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How Does Climate Finance Affect the Ease of Doing Business in Recipient Countries?

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Abstract: Developing countries face a disproportionate degree of threat from climate change. As such, they require and receive significant financial support to address the menace. However, little is known about the potential externalities of this form of external liquidity for the business sector. This paper evaluates the impact of climate finance on the ease of doing business (EODB). On the one hand, climate finance might lead to an improved business environment as the funds facilitate infrastructure provision, technological innovation, and international collaboration for recipient countries. On the other hand, however, the business environment might be negatively impacted by complex new regulations, disruptive technological transitions, market distortions, and resource diversions. Countries receiving climate funds may also introduce new environmental and business regulations, implement new technologies, and divert resources to new programs to justify the receipt of aid or demonstrate a commitment to balancing economic development with environmental objectives. We theorize that given the expected disruptions to business, climate finance should negatively impact the EODB. We also argue that this negative impact will be more severe for resource-rich countries than for their resource-poor peers. Countries rich in natural resources might experience higher disruptions to business operations as they attempt to balance resource-dependent economic operations with environmental objectives mandated by climate finance. Utilizing panel data for 86 recipient countries for the 2002–2021 period, we test our hypotheses using the Generalized Methods of Moments (GMM) technique. The baseline results suggest that climate finance has a weak positive impact on the EODB. However, as argued, resource-dependence heterogeneity analysis reveals that climate finance significantly negatively disrupts the EODB in resource-rich countries. Furthermore, a sectoral comparative analysis shows that while climate finance has a significant positive impact on the growth of the service sector, it significantly slows the growth of the resource sector, affirming the argument that climate finance might attract higher disruptions to resource-dependent business operations. By implication, lowly diversified economies might realize more negative than positive effects of climate finance, and investors should consider providing support to ease the pains of transitioning from resource-intensive growth to clean energy-driven development strategies.

Keywords: climate finance; ease of doing business; resource dependence; heterogeneity analyses

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1. Introduction

Climate finance entails the mobilization of resources via financial flows from industrialized economies to industrializing nations to help address the consequences of climate change (Verkuijl et al., 2019). In 2009, at the 15th Conference of Parties (COP 15) of the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen, industrialized nations pledged to collectively mobilize USD 100 billion a year by 2020 for climate action to developing countries through climate funds, developmental aid, and other private and public financing vehicles (Hedger et al., 2014). The obligation to scale up climate finance was reinforced at the Paris Agreement and at other subsequent Conferences of the Parties (COPs), where industrialized countries have regularly pledged to continue providing funding support to developing countries to fight climate change (Pauw et al., 2022).

In the recent past, initiatives such as the Green Climate Fund (GCF) have been established as vehicles to channel financial resources to developing countries for climate action (Brown et al., 2010). However, there are still drawbacks associated with climate finance in addressing climate change (Bhandary et al., 2021; Zhang et al., 2021). For instance, unintended consequences of climate finance could be detrimental to the business environment of recipient countries in the form of increased economic uncertainty (Zhang et al., 2021). Climate finance is normally conditional on compliance with standards regarding ownership, absorptive capacity, and environmental policy reforms that are meant to draw commitment by the recipient countries to larger global climate objectives, such as net-zero goals (Bracking & Leffel, 2021; Tadadjeu et al., 2023; Islam, 2022). Consequently, while climate finance may offer a solution to sustainable development through funding renewable energy, resilience, ecosystem rehabilitation, and climate-friendly infrastructure (UNFCCC, 2023a), it can also undermine the traditional economic structures in developing countries. This may be due to policy and institutional changes that are required to keep up with the conditions attached to climate finance allocations. The cost of lost opportunities and the need to re-orient new production systems with demand present new challenges to the business community (Jakob et al., 2015; Bowen, 2016).

It is crucial to understand the impacts of climate finance on recipient countries and strategies needed to maximize its benefits, as the 28th Conference of the Parties (COP28) calls for the acceleration of climate finance in order to triple the world's installed renewable energy generation capacity to at least 11,000 GW and double energy efficiency by 2030. It was stressed that climate finance is particularly crucial for scaling up global renewable energy production and reducing fossil fuel usage to achieve decarbonization and net-zero targets. However, as the estimated need for climate finance has constantly exceeded the supply of the same, there are growing demands for climate funds to show impact and connect more closely with the actions in the recipient countries (Bhandary et al., 2021). A clear understanding of the impacts of climate finance can motivate potential investors. For instance, after a period of painful losses for green investors, billionaire Bridgewater founder Ray Dalio has opined that private capital can only realistically finance climate solutions if the returns make sense (Marsh & Bloomberg, 2023, as cited in Kozintseva, 2024). Similarly, speaking at the Business and Philanthropy Forum during COP28, Maria Mendiluce, who is the CEO of the We Mean Business Coalition, noted that the 'certainty and stability' businesses need to affirm their investment and innovation plans will still have to be provided through national plans (Reuters, 2023). This shows the need for research on whether and how climate finance can enhance or hinder development opportunities in recipient countries as policymakers re-orient national development objectives to satisfy the demands of investors. This study directly addresses this need by asking the following: What is the impact of climate finance on the ease of doing business? Climate financing calls

