise, extreme weather events, and loss of biodiversity. These threats have been repeatedly brought up by the reports of the Intergovernmental Panel on Climate Change (IPCC), a scientific body that operates under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC), which has been increasingly proactive in analyzing and disseminating the awareness about the risks of climate change with science-related tools.

Although the IPCC reports have become progressively more sophisticated, regular, and methodologically sound, here's the next inconvenient truth that both the reports and Gore's disclosures should highlight on climate change: the policy to address it could inadvertently increase poverty and income inequality. The real dilemma in pursuing diverse policy goals such as redistributive policies and emission reduction regulations lies in identifying the optimal trade-off that maximizes overall success.

1. The trade-off between inequality and climate change: From the Environmental Kuznets curves to the Equity-Pollution Dilemma

When it comes to the authors analyzing the relation between income growth and inequality and climate-friendly policy, the standard literature (Grossman and Krueger, 1995) supports what is called the hypothesis of the Environmental Kuznets curve, with evidence from the 1990s showing how pollution in terms of CO₂ emission decreases along with



countries' GDP increases, making an inverted U shape: initially, as GDP increases, environmental degradation increases due to greater spending on polluting fuels. Beyond a certain income threshold, however, environmental degradation proxied by CO₂ emission or deforestation decreases as societies prioritize other types of energy mixes and become aware of climate degradation.

The U-shaped relation between the environmental pollution and GDP growth has significantly influenced how the literature has interpreted climate mitigation policies by forming a synergistic image of the relation between inequality and climate change: either an increase in inequality further intensified climate change due to excessive consumption of polluting energy sources by the top percentile population (Piketty 2014), or that climate change, associated to extreme weather events, tends to widen economic inequalities by affecting crop productivity, causing water shortages, and resulting in infrastructural damage (Milanovich 2016).

These traditional approaches have fostered a prevailing view contending that, by addressing climate change, the policy maker would inherently incur in positive externalities and a reduction in income or wealth inequality as well. Baek and Gweisah (2013) were among the pioneers who, despite identifying an ultimate positive correlation between income growth and climate mitigation policies, introduced the scenario where environmental policies curbing and regulating carbon consumption have undesired distributional effects. Consequently, environmental policy may lead to greater inequality, and efforts to solve an issue may give rise to unforeseen negative externalities. According to the mentioned authors, the U-Shaped Environmental Kuznets Curve does not provide an explanation for why industrialized nations reach a peak in environmental pollution, to subsequently reduce emission levels at higher growth level. Levinson and O'Brian (2019) thoroughly ask whether richer people opt for less polluting goods, or richer countries pass regulations making polluting goods more expensive, introducing the concept of the Environmental Engel Curves. The Environmental Engel Curve analyze household or individual carbon at different levels of income and the type of emissions that goods and services that are chosen at different distributional levels are chosen.

In the wake of Levinson and O'Brien (2019), Sager (2019) firstly formulates the *equity-pollution dilemma*, which states how positive income redistribution may raise aggregate household greenhouse gas emission by calculating Environmental Engel Curves in the



United States. While devising various redistributive scenarios, Sager predicts that Sweden-like income transfers in the United States in 2009 may have increased household carbon by 5.1%. More specifically, marginal micro-level transfers of \$1000 from a richer to a poorer household in 2009 may have increased the CO₂ emission of the household by a mean 28.5 Kg for each subsidized impoverished household. Sager concludes that, however, the equity-pollution dilemma does not necessarily put climate change against the pursuit of economic equality. An optimum trade-off between redistributive policy and CO₂ increase should be looked at in terms of social utility: an inequality-averse policy maker may accept the benefits of a \$1000 transfer as they might outweigh the additional environmental cost of greater CO₂ levels.

