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The New Cold War and the Geopolitics of Climate Change: Competing Powers in a Warming World

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Abstract

The paper questions the influence of strategic conflicts between the leading powers of the world on climatic policy in the world, namely how rivalry should deter, or promote successful climate action. With the help of quantitative statistical techniques, the study incorporates 2000-2025 panel information on 40 leading economies. It analyses the relationship between geopolitical tensions indexes, climate financing with regulation compliance of emission quotes employing time-series regression and cross-correlations analysis. Initial statistical findings indicate that geopolitical rivalry intensity and international cooperation measures have an inverse correlation of significant value ($r = -0.68$, $p < 0.01$). Competition between the U.S and China is linked to 25 percent reduction in the joint clean-energy investments whereas increased West Russia tensions are linked to postponements in multilateral climate accords. On the other hand, there is only restricted collaboration in the regions in congruent blocs in pursuit of technology or economic strength. The evidence proposes that the New Cold War dynamics are the weaker of collective climate governance, where strategic location is more important than sustainability. The paper proposes climate diplomacy that is non-political and multilateral systems well able to withstand great-power competition to maintain the global emission mitigation target.

Keywords: Geopolitics, Climate Policy, Great-power Rivalry, U.S.-China Relations, Environmental Governance.



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Introduction

Global climate crisis has proven to be one of the challenges of the 21st century that demand unprecedented routes of international co-operation and concerted policy response. The Paris agreement of 2015 marked a breakthrough in the sphere of multilateral environmental management where 196 countries have pledged to reduce the global warming to well below 2 degrees above the pre-industrial levels, with an aim of going to 1.5 degrees (United Nations Framework Convention on Climate Change [UNFCCC], 2023). Nonetheless, even with this apparent universal agreement on the dire need to act on climate change, the increasingly intense geopolitical tensions between major powers especially between the United States and China, and between the west and Russia have entirely changed the face of climate governance in the world (Mehling, 2025). The revitalization of what academics are describing as the New Cold War has shifted the climate policy as a sector of joint collaboration to a sector of tactical contest, which brings some urgent questions in regard to the effectiveness of multilateral structures in an age of increased great-power disputes.

Interaction between geopolitics and climatic change is a topic that has received growing scholarly interest over the last number of years. The willingness of great powers to cooperate has been long seen by climate diplomacy scholars as a way to trigger historic achievements as the bilateral impetus between the U.S. and China, which formed the backdrop of the Paris Agreement and aligned climate policy standards, demonstrated (Diplomat, 2025). The weakening of the ties between the key economies, on the other hand, has shown that the international cooperation in climate issues remains uncertain, and strategic competition now becomes the dominant factor in policies concerning critical minerals, rare earths, solar technologies, and battery elements all of which the global green shift cannot live without (Diplomat, 2025). The recent studies have examined the effects of geopolitical fragmentation on terms of sustainable development pattern (TESS Forum, 2025) along with climate policy being instrumentalized as soft power within the international relations framework (Modern Diplomacy, 2023). Nonetheless, there still exists a major research gap on the quantitative aspect of the correlation between the level of geopolitical tension and particular climate governance results among competing blocks.

The current literature has mainly discussed the geopolitics-climate nexus with the help of qualitative analysis of policy and case studies. Hill (2024) claims that climate change is no longer an island of cooperation in the sea of competition but states that geopolitical relations now are intrinsically organized into climate action. In a similar way, the Kleinman Center on Energy Policy (2024) has captured the involvement of geopolitics in making international climate activity difficult due to three major risks, which are; political-military conflicts to hamper bilateral cooperation, economic competition contributing to export control and tariffs of clean technologies, and weaponization of green technology supply chains. However, these analyses are highly based on descriptive explanations as opposed to quantitative measurement of the relationship between geopolitical rivalry variables and climate policy performance attributes. Additionally, although there is research on some speculative dyadic ties, including U.S.-China energy rivalry (Columbia Energy Policy, 2025) or the influence of Western sanctions on Russian climate collaboration (Moscow Times, 2025), limited research has been done on a comprehensive cross-national analysis on panel data that combines the geopolitical tension levels with climate financing rates and compliance with emissions.

The relevance of this study can be explained by a number of urgent issues. To start with, the UNEP Emissions Gap Report (2024) shows that undisclosed nationally determined contributions (NDCs) can bring the world to global warming of 2.6-3.1oC by the mid-century century by the end of this century - well beyond the recommendations of the Paris Agreement. Such an implementation void is in contrast to what E3G (2025) asserts is the set of trends of climate and geopolitics, where fragmentation and tension is not only pushing out climate action and space on collaboration, but is also becoming a hallmark of climate policy itself. Second, geopolitical fragmentation compounds vulnerability in developing countries because climate finance flows are also hindered, and the least developed countries currently receive 18% of total climate finance in 2022 despite having disproportionate impacts of climate (United Nations Conference on Trade and Development [UNCTAD], 2025). Third, climate policy is now being positioned as a geopolitical tool with the overall danger that the national competitiveness of states as an end in itself will be linked to defining collective sustainable outcomes, enforcing itself on the choice of possibly suboptimal paths of reducing emissions (Kleinman Center, 2024).

The proposed research fills the defined gap in the literature by exploring how satisfied strategic competitions among leading powers quantitatively determine the global climate policy results, namely, whether competition discourages or encourages effective climate action. The study uses mixed methods, combining panel information (2000-2025) of 40 major economies with time-series regression and correlation analysis to investigate association between the geopolitical tension index, financing level of climate and compliance with emission target. The analysis of the comparative policy provides a complement to the statistical data giving dumping disparities between cooperative and competition blocs. The main research question that is going to set the course of the investigation is the following one: To what extent geopolitical rivalries are associated with differences in climate policy aspirations, investment choices, and emission cuts performance among the largest emitting countries?

The hypotheses of the study are as follows: the higher the level of geopolitical tension, the lower the levels of cross-national cooperation and the unequal emission reduction commitments, the possible difference in effects across regional blocs and development rates. This study fills the current gap on knowledge of scholars about the dynamics on international relations in limiting or enabling collective action in the face of molecule challenges facing the world because it provides empirical evidence related to the geopolitics-climate governance nexus. In addition, the results have important policy implications of designing depoliticized climate diplomacy structures and multilateral systems that can endure great-power competition, which will promote the future of global emission reduction targets in broken geopolitical contexts.

Research Objectives

The following are the main aims of this study:

1. To determine the efficacy of the international climate governance amid major powers in a quantitative measure of the predictability of their geopolitical rivalry.
2. To assess the effect of strategic competition among blocs like the United States and China, and the West and Russia on division of climate finance and achievement of emission apportionment promises 2000 up to 2025.

Research Questions

The paper aims at answering the following research questions, which are directly related to the outlined objectives:

1. What role does the intensity of the geopolitical rivalry between global powers in impact and performance of the global climate policy frameworks?
2. How has strategic competition influenced the cross-national flows in climate finance and how emission cut commitment has been implemented in rival blocs between the years 2000 and 2025?

The goals and queries will facilitate a push of knowledge on the connection between global power relationships and climate policy outcomes to add substantive empirical data to the current discussion on the global climate governance in a bifurcated geopolitical condition.

Literature Review

The climate change and international relations crossroad has spawned an enormous amount of academic debate with respect to the theorization of global cooperation and competition in the environmental governance. There are several insights into climate diplomacy and geopolitical interactions that can be explained using the International Relations theory. According to realist views, the actors are states that exist in an anarchic system of international relations where they focus on their own interests and need to maximize their power (Mearsheimer, 2001). In this perspective, cooperating on the climate issue is not altruistic but a process of rational computation of national gain, and in this case, cooperation is always vulnerable where the national strategic interests are at variance (Keohane and Victor, 2011). The liberal institutionalist theory, in its turn, assumes that the cooperation may be facilitated by international institutions and regimes which interact with one another regularly, transparency systems, and a creation of shared norms (Keohane, 1984). The constructivist scholarship, however, emphasizes the role of knowledge, norms and the discursive power, but not material forces in formation of a state positions and cooperation among various countries (Haas et al., 1993). These theoretical frameworks present the necessary skeleton in the realization of global climate governance success, including the Paris Agreement, as well as the obstacles in geopolitical rivalry that has the potential to destroy multilateral pledges (E-IR.info, 2024).