for upgrading some structures that are important for business or opening up opportunities for green technologies. This study argues that strict climate finance conditionalities could be detrimental to the business environment in recipient countries, especially if they involve poorly planned reforms or rigid standards that hinder competitiveness (Annandale & Taplin, 2003; Decker, 2002). There is also potential uncertainty, particularly from the more concentrated funds, in only focusing on environmental goals at the expense of building a broader enabling environment for investments and businesses.

Climate change represents a unique market failure that defies conventional externality frameworks. As Stern (2016) emphasizes in his foundational work, the 'economics of climate change' differ radically from standard pollution problems due to three systemic characteristics: (1) the global scale of impacts that transcend generations, (2) irreversible threshold effects (e.g., ecosystem tipping points), and (3) profound uncertainty in damage functions. This tripartite exceptionalism explains why voluntary mechanisms consistently underdeliver—and why the regulatory conditionality embedded in climate finance (Verkuijl et al., 2019) becomes not just preferable but economically imperative. Indeed, several multilateral institutions confirm that climate finance requires enabling national frameworks to achieve impact. The OECD (2024) found that climate investments underperform by 30–40% without policy reforms, while data from The World Bank (2024) show that regulatory tools like carbon pricing triple private co-investment. These institutional findings validate that COP28 agreements—like all climate finance mechanisms—depend on 'parallel policy accelerators' (UNFCCC, 2023b) to translate commitments into action.

These dynamics bear significant implications for the extent to which developing countries can sustain the growth of the business sector as they shift into climate-resilient development trajectories. The business and investment community remains a crucial stakeholder in the success or otherwise of climate finance initiatives. As explained by Mark Carney, former governor of the Bank of England, the accelerating climate crisis demands urgent financial system reforms, yet the business community remains dangerously exposed to transition uncertainty (BBC News, 2019). As he warned, 'the vast majority of financial assets are mispriced for climate realities', with over 80% of institutional portfolios still being tied to carbon-intensive sectors facing potential stranding (BBC News, 2019). This systemic misalignment creates a paradox: while climate finance flows grow annually, their transformative potential is undermined by inadequate policy frameworks and persistent short-termism in investment decision-making. Our study directly addresses this gap by investigating how climate finance interacts with national business environments—particularly in resource-dependent economies where financial and regulatory systems are most vulnerable to transition shocks. By quantifying these dynamics through the ease of doing business (EODB) lens, we provide empirical evidence to inform the policy interventions Carney deems critical.

Despite the existing literature exploring various determinants of climate finance allocation and its effectiveness in reducing emissions and vulnerability in developing countries and contributing to sustainable growth (Lee et al., 2022; Ameli et al., 2020), there are still limited studies in the literature related to the impacts on the business environment of recipient countries. The limited number of studies that have investigated related variables offer reference points for understanding the processes relating to climate funding and private sector performance. Zhao et al. (2022), for instance, established that higher climate finance per capita counter-intuitively raises yield on sovereign bonds for developing countries due to higher risk perceptions. They credit this to high standards and the reforms required to access climate funds, which negatively affect macroeconomic stability. In an adjacent study, positive productivity effects were reported in specific sectors, including renewable power production in sub-Saharan Africa (Akpalu & Wilson, 2021). However,

gaps still exist in terms of assessing the impact on the business environment. In Kouwenberg and Zheng's (2023) systematic review of the literature on global climate finance, more research is recommended in the context of effectiveness and adverse effects in recipient countries. In response to this call, this paper employs data on the ease of doing business that capture a broader spectrum of the policy environment for entrepreneurship. This makes it easier to measure whether stricter conditions linked to climate funding negatively affect or improve the business climate. In addition, this study also questions whether the impacts of climate finance vary based on the level of natural resource dependence, convinced that the resource sector (extractive industry) will be under significant pressure to transition, as may be required by climate conditionalities, away from fossil fuels (Kling et al., 2021; Tadadjeu et al., 2023). Indeed, countries around the world are increasingly revising their national development plans to incorporate so-called green growth policies (Sarkodie et al., 2023) championed by certain multilateral institutions. Within these policies, decisions regarding the natural resource sector take center stage (Sarkodie et al., 2024) as they affect other elements such as environmental productivity, socio-economic change, and quality of life.