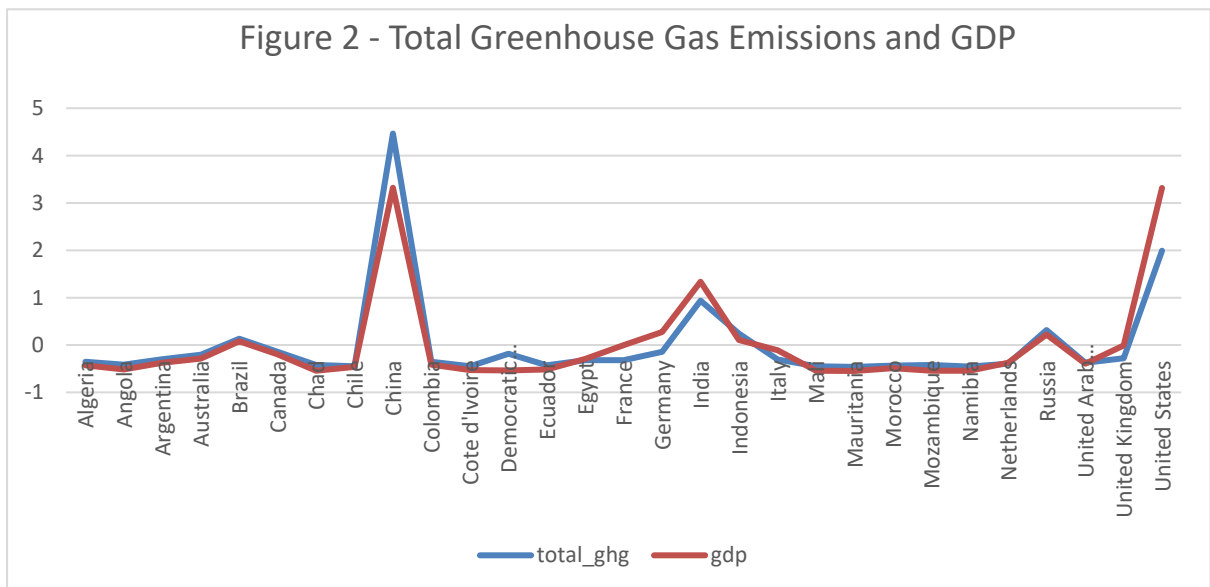
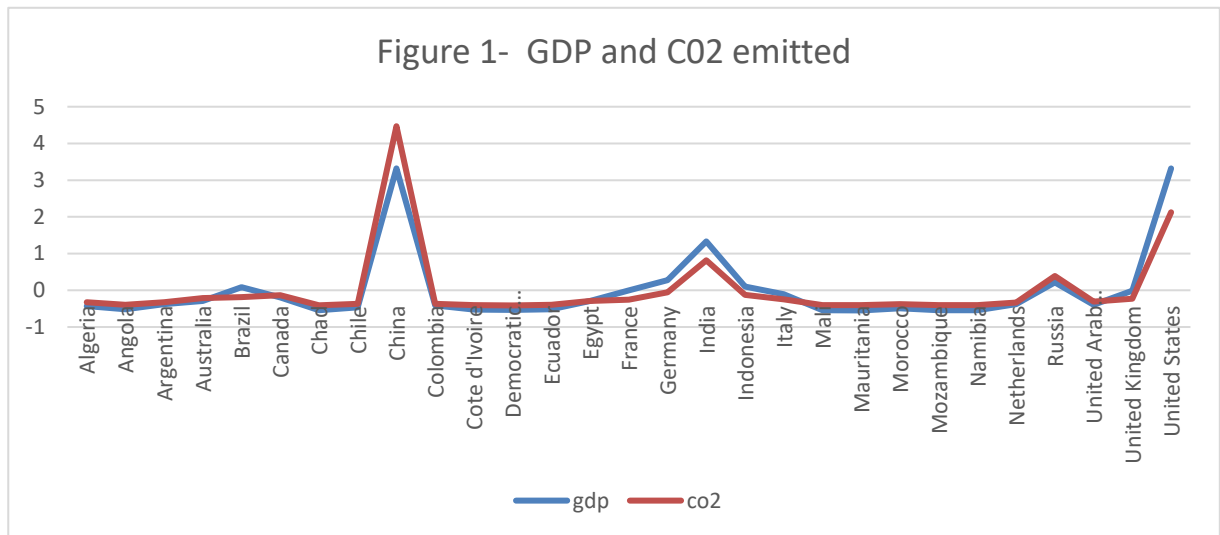
2. The Equity-Pollution dilemma for developing countries

The equity-pollution dilemma has finally been effectively resumed by mounting evidence, brought forward by IMF report¹, which shows that climate security and inequality are two objectives that have a narrow trade-off, especially in developing economies. On the one side, the economic and social impact of climate change is unequal: rising temperatures from fossil fuels and greenhouse gas buildup could have direr consequences on low-income countries. Climate threats such as draughts, storms and hurricanes, rising sea levels and increased water temperature affect more directly activities that poorest economies are specialized in, such as the agriculture, forestry and fisheries sector. On the other, the socio-economic cost of the measures enacted to mitigate climate change (namely, subsidies to types of cleaner fuels in the energy transition, decarbonization strategies, and the like) could stifle developing countries' economic growth. Finally, the dual-sided weakness experienced by many developing countries that stems from both the inequalities induced by climate change and its mitigation policy unveils another paradox.