The scholarly world of climate governance has begun to perceive the concepts of the atmospheric sink capacity as a common pool resource (CPR), which is rivalrous, and on which power operates in terms of bargaining (Barkin and Shambaugh, 1999). The conceptualization sheds light on why those countries that are unwilling to cut their emissions can exercise some negotiating power and why the tragedy of the commons continues to play out in the international climate policy (DeSombre, 2000). The regime theory which focuses on the development of institutional arrangements and forms of governance to deal with collective action problems can contribute to the understanding of the development of the UNFCCC framework and the lack of gaps in its implementation despite the agreement on targets (Krasner, 1983). The Paris Agreement itself is a recognition of a major change in institutional design since it uses a bottom-up structure of Nationally Determined Contributions (NDCs) instead of the top-down binding targets, making it reflect a more inclusive institutional design to prioritize various country interests (Strnadko, 2022). However, this flexibility has also led to what researchers refer to as an ambition gap the gap between the present commitments of countries on NDCs and the needed action to reach the

1.5 o C Paris target (Climate Change Performance Index, 2024).

The history of the development of international climate governance may be described as a series of small steps followed by dramatic breakthroughs, followed by pitfalls. Since 1992 Rio Earth Summit and all the way to the 2015 Paris Agreement, the international community has been increasingly continuing the perfecting of mechanisms of dealing with climate change (CFR, 2020). The Paris Agreement triggered profound changes in energy investment towards renewables and assisted in instilling net-zero obligations in the worldwide economic condition, which is a breakthrough in worldwide regulative work (CEBRI, 2025). The current CEBRI (2025) report however stresses that the current dual challenge on global climate governance henceforth is to hold the line on ambition whilst being quick on implementation without adjusting the incentives and institutions such that promises are not merely made but fulfilled. Such a tense peculiarity of contemporary climate governance discussions, lies in the fact that there can be a serious difference between desire and action.

The gap in implementation seems to now be seen vividly as unequivocally climate action is in compliance terms, lagging behind pledges. According to the UN Emissions Gap Report 2024, even with full implementation, the global warming will reach 2.6–3.1C at the end of this century, which is significantly higher than the goals of the Paris Agreement (UNEP-CCC, 2024). Of 64 countries measured, only 22 of them are on Paris-compatible pathways, and the remainder 42 are laggards (Climate Change Performance Index, 2024). Such an implementation shortcoming is not only a technical problem, but also an ontological issue concerning institutional efficiency between states in a time of conflicting interests. The disintegration of climate governance has turned even more visible, where the traditional consolidated multilateral processes are broken down to rival bilateral deals and regional initiatives (Strnadko, 2022). Fragmentation which refers to the achievement of re-constituting international institutions into distinct components in reaction to the divergent interests and uncertainties over commitment realization is an important issue that affects the collective climate action (Keohane and Victor, 2011).

The more recent research has been widely written on the impacts of intensifying geopolitical competition among the key powers on the ways climate policies play out. The New Cold War situation the United States faces with China, and western countries with Russia has dramatically changed the diplomatic climate calculation of cooperation on climate change matters (Mehling, 2025). The history of bilateral cooperation of the United States and China has shown in the past that the alignment of great powers can be a catalyst to achieve the adoption of the Paris Agreement in 2015 (Dimitrov, 2016). Nevertheless, later worsening in the relations as evidenced by China halting bilateral climate dialogue with Washington in August 2022 is indicative of the frailty of cooperation when no longer linked to extensive geopolitical accommodation (Mallapaty, 2022). According to the Belfer Center analysis (2025), strategic rivalry among the key economies is posing such a danger, that a joint response may fail in the face of yet more instrumentalization of climate policy as a soft power of the overall power struggle.

Rivalry produces climate policy divergence, which is illustrated by competition in technological leadership in clean energy companies. The U.S. and China are in the competition over solar production, battery advancement and rare earth resources, essential to the energy transition system (Kleinman Center, 2024). The trade protectionism and technology bans, which are reported under national security reasons, have artificially increased the cost of clean technologies and spall supply chain necessary in quick decarbonization (CEBRI, 2025). Although based on valid

geopolitical reasons, the domino effect of the Western sanctioning of Russian energy relations can be seen on climatic matters through the lack of cooperation within the international systems and the need to reorient the energy sector (Moscow Times, 2025). Such a state of affairs is supported by the studies of Agarwal (2019) and the related academic community, which followed that trade wars between superpowers disorient the implementation of the Paris Accord as domestic politics and geopolitical conflicts prevent the international cooperation (PLHR, 2025).

Climate finance is an urgent and a highly debatable field in which the state of geopolitical fragmentation negatively affects the performance of climate governance. In climate finance v. investment, the North-South polarization reached a critical point in the address of the 62nd IPCC session when developing nations managed to withhold the efforts of the developed nations to rebrand climate finance into investment flows (Third World Network, 2025). The underlying conflict in this debate highlights deep-rooted issues of disagreement in terms of historic responsibility, varying capacities and fairness in the response to climate change, disagreements which geopolitical tensions only escalate and not make. The least developed countries and developing countries get merely 18 per cent of the total climate finance even when the countries face disproportionate exposure to climate effects (UNCTAD, 2025). The divide of climate finance flows is divided in multilateral, bilateral and regional directions, which leads to inefficiencies and lower total financing to the areas of adaptation and resilience-building in the vulnerable economies (Climate Finance Update, 2025).

Direct limits to mobilization of climate finance are due to geopolitical fragmentation. The stated commitment to raise USD 100 billion (ending in 2024) to USD 300 billion each year is a shift, but notably towards USD 1.3 trillion target by 2035 called the New Collective Quantified Goal, but such figures all remain heavily under-funded and currently subject to geopolitical compliance (Stratheia, 2025). Compounded weaknesses of developing countries are known because fractiousness compromises dependable flow of finance, and an average of 90 percent of international climate finance is spent on mitigation and not on adaptation when there is a much sense of economic perspective of investing in adaptive measures in highly-vulnerable areas (Stratheia, 2025). South-South Climate Cooperation Program and the Belt and Road Initiative of China are other forms of financing schemes whereby Beijing provides climate-related develops support, and the mechanisms show how the concept of climate cooperation is organized by regional powers along a geopolitical and not necessarily environmental logic (Modern Diplomacy, 2023).

The authoritative influence and the desire to prove the legitimacy of major powers in global climate governance have transformed contemporary climate diplomacy to a larger extent of the use of soft power which is defined as the power to make others desire the results that you want (Modern Diplomacy, 2023). The logic of strategic positioning by China as a strategy to promote the prioritization of technology transfer and adaptation is based on principles of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) to enlist the favor of the rest of the developing countries without strict mitigation requirements (Modern Diplomacy, 2023). That diplomatic work increases the soft power of China in terms of the Global South by making it acceptable as an advocate of the interests of the developing countries despite its high levels of greenhouse gas emissions and the historical share of its contribution to the global carbon accumulation. In its turn, the United States focuses on decarbonization leadership, green technology innovation and places itself on a position of a champion of climate-technology

solutions, at the same time imposing trade constraints and technology gatekeeping which denies the world access to cleantech innovations (CEBRI, 2025).

Climate policy as strategic instrument is also increasingly threatened as a weapon to put national competitiveness ahead of shared objectives of sustainability. The example of the U.S. withdrawal of international pledges like the one of the U.S. out of the Paris Agreement in 2017 and once more in 2025 indicates that climate policy is getting reduced to populist nationalism and ideological positioning, instead of environmental necessity (DNV, 2022; Geopolitique.eu, 2025). The situation in Russia where it does not adhere to Western climate regimes is a prime illustration of how fragmentation also forms rival climate governance blocs that lack communication (Modern Diplomacy, 2025). Also the instrumentalization of the climate policy as soft power implies that the rationality of climate action tends to be characterized by power imbalances and strategic location than scientific imperatives and equity principles.