This paper offers the first piece of evidence on the nature of the interaction between the ease of doing business and international climate funding, contingent on the resource dependency level, to elicit how resource-rich countries experience more extreme declines or enhancements in the ease of doing business relative to resource-poor countries. Furthermore, since it is anticipated that climate finance puts more pressure on energy transitions, especially in resource sectors, this study conducts other heterogeneity tests showing the sectoral impacts of climate finance. This offers an understanding of which sectors of the economy experience deteriorating impacts compared to other sectors that are likely to benefit more from climate finance inflows. This is particularly important for targeted policy reforms to maximize the benefits of climate finance for both recipient economies and investors.

Therefore, this work contributes to the growing literature on climate finance and its impact on developing countries in a novel way that has not been considered before, by measuring the relationship between the amount of climate finance and the business environment as defined by the score of the ease of doing business. The study also investigates moderated effects depending on natural resource dependence and the sectors of the economy. The results provide useful information on whether stringent conditions for accessing international climate finance hamper or enhance the broader business conditions and efficiency of enterprises. The conclusions will help policymakers adopt inclusive strategies and policy reforms capable of achieving both climate change goals and business development goals through climate funding instruments. The implications are useful for current discussions on the increase in climate finance obligations based on principles of climate justice and compensations for the unequal bearing of climate burdens by developing countries (Ciplet et al., 2022).

The remaining part of this study is organized as follows: Section 2 discusses the extant literature and develops testable hypotheses relating to climate finance. Section 3 outlines the panel data and econometric method used to test the hypotheses developed in Section 2. Section 4 provides the results and discussions, and Section 5 concludes with the policy implications of the study.

2. Literature Review and Hypothesis Development

Similar to the political economy literature on the relationship between foreign aid and domestic institutions (Acheampong & Taden, 2024), climate finance represents an external form of liquidity that has significant bearings on the decision-making calculus of domestic policymakers. Climate finance comes with environmental regulations necessary to make the needed impacts in safeguarding our planet by attaining energy transition from fossil fuel to renewable energy. On the one hand, regulations might stimulate innovation and performance (Porter & Van der Linde, 1995), thereby improving business and industry. Climate finance may also enhance technologies and infrastructure that promote quality service delivery and boost firm productivity (Kerr et al., 2016; Steckel et al., 2017). Consequently, some or all regulatory compliance costs may be offset by innovations induced by environmental regulations.

However, on the other hand, as argued by regulatory burden theorists, the stringency of climate funding conditionalities may harm business environments (Meyer & Roser, 2012). For instance, Meyer and Roser (2012) note that environmental regulations lead to higher firm costs. Likewise, compliance reduces returns and discourages future investments (Altman, 2001). In this regard, climate finance regulatory conditionalities that require a commitment to climate targets can extend bureaucracy and disrupt competitiveness in the business sector (Decker, 2002; Annandale & Taplin, 2003). Backing this assertion, Parker and Hartley (2003) and Levie and Autio (2011) also note that stringent regulations reduce efficiency. Furthermore, regulatory reforms which undermine traditional capital development can be detrimental to private-sector business development (Müller, 2015). Furthermore, the institutional capacity to absorb such regulatory shocks varies across economies. Acemoglu and Robinson (2012) emphasize that institutional resilience—the ability to adapt to external pressures—determines long-term economic performance. Resource-dependent countries, however, often exhibit weaker resilience due to the 'resource curse' (Sachs & Warner, 1995), where natural resource wealth crowds out diversification and entrenches rent-seeking behaviors (Taden, 2021). Climate finance conditionalities may exacerbate these vulnerabilities by disrupting entrenched economic structures without providing transitional support for affected sectors.

As creative destruction theories also propose, the forced use of unfamiliar technologies generates market friction (Schumpeter, 1994). These disruptions align with North's (1991) theory of institutional change, where external pressures (e.g., climate finance conditionalities) destabilize existing 'rules of the game'. In resource-rich contexts, elites reliant on extractive industries may resist reforms, creating institutional friction that heightens transaction costs for businesses. Conversely, diversified economies with adaptive institutions can reallocate resources more smoothly, mitigating negative impacts on the ease of doing business. This means that disruptions occur, especially when regulations push developing countries to change systems to adapt to the new normal (Lovio et al., 2011). These disruptions reflect what Stern (2016) characterizes as the unique 'market failure of climate change'—where standard externality frameworks underestimate systemic risks. While Schumpeterian creative destruction explains technological transitions, climate finance operates in a context where even major investment funds face existential threats if mitigation accelerates (Carney, 2019). This financial systemic risk is exemplified by the potential stranded assets in fossil fuel portfolios.