Figures 1 and 2 describe the paradox by examining the standardized GDP and total carbon dioxide emission values in 2018 of a selected sample of industrialized countries (EU, Canada, US) and a differentiated geographical set of developing countries, among which BRIC countries. The two figures reveal that GDP is strictly positively related to total



greenhouse emissions, which means that richer countries in 2018 emitted a proportional amount of greenhouse emissions.

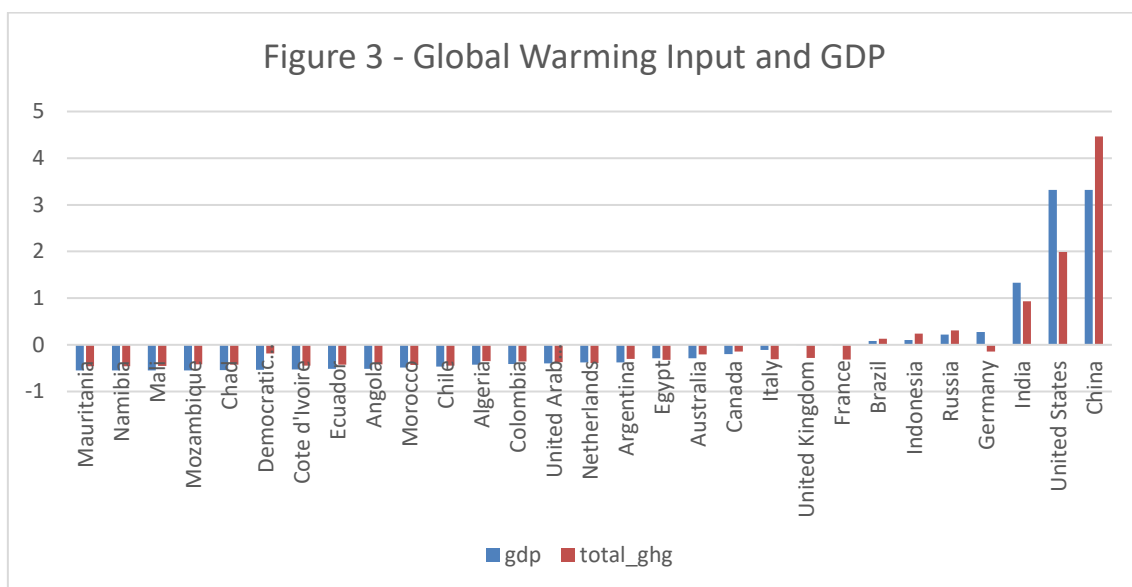


Source: Our World in Data CO2 and Greenhouse Gas Emissions database. Author's own calculations.

Figure 3 instead looks at standardized values of greenhouse emissions, which accounts for each country contribution to climate warming, and Gross Domestic Product, which