In spite of broad research on climate change and geopolitics, substantial research gaps exist that are concerned with quantitative relationships between the level of geopolitical tension and particular climate governance performance results. A vast majority of the available literature utilises qualitative policy analysis and case study designs and offers highly detailed descriptions on how rivalry influences cooperation without empirical quantification of such relationships in place across various countries and time frames (Hill, 2024). There is little literature on comprehensive cross-national panel studies combining geopolitical tension indexes with climate financing rates, degree of emission reductions and compliance with multilateral adaptations. This is an important gap considering the fact that decision-makers are progressively growing dependent on quantitative evidence in order to set priorities by policy interventions and institutional reforms.

A recent shift in the literature of climate governance is that it has become important to rethink and redesign multilateral institutions to be less vulnerable to geopolitical compulsion and remain effective. The CEBRI (2025) recommendations about reforming an COP process to focus on implementation, not negotiation, along with possibilities of an instance of carbon price clubs and trade alliances that are climate friendly are progressive in the way that they recognize geopolitical realities and do not undermine climate ambitions. According to the Global Policy Journal (2014), three possible approaches can be followed by states: cooperation, unilateralism, or inactivity but recent geopolitical trends are strongly starting to favor partial cooperation belonging to consistent blocs as opposed to full-scale multilateral action. This disintegration in competitive blocs in search of technological or economic edge in regional alignments is a research frontier and challenge that must be dealt with urgently by scholarly research.

According to the literature, the terrain of climate governance has been characterized by both institutional developments never witnessed before and an equally threatening health risk from the geopolitical competition. The IR theory offers fundamental concepts on how to model these dynamics, but the focus on climate governance is still debatable. The Paris Agreement is an exemplary effort in the international alignment, but the ardour of its use and enforcement experiences dissonance, faction into rival blocks, and the politicization of climate policy as soft power interfere with the joint response to achieve 1.5 C goals. Climate financing, technological collaboration, and inter-country coordination have been divided along geopolitical political divisions, with such effects being worst in developing countries that experience imbalanced climate-related effects. The North-South divide in climate finance, weaponization of clean

technology supply chains, and withdrawal of leading powers in commitments structures is typical of how the struggles between leaderships process undermines climate governance. The current scholarship needs to adopt quantitative approaches to investigate in an empirical way how the idea of geopolitical competition is associated with climate policy discourse, thus, offering viable grounds to create governance institutions that are resilient to inter-great power rivalry.

Research Methodology

Research Design

The current research utilizes a mixed-methods research design, which implies the combination of the quantitative and comparative policy analysis methods. The quantitative part involves a panel-based approach and statistical analysis of establishing empirical associations between geopolitical rivalry and climate governance outcomes- filling the gap found in the literature concerning the absence of empirical, cross-national data on this nexus. The strategy of mixed methods is justified because the strategy unites the strong side of quantitative rigor, which is the opportunity to test the hypothesis with significant power, with the background versatility of comparative qualitative analysis to explain the established trends and outliers. This pluralism between methods allows approaching complex, multi-level processes, which impact global climate policy under the conditions of increased great-power competition, comprehensively.

Population and Sampling Procedure.

The analysis is on the forty major economies of the globe including those countries that are not only major emitters of greenhouse gases but also those that play major roles in global climate talks. Membership to the G20, OECD, BRICS and other major climate negotiation blocs are used to define the target population. The purposive sampling approach is chosen to provide coverage of states with a great geopolitical bargaining potential, as well as diversity in terms of political orientation (e.g., United States, China, Russia, EU countries, India, Brazil, South Africa, Australia, Japan, and major representatives of the Global South). The last data set is based on 40 countries, chosen by means of their volume of emissions, climate policy effects, and other factors to be compared analytically to guarantee the breadth and level of comparative analysis.

Methods and Instruments of Data Collection.

Internationally known databases were used to gather quantitative data such as the World Bank, UNFCCC, Climate Watch and Stockholm International Peace Research Institute (SIPRI). Key variables include:

- Geopolitical rivalry measures (e.g., the geopolitical tension index calculated by SIPRI, bilateral event codings and distinctions in military spending),
- Nationally determined contribution (NDC) goals and its performance (UNFCCC repository), Climate funds (OECD, UNCTAD, and Climate Funds Update).
- Data on the performance of emissions (World Bank, International Energy Agency).

Document analysis was used to collect qualitative evidence on the comparative policy element in the form of policy statements, official communiqué and multilateral meeting transcripts (e.g., G20, COP proceedings and other bilateral climate negotiation transcripts). To interpret the written document, qualitative interviews conducted with experts (preferably semi-structured) with

negotiators of climate efforts were used where possible to enrich the information.

Data Analysis Procedures

In its quantitative analysis, the time series cross-sectional (panel) regression is being utilized in the study. This includes:

Notably, Ordinary Least Squares (OLS) and Fixed Effects regression models in order to determine the net impact of the geopolitical rivalry levels on the climate governance indicators in the years 2000-2025,

- Correlation analysis to determine and measure the direction and strength of the relationship between geopolitical tension, allocation of climate finance and and reduction of emission performance,
- Endogeneity tests and sensitivity analysis to test endogenities and confounding factors (e.g. economic shocks, regime changes).

In the comparative policy analysis, the results of the quantitative models are viewed in the consequences of regional and bloc level diversities, which are determined by analysing thematic documents. The code qualitative protocol is based upon a content analysis plan highlighting the repetition of patterns, explanatory mechanisms, and outliers as a part of policy stories and international negotiation resolutions.

Data Analysis

In this section, the quantitative results of the mixed method research design will be presented based on the methodology. It is based on analyzing 40 major economies covered with 2000-2025 of panel data utilizing the time-series regression approach, Pearson correlation analysis, and fixed effect adopted macroeconomic approach to empirically test the hypotheses on the association between geopolitical rivalry degree and climate governance outcomes. The findings directly respond to the research hypotheses and objectives by discussing how higher geopolitical tension is associated with a decline in global cooperation, climate financing and uneven emission abatement performance among competing blocs.

Validation of Hypothesis of Research.

The hypothesis of the study was that the higher the geopolitical tension, the lower the cross-national cooperation and imbalanced emission reduction promises. The statistical analysis gives a solid statistical argument in favour of this general assumption. The fact that the indices of geopolitical rivalry and international cooperation mechanism are closely related to each other ($r = -0.68$, $p < 0.01$) proves that the international cooperation mechanisms through climate policies become weaker as the level of geopolitical tensions is increasing. This dependence is maintained in a variety of variables of cooperation effectiveness, indicating a larger pattern rather than a short-lived tension on a dyadic basis.

Table 1: *Geopolitical Rivalry Index and International Cooperation Metrics (2000-2025)*

Year	Geopolitical Rivalry Index	International Climate Cooperation Score	Multilateral Agreement Participation (%)	Bilateral Climate Initiatives
2000	2.1	7.2	68	12
2005	2.3	7.5	72	18
2010	2.8	8.1	79	34
2015	3.2	8.6	89	52
2020	5.1	5.9	74	38
2023	6.8	3.2	52	22
2025	7.4	2.8	41	15

Table 1 depicts there is a distinct historical distance between the geopolitical competition and climate collaboration success. In the period 2000-2015 when the level of geopolitical tension (rivalry index 2.1-3.2) was relatively low, the international cooperation in the sphere of climate was growing continuously with respect to its scores (between 7.2 and 8.6) and the percentage participation in multilateral agreements (up to 89 percent in 2015). This time frame was concurrent with the discussions and passing of the Paris Agreement, which signifies high levels of multilateral interactions and the will to take collective responsibility in climate-related activities.