Some firms may not have the capabilities and support systems required for new technologies, while others, such as small informal sector businesses, may have no motivation to innovate. This is also true for opportunity cost arguments, where countries reallocate resources to access climate finance, leaving the traditional development sectors to suffer, even if some might benefit (Figge & Hahn, 2012). That is, on the one hand, service in-

dustries may benefit more from the innovation opportunities created by climate funding (Lee et al., 2022). Manufacturing might also benefit from renewables, efficiency gains, and trading opportunities that would push for the export of clean technologies to meet new standards of emissions toward net-zero targets (Wang & Wang, 2022). However, on the other hand, the conditionalities for the receipt of aid might involve abandoning certain types of operations in the natural resource sector that are deemed environmentally destructive. This results in costly stranded assets, which impede the ease of doing business. The opportunity cost concept also implies that climate funding redirects policy focus and budgetary resources from the oil, gas, and mineral industries toward new innovative and climate-friendly initiatives such as afforestation, renewable power, and adaptation projects (Figge & Hahn, 2012; Grainger, 2020). State-owned hydrocarbon firms also receive lower subsidies and preferential credit, with green objectives receiving higher attention (Hong et al., 2021). As a result, efficiency in the resource sector decreases. Also, as nations shift their focus to obtaining international climate financing, the extractive industry's political backing weakens, leading to increased transitional costs for the resource sector on the basis of established creative destruction (Lovio et al., 2011). Other factors, such as the upgrading of drilling tools used in oil exploration and mining as well as advanced mining technology and transport systems, are relatively more expensive and present a greater challenge in terms of the initial capital requirements. Various operating costs, such as the costs of retraining workers and providing compensations for job losses in coal and oil, also impose high costs on resource sector activities. These pressures can deepen the decline of productivity and worsen business conditions in the resource sector. Additionally, climate funding reforms stress the reduction in emissions and discourage the use of fossil fuels (De Nevers, 2011). Policies such as carbon taxes, cap-and-trade schemes, and regulations that phase out hydrocarbon subsidies are also found in policy conditionalities of climate finance (Zhang et al., 2021). These regulatory requirements directly increase the cost of production for miners, drillers, and other resource-intensive businesses, which decreases their international competitiveness. Large-scale projects are particularly adversely affected by declining margins and foreign investment in the extractive industry compared to other industries.

Furthermore, subsidy impact theories also propose that climate incentives and preferential tax treatments will lead to the promotion of renewables over fossils (Zhang et al., 2021). However, such programs, if imposed in a hurry, can distort the market (Wang & Wang, 2022). Subsidies also lead to disparities between young, small green firms and large firms (Gliedt & Parker, 2007). Therefore, funding fosters unequal competition transitions that hinder the development of the business environment. Climate funding also comes with high transition costs in addition to creative destruction pressures due to changing systems and infrastructure (Bowen, 2016; Ma et al., 2024). These transitions often trigger social resistance—when environmental enforcement displaces informal workers or restricts community land access, protests may erupt (Bracking & Leffel, 2021). Such conflicts are particularly acute in resource-rich countries where governance gaps persist. For instance, corruption in climate fund allocation (as measured by the Corruption Perceptions Index) may divert resources from intended beneficiaries, exacerbating business uncertainty (Kling et al., 2021). New skill requirements lead to higher retraining expenses. Firms incur the cost of decommissioning, while governments subsidize displaced employees. The additional burdens would pose specific challenges to already cash-strapped developing countries in their efforts to fund core services (Halonen et al., 2017). Therefore, climate transitions are likely to undermine fiscal capacities for direct business support.

In general, it is proven that climate funding compliance erodes competitiveness. However, these dynamics depend on sectoral differences (Kouwenberg & Zheng, 2023). In a similar way, Marshall (2023a) argues that as climate funding increasingly drives the transition from fossil fuels to renewables, pressures will be higher for the extractive and carbon-intensive sectors. Climate policy transitions, for instance, put more extreme pressure on fossil fuel industries (resource sectors), suggesting that resource-dependent countries would experience more adverse impacts on the ease of doing business than more diversified economies.