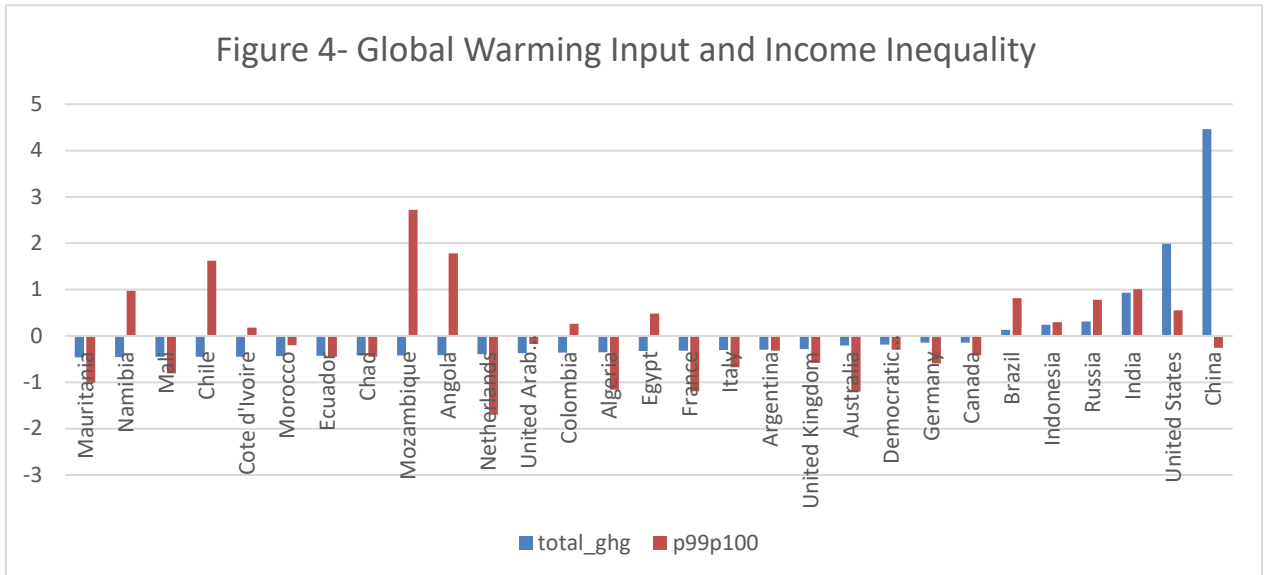


accounts for measures of economic prosperity. As the values are standardized, bars above the 0 line are values that are above average and vice versa. The evidence reveals that the US, Russia, China, and India in 2018 unsurprisingly have above-average Global warming input and GDP with regards to economically and demographically smaller countries. The US however seems to have had the greatest suffering from climate change, together with the Russian Federation, with relation to how much gas emissions have they produced. Aggregate data from the European Union could not be retrieved in the same time frame.



Source: Our World in Data CO2 and Greenhouse Gas Emissions database. Author's own calculations.

Figure 4 conversely examines the change in superficial temperature associated to greenhouse emission for 2018, that proxies for climate risk, or the amount of damage received from climate change, and the associated measure of income inequality, which is income perceived at the top 1% of the distribution. As can be seen, countries that have contributed less to climate change on average tend to have higher income inequality than countries that have contributed more on climate change. Striking examples are the United States and China, which feature a very important share of greenhouse emissions, but feature lower income inequality at the top than countries who have less emissions. Namibia, Chile, Mozambique, Angola Russia, Brazil, and Angola all have far higher inequalities than their contribution to development.



Source: Our World in Data CO2 and Greenhouse Gas Emissions database, Author's manipulation

The findings suggest a preliminary convergence to the argument that analysis of climate risk should invariably be integrated with economic distributional analysis to ascertain the best trade-off between addressing climate change and lifting millions from poverty. The narrow tradeoff between a socially secure environmental transition and an environmentally viable economic growth implies that climate change mitigation efforts should be equitably distributed in the income distribution to ensure they serve the broader objectives of development, poverty, and inequality reduction. Wealthier nations, owing to their larger historical contribution and greater capacity to afford mitigation, should spearhead ambitious climate actions and cooperate with less affluent nations to alleviate their mitigation burdens. To achieve this end, the 16th Conference of the Parties (COP 16) had introduced the Green Climate Fund (GCF), a multilateral institution that fosters growth and funds green programs that help developing countries to reduce their greenhouse emission. In 2015, via the Paris accord, the fund has become fully operational, with an aim to raise more than 100 billion dollars for climate finance activities by 2020. However, the fund is controversial due to a lack of transparency in both stating its real resources and in achieving its objectives. More importantly, the fund has approved more than \$10 billion in funding for more than 160 projects and programs in developing countries to reduce greenhouse emissions, but



effectively many projects still financed fossil fuel production plants. Finally, the GCF does not actively work to reduce inequalities by compensating developing countries for the opportunity cost incurred by giving up projects that would temporarily increase greenhouse gasses for the sake of greater development and growth. In the next Conference of the Parties (COP 28) occurring in Dubai, United Arab Emirates, states ought to consolidate a strategy of financial transfers should therefore be employed and encourage their participation in mitigation efforts, financial transfers across nations can be employed.

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