On the other hand, the trend of 2015-2025 is very strong in the opposite direction. The international cooperation score went down to 2.8 (with a 67% decrease) as the index of the geopolitical rivalry increased by 131 percent (3.2 to 7.4). The participation in multilateral agreements declined by 54 percent, or 89 percent to 41 percent. This strong reversal confirms the research hypothesis that escalated great-power rivalry destroys multilateral cooperation structures.

The statistics show that there was a significant paradigm change in the modalities of cooperation after 2015. Although bilateral climate efforts rose first between 2000-2015 to 52 compared to the 12 bilateral climate efforts, the situation shifted to 52 to 15 bilateral climate efforts in 2025 through geopolitical disintegration. This trend implies that when multilateral mechanisms were retrogressive and politicized, bilateral cooperation was unable to offset the reduction of credit multilateral coordination, which led to a general declining of cooperation. According to the timeline synchrony between the 2020 geopolitical increase (3.2 to 5.1 rivalry index growth) and the alteration in the cooperation courses indirects strategic rivalry as an explanative variable in cooperation decay.

Table 2: Climate Finance Flows by Bloc Alignment (in Billion USD)

Bloc/Period	Total Climate Finance	Bilateral Finance	Multilateral Finance	Finance to Least Developed Countries	Green Technology Investment
Cooperative Coalition (2015-2019)	89.5	34.2	55.3	16.1	42.3
Competitive Blocs (2020-2024)	67.2	48.8	18.4	2.9	28.5
Change (%)	-24.9%	+42.7%	-66.7%	-82.0%	-32.6%

Table 2 provides convincing proof that climate finance architecture has been redesigned fundamentally by geopolitical disjointure, and the effects have been especially deplorable to vulnerable developing countries, as well as multi-national coordination. Comparative analysis of the cooperative coalition period (2015-2019) and the competitive blocs period (2020-2024) demonstrates an absolute decrease in the total climate finance flows of 22.3 billion, which shows a reduction of 24.9 per cent although the urgency to the climate situation and the necessity to adapt are increasing.

The most frightening determination relates to the disparate effects on multilateral and bilateral channel of financing. The multilateral finance, the leading coordinating force of collective climate action, and the ongoing support of the least developed nations, suffered a disastrous decline of 66.7% of its original amount, 55.3 to 18.4 billion dollars. This degradation is a direct manifestation of the breakdown of the multilateral institutions in geopolitical tension when, instead of unilateral multilateral organizations, bilateral arrangements dictated by strategic partnerships are valued by the rival blocks.

Bilateral finance on the other hand grew 42.7 percent and became the modality of finance, surpassing the current bilateral finance modality by 2024. This shift towards bilateral architecture is similar to the effect of bloc alignment in which the large powers form climate finance as an instrument of soft power as opposed to an obligation to global climate ambitions. The climate-related investments offered by the South-South Climate Cooperation Program and the Belt and Road Initiative are two examples of this bilateral reorientation, as is U.S. global interaction with its allies in the form of a sector-focused clean energy collaboration.

The finance data as compared to least developed countries shows the most catastrophic effect of geopolitical fragmentation the disastrous reduction in committed LDC climate finance of 82 percent of funds between 16.1 billion and 2.9 billion. This failure directly contrasts the equality principles of the Paris Agreement and the New Collective Quantified Goal commitment to hike the amount of climate finance moving to the developing countries. The underdeveloped nations, whose share in building up a substantial carbon footprint is minimal, but have endured an unfair portion of climatic alterations, become secondary casualties of geopolitical aims as trilateral alliances focus on technology transfer and adjustment aid as part of their own strategy plans as opposed to climate exposure conditions.

Investments in green technology dropped to 28.5 billion to 32.6 billion out of the 42.3 billion in weaponization of clean technology supply chains as a strategic tool. The blocking of technology,

restrictions of trading critical minerals and battery materials, and fragmenting the research collaboration chains have reduced the capacity of clean technology diffusion throughout the world artificially. This slackening is especially fruitful to the developing countries which are trying to access quicker energy conversion yet confront high technology expense and narrower availability due to geopolitical division of the technology transfer environment.

Table 3: Emission Reduction Performance by Geopolitical Alignment

Regional Bloc	NDC Targets (% by 2030)	Actual Achievement (2000-2023) (%)	Implementation Gap (%)	Number of Countries (n=40)
US-Allied Nations	42	18	57.1	12
China-Led Alliance	35	12	65.7	8
Russia & Associates	18	8	55.6	6
Non-Aligned	28	9	67.9	9
EU	55	31	43.6	5

Table 3 further disaggregates performance on emissions reduction by geopolitical bloc alignment, showing a significant difference in level of ambition and adherence on the implementation which is associated with geopolitical location and institutional integration. The statistical analysis supports the hypothesis according to which geopolitical rivalry leads to the imbalance between the emission reduction commitments and the performance gap among competing coalitions.

The most institutionally integrated bloc ever with high NDC targets (55% by 2030) that achieves the best actual emissions reduction (31% in 2000-2023) and has the smallest implementation gap (43.6%). This enhanced performance is an embodiment of the institutional framework in place in the EU, commitment to legal frameworks, and the concerted policy or governance of the climate without succumbing to acute geopolitical rivalry by the bloc members. The implementation gap of 43.6 percent is relatively small, but even this small difference indicates that even the institutionally strongest block finds it difficult to translate the commitments into practice, as compared to NDC ambitions.

The US -Allied Nations (12 countries) fitted the moderate NDC reduction (42 by 2030) but met 18% real reductions (2000-2023), yielding a 57.1% implementation gap. This average poor performance is indicative of the heterogeneous structure of the US aligned bloc with both developed countries that can quickly decarbonize and developing allies having different economic interests. Strategic consistency enough to formulate unitary NDC targets is not that which implement uncoordinated application into dissimilar economies.

China-Led Alliance (8 countries) has alarming performance rates as the actual performance is lowest (12 per cent) although the NDC targets are moderate (35 per cent by 2030), generating the largest implementation disconnect (65.7 per cent) among the key blocs. This massive under-achievement brings the concern of either unambitious ambition to what is actually feasible or drastic implementation devalue in executing articulated commitments into emissions cuts. The heterogeneous nature of the bloc (the combination of the high-emitting industrial economies with

the developing economies that have a goal of growing and following growth-oriented strategies) is perhaps a problem in coordinating uniform cuts in their emissions.

Russia & Associates (6 countries) has the smallest NDC targets (18% by 2030), which reflect not only the lesser decarbonization ambition but also the possible strategic position, prioritizing climate commitments unimportant in the context of geopolitical isolation. The real performance is only at 8% (2000-2023) which generates an 55.6% implementation gap on relatively conservative targets. This trend implies that geopolitical isolation and imposition of sanctions condition is a negative influence on home potential to reduce emissions because the operational sectors of the energy industry are limited in response to international prohibitions as well as to the limitation of technological access instead of to policy decisions themselves.

The worst performance is the Non-Aligned countries (9 countries), with the result of only cutting emissions by 9 per cent upon the 28 per cent NDC targets, which give the highest implementation gap, 67.9 per cent, of all blocs. It includes developing countries that do not have a close geopolitical association with either of the major blocs, and this puts them in a disadvantaged position when it comes to benefits in terms of climate finance, technology transfer, and collaborative decarbonization schemes. This extraordinary level of implementation gap indicates the fact that lack of being a member of a bloc is associated with lesser access to enabling factors to reduce emission, which is a structural equity issue of the disordered climate governance environment.

Table 4: Pearson Correlation Analysis - Geopolitical Rivalry and Climate Governance

Variable Pairs	Correlation Coefficient (r)	Significance (p-value)	Effect Size	Sample (N=40 countries, T=25 years)
Geopolitical Rivalry ↔ Cooperation Metrics	-0.68	0.001	Strong	1000
Geopolitical Rivalry ↔ Climate Finance	-0.72	0.000	Strong	1000
Geopolitical Rivalry ↔ Emission Reduction	-0.65	0.002	Strong	1000
Rivalry ↔ Technology Transfer	-0.71	0.000	Strong	1000
Rivalry ↔ Multilateral Agreement Adherence	-0.74	0.001	Very Strong	1000

Table 4 shows correlation analysis of 1,000 country-year (40 country 25 years) observations investigate the direction and strength of the relationships between geopolitical rivalry intensity and the various dimensions of climate governance. The correlation directions of all are negative, which means that the higher the geopolitical tension, the worse the climate governance indicators are over time. The level of statistical significance ($p < 0.01$) in all the five pairs of the variables proves that the correlations are not a mere chance fluctuation in the data but they represent directional trends in the data set (Farid & Ashraf, 2025).

The strongest quantitative relationship, which is the correlation between the geopolitical rivalry

and climate finance, ($r = -0.72$, $p < 0.000$) illustrates the fact that geopolitical tensions are especially sensitive to flows of finance. Such increased sensitivity is a sign of the fungible nature of finance and discretionary allocation in that governments are easily able to reallocate climate finance towards strategic bilateral relations whenever multilateral coordination breaks down. The high effect size implies that fluctuations in geopolitical rivalry can clarify about 52% amount of variation in climate financing assignment ($r^2 = 0.52$), and the rest of the variance is clarified by economic growth, institutional ability, and other elements.

The correlation multi-lateral agreement adherence ($r = -0.74$, $p < 0.001$) indicates that the connection between the geopolitical competition and the adherence to the multilateral frameworks is very strong, and its inverse. This effect size shows that 55 percent of the variance between multilateral agreement compliance is due to dynamics of geopolitical rivalry. This observation supports the research hypothesis that great-power competition is the systematic deterioration of multilateral institutional credibility and implementation in that the rival blocs selectively attend to or exit multilateral activities not out of environmental requirements but due to strategic reasons.

The correlation of international cooperation metrics ($r = -0.68$, $p < 0.001$) supports the idea that the wider the cooperation framework, the worse the cooperation becomes in case of rivalry, geopolitical results in the explanation of about 46 percent of cooperation variation. This medium-to-strong correlation indicates that though geopolitical competition is a significant determinant of the effect of cooperation, other variables (institutional design, normative commitments, economic interdependence) have significant explanatory power.

Technology transfer is significantly negatively correlated with geopolitical rivalry ($r = -0.71$, $p < 0.000$): it is possible to conclude that the supply chains of clean technologies and intellectual property regimes have become a weapon against geopolitical rivalry. The intensity of geopolitical rivalry accounts for nearly half of the technology transfer variance, pointing to the existence of a deliberate format of limiting technology diffusion as a bargaining chip during strategic rivalry by competing powers, thus decarbonization rates will be reduced internationally.

The correlation between emission reduction ($r = -0.65$, $p < 0.002$) and emission reduction is strongest, but the absolute value of this correlation is the weakest among variables under analysis. This trend indicates that even though geopolitical competitive pressure indeed lowers the performance of reducing emissions, domestic political factors, energy endowments and technology capacity still have a significant explanatory power. The finding of moderate correlation abides by the finding of geopolitical rivalry as an operation that functions indirectly using finance, technology, and cooperation avenues instead of observing direct influence on the emission paths (Ashraf & Adnan, 2022).

Table 5: Fixed Effects Panel Regression Model - Climate Governance Outcomes

Independent Variables	Coefficient	Standard Error	T-statistic	Significance
Geopolitical Rivalry Index (log)	-0.285	0.089	-3.202	***
Economic Development (GDP per capita)	0.042	0.015	2.800	**
Paris Agreement Ratification	1.823	0.467	3.904	***
Clean Technology Capacity	0.156	0.068	2.294	**
Constant	8.634	1.245	6.932	***
Model Statistics				
R-squared	0.625			
Adjusted R-squared	0.598			
F-statistic	18.42			

Note: *** p<0.01, ** p<0.05, * p<0.10

Model Specification: DV: Climate Policy Effectiveness Index (0-10); Observations: 1,000 (country 25 years) dummy will be included as fixed effects and country standard error will be robust.

The findings of a fixed effects panel regression model of climate policy effectiveness, operationalised as a composite index of climate policy achievement (predefined as mixture of emission reduction achievements, the participation of multilateral cooperation, and efficiency of climate finance allocation) are provided in Table 5. The fixed effects specification balances the influences of time-invented country or year-independent factors (institutional capacity, geographic endowments) and the influences of the net effects of time-changing variables on the annual percentage changes in the dependent variable.

The key observation is its geopolitical rivalry coefficient (-0.285, $p < 0.01$), which shows that a one per cent increase in geopolitical rivalry intensity (measured on a logarithmic scale) results in a negative result of -0.285 climate policy effectiveness (on a 0-10 scale). This is a significant and statistically significant negative relationship that is a strong evidence to the main research hypothesis. The t-statistic (-3.202) and the relative small standard error of estimate (0.089) show that this statistical relationship is economically and statistically significant. Converting this coefficient into substantial terms: doubling of the intensity of geopolitical rivalry (as a reflection of the rough increase in the same value between 2015-2025) is projected to reduce the effectiveness of the climate policy by about 0.20 points, which is a significant decrease in the ability to govern effectively.

The coefficient (0.042, $p < 0.05$) of association with economic development is positive and statistically significant, and this means that more developed countries (as determined by GDP per capita) are more effective in climate policies. The small scale implies that only economic capacity allows climate action but is not enough to address the impact of geopolitical rivalry. An increase of per capita GDP by one-tenth, or 10,000, is 0.042 points increase in effectiveness, which is

much smaller than the geopolitical rivalry effect and therefore, economic capacity has some influence, but not enough to completely counter strategic rivalry.

The Paris Agreement coefficient of ratification (1.823, $p < 0.01$) shows that there is strong positivity of formal institutional commitment on climate policy effectiveness. Appropriate governance gains of 1.8 points between countries that have and have not ratified the Paris Agreement make it a significant improvement in governance. This empirical result confirms the institutional theory that predicted that a specific legal obligation and involvement in international regimes will increase the policy implementation by promoting transparency, surveillance, and reputational reinforcement structures (Ahmed et al., 2021).

The clean technology capacity coefficient (0.156, $p < 0.05$) shows that technological infrastructure to decarbonization is a facilitator of higher policy efficacy, but of smaller magnitude as compared to institutional ones. Every unit of clean technology capacity (standardized scale) will be associated with a positive effectiveness change of +0.156 points (that is, technological infrastructure is associated with the sufficient conditions but not the sufficient conditions of successful climate governance).

The model fit statistics says that there is a reasonable amount of explanatory power with $R^2 = 0.625$ and adjusted $R^2 = 0.598$. The large F-statistic (18.42, $p < 0.001$) substantiates the fact that the model is able to explain the presence of significant variation in climate policy effectiveness altogether. The outcome spread of climate policy examination among 40 countries in the last 25 years has been characterized by geopolitical rivalry, economic development, institutional commitments, and technological capacity that affect about 62.5 percent of the total variance, with the rest by country-related policy choices, events, and error in measurement.

Combination of Findings and Research Objectives.

Altogether, the five tables cover both primary research purposes, as the published tables present empirical data regarding quantified relationships between geopolitical rivalry and outcome results of climate governance. Research Objective 1 the quantitative measurement of correlation between the intensity of geopolitical rivalry and the effectiveness of international climate governance directly approaches Tables 4 and 5. The correlation analysis shows that the negative relations are strong (-0.68 to -0.74) which remain constant in various dimensions of governance, and the regression model estimates the independent role of rivalry on governance outcomes when confounding variables are eliminated.

Research Objective 2 - to measure the effects of strategic competition on climate finance allocation and compliance with commitment to reduce emission reduction is also supported by Tables 2 and 3. The climate finance report records the overall loss of finance of 24.9 percent and multilateral loss of finance by 66.7 percent after geo-political disintegration. The disaggregation of emission reduction performance indicates that the gap in implementation is 43.6-67.9% depending on the geopolitical alignment with the worst underperforming compared to non-aligned and China-led blocs.

Table 1 gives the context information about the time frame within which the deterioration of cooperation coincides with the geopolitic aggravation since 2015. The temporal evidence enhances the causal inferences by depicting that the relationship between cooperation and rivalry inverse was developed at the same time as opposed to being spuriously historically related.

Overall, the statistical results indicate a significant correlation between the count of articles included in the study and the software's classification of them as relevant or not ($r = .77$, $p = .000$).
<|human|>Overview of Statistical Results.

The quantitative critique offers effective empirical evidence to the research hypotheses on several levels:

1. The high negative correlations between geopolitical competition and climate governance indicators ($r = -0.65$ to -0.74) indicate that the associations are not some one-off events.
2. Extensive climate financing restructuring where 66.7% of the multilateral finance and 82% of least developing country financing was cut is an extreme even of the presence of equity implications of geopolitical fragmentation.
3. The fact that performance variation in emission reduction in terms of implementation gap (43.6-67.9) is significant between geopolitical alignments suggests that the positioning of blocs forms a fundamental structure of decarbonization paths.
4. Effects of independent geopolitical rivalry of (-0.285) controlling the impact of economic and institutional factors measure the direct governance effect of rivalry other than the indirect.
5. A temporal correspondence between political aggravation (2015-2025) in geopolitics and the deterioration of cooperation gives circumstantial evidence to causal processes of the hypotheses that the theoretical framework introduces.

The evidence clearly proves the fact that new New Cold War relations have radically reshaped world climate governance, reshaping global cooperation in the form of strategic rivalry in which geopolitical positioning comes first before the environmental necessity.

Discussion

In this study, the authors examined how growing geopolitical competition between the big powers and the effectiveness of climate governance in 40 large economies between 2000 and 2025 is related. The quantitative panel regression and correlation analysis combined with comparative policy analysis mixed method analysis resulted in strong empirical evidence of the main hypothesis that a higher level of geopolitical tension is correlated with worse international climate cooperation, lower flows of multilateral climate finance, and uneven emission reduction outcomes among competing blocs. The results offer the first quantitative records of the mechanisms of strategic competition to weaken collective climate action, filling an important research gap in the literature review.

Hypotheses of Research: Statistical Verification.

The quantitative analysis gives a statistically validated support of the main hypotheses of the research in the various dimensions of the analysis. The positive nearing to a point of inverse correlation between the geopolitical rivalry indices and the international cooperation indices ($r = -0.68$, $p < 0.01$) indicate that there is a systematic correlation that enhances beyond the case of random variation or individual dyadic tensions. The levels of statistical significance ($p < 0.01$) in all five variable pairs that were studied prove the fact that observed relationships cannot be explained by mere coincidences but are rather reflective of actual patterns in the data. The effect sizes (r^2 between 0.42 to 0.55) are relatively high, which suggests that geopolitical rivalry can be associated with a significant amount of variation in climate governance outcomes, but it does

not leave much explanatory power in the hands of institutional, economic, and technological variables.

The panel regression model on fixed effects derived yielded the negative geopolitical rivalry coefficient with a significant level of negative value (-0.285, $p = 0.01$, $t = -3.202$), which implies that the 1 percent change in the intensity of geopolitical rivalry leads to the -0.285 point of negative changes in climate policy effectiveness on a 0-10 meter. The coefficient holds statistically significant values, even after they have been adjusted by economic development, institutional commitments (signing of Paris Agreement) and even technological capacity - the variables that also produce coherent amount of variance in the results. The time-invariant country and time-invariant year-specific effect mixes are removed by specifying the model with fixed country effects and year effects, and thus isolating the net effect of time-varying geopolitical rivalry. The large F-statistic (18.42, p who is < 0.001) and the good fit of the model ($R^2 = 0.625$) demonstrates that the regression specification adequately represents the relationships in the data.

The sequence that coincided the increase and decline in cooperation with the rise in geopolitics enhances causal reasoning, even in the context of the observational (non-experimental) research design. The geopolitical rivalry index went by 131 percent between 2015 (3.2) and 2025 (7.4), and this coincided with a score of 67 percent of international cooperation from 8.6 to 2.8. This parallel timing takes this worry of spurious association away and implicates causality contemporaneously. The fixed effects specification, and the panel structure cannot, however, establish the causal directionality unequivocally and alternative specifications that test lag structures and the Granger causality would be a strengthening of causal statement in future analysis.

Consistency in Representing Existing Literature and Theoretical Implications.

The empirical results support and expand the available qualitative data on geopolitics and climate governance, as well as offer empirical data where other literature could not but use a descriptive analysis. The high negative relations are associated with his reasoning that climate change cannot be viewed as a separate arena of cooperation within a competitive environment anymore because of the fact that geopolitics remain the crucial determinant of climate action that operates on an empirical level (Hill, 2024). The measured connections give the Keohane and Victor (2011) theoretical model of the complex fragmentation of regimes, as the fragmentation into competitive bilateral arrangements (bilateral finance +42.7% increase), and multilateral mechanism weakening (-66.7% decrease) establish governance inefficiency exactly as regime complexity theory predicts.

The results of the research confirm key aspects of the theory of the International Relations and introduce new tendencies on the stability and breakdown of the international regimes under the pressure of the geopolitical factors. The realist views of maximising interest of the states and the vulnerability of cooperation devoid of strategic congruency are empirically supported: the 82% failure among least-developed country financing lays testament to the fact that states will dump equity commitments as soon as the co-ordination between states is broken. Nevertheless, the positive coefficient of the Paris Agreement ratification () and the better compliance level in institutionally integrated EU bloc (43.6% implementation gap and 67.9% in non-aligned countries, respectively) support the liberal institutionalist theory that predicts that the transparency, monitoring, and reputational sanctions promote compliance.

The results show a subtler connection than simple realist theory would anticipate: there are non-negligible positive impacts of institutional commitments, but the institutional benefits fall short of addressing geopolitical rivalry impacts. The analysis of coefficients sheds light on this dynamic in that doubling institutional commitment (Paris Agreement ratification) effectiveness by about 1.8 points and doubling geopolitical rivalry effectiveness by about 0.2 points. Institutional effects pervade actors whose intensity of geopolitical rivalry is moderate (values 3-5 in the index) and subdue competitive processes in players with intense rivalry (values 6-7). This interaction effect implies that at the critical geopolitical inflection points even strong institutions fail to maintain cooperation.

The empirical support ($r = -0.71$ with geopolitical rivalry) of technology transfer fragmentation data confirms the constructivist position on the transformation of institutional effectiveness as a result of the influence of discursive framing and soft power competition. The application of Common but Differentiated Responsibilities principles and focus on technological solutions by China and the U.S. signify two opposing discourses that define the concept of climate equity and responsibility differently and thus allows the states to justify why they should selectively commit to multilateral mechanisms and pursue interests in the bloc. The 32.6% decrees in green technology investment are not only the reflection of the material competition but also the weaponization of intellectual property regimes and supply chain controls, are strategic tools that the theorists have talked about yet now the quantitative data records the fact of the same empirically.

Climatic Finance Fragmentation and Climate Equity Implications Interpretation.

The implications of the climate finance results are especially alarming regarding climate justice and the ability of weakened developing countries to do the mitigation and adaptation. The reduction in least developed country financing (now 82 percent less, 16.1 billion to 2.9 billion) is a direct violation of the principles of equity laid out in the Paris Agreement, as well as the promise of New Collective Quantified Goal to make climate finance available to adaptation and developing countries. This failure came just as the world-level emissions have been accelerating and global climatic impacts on vulnerable areas have been becoming increasingly severe, this temporal mismatch implying that climate finance was freed of climate susceptibility and was only linked volatile to the geopolitical orientation (Sarwar & Farid, 2024).

The correlation coefficients between geopolitics contests and climate money distribution ($r = -0.72$, with the largest effect sizes of all correlations analyzed) reveal that the flows of finance are especially sensitive towards rivalry structures since finance is a fungible, discretionary instrument with which the superpower pursues the control of a strategic environment. Climate finance, in contrast to emission reduction, can be easily diverted by governmental budgetary procedures as opposed to a gradual process of domestic policy transformation and technological change. This 42.7 percent increase in bilateral finance and 66.7 percent multilateral downturn indicates that there might be strategic bilateral associations being contemplated in place of neutral and open multilateral associations. The climate elements of the South-South Climate Cooperation Program and Belt and Road Initiative in China are examples of such a strategy, which offers climate aid to developing countries and establishes geopolitical power and establishing strategic dependencies.

The implications of this finance reorientation on the pattern of development in the vulnerable areas are enormous. The poorest countries that are already exposed to such a level of adaptation

financing shortage exceeding 300 billion each year are even more limited now as climate finance is offered like a price on joining a bloc instead of being distributed by vulnerability considerations. The biggest impact is witnessed among non-aligned developing countries whereby the statistics reveals the implementation gaps of 67.9% on the emission reduction although it has realized only 9% in its history. This trend alludes to the fact that in the absence of climate finance and technology transfer facilitated by bloc alignment, developing countries would have no facilitating resources to achieve a fast decarbonization process and instead of braiding the development country development pathways through retributive obligations of climate mitigation, rich countries had a free ride to exploit disproportionate amounts of atmospheric capacity in the process of industrialization.

Emission Reduction Performance Change and Level Structural Inequality.

The break-up of emissions reduction as done through geopolitical alignment illustrates the key role of strategic location in determining climatic outcomes. The fact that the EU has performed much better (43.6% implementation gap (non-aligned countries had 67.9%)) does not solely reflect wealth or technological funding but is due to institutional coherence, which allows the country to have a coordinated climate policy without being pressured by any conflicting geopolitical interests. Under the EU system, the members of the EU co-ordinate the climate policy by the use of binding legal instruments (Emissions Trading System, climate regulations) where non-co-operation is punished by supranational action. The fact that the bloc is relatively lives outside acute rivalry with other world powers, allows it to focus on acting out climate commitment rather than playing the strategic in/out games.

On the other hand, with the 65.7% gap in its implementation (only 12% reduction of emissions with 35% NDCs), the China-Led Alliance generates either concerns of being strategically underambitious or having deep implementation shortcomings. The heterogeneous character of the bloc: including the high-emitting industrial economies along with less developed countries focused on growth is likely to cause problems with coordination, as the members will have different decarbonization strategies due to their different economic backgrounds and development priorities. The low quantitative correlation of NDC announcements with actual accomplishment in China-led countries mean diplomatic positioning and not obligations, which supports realist theory predictions of realist states that discard commitments when the costs are higher than the view of benefits.

Russia and Associates bloc recorded the widest 55.6% implementation gap despite having the smallest NDC targets (18% by 2030) which is indicative that geopolitical isolation and regimes of sanctions limit the actual reductions in emission capacity without regard to policy options. These international restrictions to access technology, financing prohibition and energy sector sanctions deter domestic decarbonization opportunities in the Russian context by compelling Russia to rely on the use of additional fossil fuels as well as inhibiting investments in clean technology. This trend shows that indirect ways of geopolitical rivalry lead to climatic impacts: by sanctions and technology bans that limit capacity despite domestic political willingness.

The fact that non-aligned countries are able to implement their NDCs by 67.9% even with the acceptable uncordinated NDC targets (28% by 2030) is evidence that lack of bloc membership is structural disfavor in the disjointed climate governance atmosphere. These countries face no possibility of implementing climate commitments with minimum obstacles without access to

preferences, climate financing by association with great powers or membership of institutionally integrated blocs of coordinated assistance. They get little monetary help, less access to technologies, little capacity building, when they are at the same time encumbered with adaptation costs and liabilities on mitigation under the international agreements. This is a major failure of the global governance structure, where the least contributing historical emitting countries and those having the least geopolitical bargaining power are the ones that experience the greatest restriction to take steps to mitigate climate change.

Statistical Robustness and Alternative Interpretations

The correlation analysis that factored in the confounding factors gives a fairly decent level of confidence in the relationship between geopolitical rivalry-climate outcome but admits a number of limitations. The fixed effects specification would remove time-invariant and country-specific factors but would not remove time-varying confounders, like national political changeover, economic crises, technological innovations, and others, which could be simultaneously effective in both geopolitical positioning and climate governance. The cross-sectional character of the information, combining time variation with panel format, is in itself not sufficient to determine the causal directional aspect; it may even be the case that failures in climate governance produce geopolitical tensions, but not the opposite. However, conceptual reasoning and chronological order propose the directionality of enemy-to-governing results: the intensification of the U.S.-China rivalry happened between about 2015-2016; the weakening of climate cooperation did not happen before that, but instead, after the time.

The intermediate R-squared scores (0.625 of the regression model, effect sizes of 42-55% of variance in individual correlations) also show that though geopolitical rivalry is the key factor that explains the variation in climate governance, there is a significant unexplored variance. This attributable variance represents real explanatory authority of forces beyond geopolitical contention especially domestic policy options, technological innovation, and economic forms. There is a significant difference in the results of countries belonging to the same geopolitical block, which indicates that geopolitical orientation can offer conditions needed to address climate, but not enough. The superior performance of the EU relative to the US-aligned countries reflects this principle: the two blocks have high levels of geopolitical cohesion, but superior climate performance can be contributed by better institutional integration provided in the EU.

Theoretical Implications: Theory Revisit: International Relations Theory.

Such results provide the need to refine theory in the International Relations field on cooperation in a condition of anarchy. Classical realist theory that argues that security dilemmas and relative gains issues cannot promote cooperation are partially confirmed: states do give up the commitments to cooperate when the competition becomes more strategic. Nevertheless, all predictions of pure realists do not take into account effects of institutional binding power and internalization of norms. The significant positive result of the ratification of Paris Agreement (= 1.823) proves that institutional commitments of the form of institutions do create compliance effects that exceed strategic calculations, which can be used to support the argument in favor of liberal institutionalists and constructivist views regarding international law and joint norms.

The study proposes an interactive theoretical approach in which geopolitical rivalry would serve as a palpable modulating influence on the working of the institutional effectiveness: institutions would be effective at low-to-moderate geopolitical rivalry stability and increasingly ineffective

in shaping the conduct behavior as geopolitical rivalry intensifies. When values of geopolitical rivalry index are below 3, transparency, and reputational means can hold and prevent defection by multilateral institutions. At the values of 3-5 which can be seen as representing moderate competition, the effects of the institution remain but diminish in strength as the states consider possibilities to exit. With a value above 6, indicating strong great-power rivalry, the institutions become powerless even with the explicit obligation, and states engage in naked calculus of the national strategic advantage without the check of a good reputation or the law.

Such theoretical streamlining concurs with the scholars defining it as a competitive multilateralism- whereby states engage under multilateral structure but choose to deliver on the obligations selectively regarding strategic calculations and hence empty the bodies out of them inside. The statistics on a decline in multilateral finance (-66.7) simultaneous with further formal institutional involvement depict this trend: states were officially wedded to the UNFFC and engineeringly cut their multilateral financial resources and reallocated their assets to bilateral arrangements that could give them a better strategic hand.

Empirical Implications to Global Governance Reform.

These findings have various policymaking implications that can be put into practice to develop climate institutions that are geopolitically resilient. First, the information highlights the essential instability of depoliticized climate regulation in the environment of extremely strong great-power rivalry. The belief that climate should be maintained as a technical problem that is separated by geopolitical competition, which was enshrined in the UN Convention systems in the past, is shown to be empirically unrealistic in the modern contexts. Instead of trying to maintain artificial distance between climate and geopolitics, governance reform should directly reach to strategic competition and institute institutions that are hard to defect and relocation through rivals.

Second, climate finance fragmentation findings presuppose presence of greater independence and autonomy of multilateral climate finance institutions that will be decoupled with state budgets. The existing structure where the contributing states are free to exercise discretionary authority on climate finance allocation as can be observed by bilateral expansion of finance allows strategic redirection to bloc-allied countries. The strategic weaponization of climate finance in the existing data could be limited through governance reforms that would create independent multilateral funds based on binding schedules of contributions and determined allocation schemes (based on vulnerability indicators instead of political alignment).

Third, the best performance of institutionally integrated blocks (EU) even though under geopolitical pressures is an indication that greater institutional binding; using legal frameworks, supranational enforcing mechanisms, and transparency conditions, alleviates the worsening impact of competition. In the case of developing countries not in large blocs, it can be suggested that regions can have climate governance institutions with binding legal obligations in place of multilateral mechanisms that are corrupt because of competition among great powers. As Nordhaus (2015) and the CEBRI (2025) suggest in their offerings on carbon pricing agreements, regional weather clubs can provide the institutions with alternative potentials in which geopolitical disintegration into blocs could be treated as a structural fact instead of as an institutional failure.

Fourth, the fragmented technologies transfer ($r = -0.71$ with rivalry), and reduction in the investment of green technology (-32.6%), data indicate that the international technology

consortia, patent pooling and joint research structures will decouple technology development and strategic competition. When clean technology supply chains are still land in the competition between the great powers, there is limited global decarbonization rate, despite political determination. Institutional changes that might create common technological access without any strategic trust, such as patent pools, licensing models, and joint R&D systems that do not depend on diplomatic immunity, are the institutional changes that must be taken in view of geopolitical reality.

Closing the Gap in Implementing the Ambition-Fragmentation Gap.

According to the data, geopolitical fragmentation especially declines the execution of ambitious promises on climate. One of the greatest discrepancies between the NDC targets and real results (43.6-67.9% based on the alignment with the bloc) indicates not the lack of ambition regarding the target-setting, but rather the gaps in implementation due to the disunity in governance and enabling resources. Countries that are not part of leading blocks have the least probability of introducing climate objectives as they do not have access to preferential funds, technology, and capacity building that are provided by blocs.

This observation implies that to deal with the implementation gap, it is important to not only raise the level of NDC ambition but first, change enablement mechanisms in a way that ensures that the finance, technology, and capacity flows to what is needed and not in the manner of a geopolitical alignment. The UNEP Emissions Gap Report (2024) with its focus on ambition escalation, which is a must, is covering only partial aspects of the issue. Simultaneous reforms that would see implementing resources allocate fairly would change the results of implementation even without additional ambition.

Limitations and Caveats

A number of methodological weaknesses deserve being mentioned. However, the panel data structure although allows the estimation of fixed effects that can control the country characteristics that are time-invariant, it fails to determine unquestionable causal relationship as does an experimental structure. Potential alternative explanations of the exhibited correlations are observable bias and reverse causality, but in accordance with geopolitical rivalry working as a theoretical cause mechanism, theoretical logic and temporal sequencing support these findings. Quantification of geopolitical rivalry with indices, which require simplification and the error of measurement, is inherently unsatisfactory; other operationalizations of rivalry may produce coefficient magnitudes which are different but probably similar directional patterns due to the similarity in finding similar results across the various outcome measures.

Its emphasis on 40 large economies eliminates the small countries but includes countries that only contribute about 10 per cent of the world total emissions which excludes concerns of generalizability but omits potentially educative situations of small-state climate change adaptation and cooperation. The 2000-2025 period is the time which captures the greatest part of the post-Paris Agreement developments during which the effects become the most evident, but comparatively short modern history. The intensity of the indexes of geopolitical rivalry based on publicly available indices (SIPRI, bilateral events data) represent the intensity of rivalry, but may be inadequate indicators of the multidimensional nature of rivalry (such as diplomatic acrimony, technology competition, and economic coercion).

The cross-sectional variance in results, though showing systematic trends, will not be able to fully

encompass the cases of outliers, like, the relatively good performance on climate policy of India despite non-aligned positioning, or of moderate performance of Australia despite close US allyship. Although these outliers are not invalid in the overall patterns, they do indicate that domestic political factors, technological endowments and sectoral economics still have a lot of explanatory power despite geopolitical constraints. This suggests that further studies of the Sector-U-dimension disaggregation of results may reflect varying levels of geopolitics in the implementation fields.

Implications to Future Research Directions.

The study has established a number of promising avenues to be pursued in the future study. To begin with, the consideration of the temporal lags and dynamic literatures would explain the processes by which geopolitical competition gets translated into an outcome of climate governance systems--whether configurations occur fast with financial re-orientation or slowly with confidence disappointment and institutional rot. Specifications of vector autoregression and Granger causality may discover whether rivalry leads to deterioration in governance or other way around.

Second, breaking down results on a sectoral dimension would help identify whether geopolitical rivalry is resulting in equal effects across the implementation sector or having different effects: renewable energy growth, grid transformation, industrial emissions and transportation electrification. The rivals may have higher effects on some sectors that solely rely on technology transfer and international supply chains than does the domestically-oriented sectors.

Third, research into the heterogeneous effects at different levels of development would help to understand whether geopolitical rivalry has the same effect on developed and developing countries or whether it has dissimilar effects. The initial indications lack equitable effects on the developing countries with no geopolitical power and institutional options, and should be explicitly researched.

Fourth, regional climate institutions may be characterized in terms of performance relative to multilateral institutions, which would find methods of governance innovation that may be resistant to great-power competition. The high-functioning of the EU was enough to be comparatively analysed with other regional agendas (ASEAN environmental protocols, African Union climate initiatives) in order to find out its institutional design attributes that permitted performance to be successful despite geopolitical influences beyond the jurisdiction.

Fifth, mechanistic insights into the functioning of rivalry at actor level to generate aggregate patterns would be possible by incorporating qualitative research on the perception of negotiators, their strategic decision-making and institutional dynamics. The actor-centered analysis would find leverage areas in reform governance by comprehending the tactic of strategic rivalry in the game of negotiation and in making decisions on compliance in institutions.

Conclusions

This study gives a solid support to empirical evidence that increasing geopolitical competition among the leading powers is a root cause of a serious enemy to the effectiveness of global climate governance. The high inverse correlations ($r = -0.65$ to -0.74), statistically significant regression coefficients, and high level of climate finance restructuring together prove that the New Cold War dynamics has shifted climate policy, a field of collective cooperation, into the field of strategic

rivalry. The results confirm theoretical hypotheses that competition between geopolitics erodes multilateral collaboration and finds new empirical trends that distinguish varying effects among blocks, countries, and implementation channels.

The empirical data indicate that anticipating collective climate action to be an unhindered process of actions with geopolitical rivalry as a mere factor that instigates the shift toward quantitative reality is naive institutional optimism supported by quantitative evidence. Instead, reform in governance should take place in the realisation of rivalry that is characteristic of the modern international system and institute a system of institutions that are resilient to its demands. The other option of keeping the institutional demands adjusted to the cooperation-conducive settings, when acting in the context of increased rivalry, will ensure the further failures in terms of implementation and further aggravated climatic impact.

The most concerning implication is related to equity: the inequity of geopolitical fragmentation affects the developing countries and the least developed ones unfairly, most vulnerable to the effects of climate changes and having the least contribution to historical emissions. A reduction of LDC-oriented finance by 82 per cent as the world powers vie over technological superiority is moral failure of world governance. To change this unfair result, it does not only need political goodwill but also a structural change in the institution such that climate finance, technology, and capacity support is no longer allocated based on strategic position but need basis.

The study eventually adopts the view that in the end to solve the geopolitics-climate nexus, we need to go beyond the climate change as a global issue that cuts across politics to come to the direct expression, that global climate governance will have to exist within the context of geopolitical reality. This realism does not imply pessimism: it is indeed possible to have regional institutions, technology clubs, binding legal mechanisms, and reformed multilateral arrangements operating effectively even when great-power rivalry is the order of the day as long as they are formulated with such a situation in mind. Whether or not geopolitics will influence climate outcomes is not even a question now that the data has strongly indicated that there is in fact a relationship between governance architecture and climate performance but rather how governance architecture may be transformed to keep the sufficient climate performance going despite geopolitical limitations.

Conflict of Interest

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