To date, the business implications of climate finance are under-researched, yet a few studies have provided suggestions. For instance, Zhao et al. (2022) document that climate finance significantly aggravates economic uncertainty for recipient countries. At the sector level, Akpalu and Wilson (2021) also report that the funds improve the productivity of renewables in Africa. However, there are no assessments regarding the ease of doing business globally in the overall or general sense. This analysis is useful for policy discourse on scaling up climate finance commitments.

Substantively, the complex interplay between climate finance mechanisms and institutional dynamics requires examination through multiple theoretical lenses. Building on North's (1991) institutional change theory and Sachs and Warner's (1995) resource curse framework, we identify three interconnected pathways through which climate finance transforms business environments, especially in resource-dependent economies. First, the efficiency of policy implementation suffers when climate conditionalities challenge entrenched extractive-sector interests, creating implementation gaps particularly evident in oil-dependent states' slow adoption of carbon taxes (Tadadjeu et al., 2023). Second, interest group dynamics emerge as fossil fuel lobbies resist subsidy redistribution to renewables, producing political economy bottlenecks that stall reforms (Marshall, 2023b). Third, technological lock-ins from path-dependent infrastructure investments—such as oil pipelines and refineries—generate institutional rigidities that amplify transition costs (Lovio et al., 2011). These mechanisms collectively explain why resource-rich economies experience climate finance as disruptive: their institutions face simultaneous pressures from external conditionalities and internal resistance to change.

Taking inspiration from the above-discussed theoretical underpinnings and motivated by related empirical pieces of evidence expounded, this study proposes the following hypotheses:

Hypothesis 1: *Climate finance has negative effects on the ease of doing business, with all things being equal.*

Hypothesis 2: *The negative effect of climate finance on the ease of doing business is more pronounced for resource-rich countries than resource-poor countries.*

3. Data and Methodology

The data on climate finance, the primary explanatory variable, is sourced from the OECD. These data contain information regarding the various donors of climate finance, including bilateral and multilateral donors. It also includes information on the recipients of climate finance. Climate finance in this context is defined as the element of development finance that directly supports or promotes adaptation and/or mitigation objectives. It is calibrated as a quantitative measure expressed in United States dollars.

The primary dependent variable is the ease of doing business score sourced from the World Bank's World Development Indicators (WDIs). The variable is calculated as the sum of a country's scores on ten indicators germane to the regulatory best practices of the business environment. These best practices include starting a business, registering property, obtaining electricity, dealing with construction permits, trading across borders,

enforcing contracts, obtaining credit, protecting minority investors, paying taxes, and resolving insolvency. An economy's score is measured on a scale ranging from 0 to 100, with 0 denoting the poorest regulatory performance and 100 representing the highest.

The data for the control variables, such as debt service, population density, inflation, trade openness, personal remittances, foreign direct investment (FDI), GDP per capita, natural resource rent, and educational attainment, were also sourced from the WDIs. Educational attainment is represented by the share of the population with at least upper secondary education.

The data about additional control variables, such as government effectiveness as well as political stability and the absence of violence/terrorism, were sourced from the World Bank's Worldwide Governance Indicators (WGIs). These sets of control variables are country-level factors deemed by the extant literature as capable of influencing the perception of economic uncertainty or ease of conducting business (Zhao et al., 2022). Table 1 contains descriptive statistics for our final set of variables for the study.

Table 1. Descriptive statistics including a row for climate finance per GDP.

Variable	Observation	Mean	SD	Min	Max
Climate finance (% of GDP) (log)	1257	0.129	0.0994	−0.290	0.290
Ease of doing business score	17,024	4.243	15.89	0	87.17
Trade (% of GDP)	10,978	73.10	50.98	0.0210	863.2
Inflation, consumer prices (annual %)	10,998	19.87	288.6	−17.64	23,773
Political stability and absence of violence/terrorism, estimate	4717	−0.0164	1.001	−3.313	1.964
Government effectiveness, estimate	4660	−0.0126	0.996	−2.440	2.470
GDP per capita (log)	8176	9.311	1.166	6.221	12.07
Population density (log)	14,901	3.971	1.598	−2.316	9.980
FDI (log)	10,266	0.346	1.670	−14.98	7.444
Personal remittances (% of GDP)	9117	3.682	9.277	0	235.9
Completed upper secondary (% of population)	2029	50.88	26.06	0	97.40
Resource rent (per GDP)	11,703	6.935	10.34	0	88.59

Note: Mean denotes the arithmetic mean of the variables, SD stands for standard deviation, and Min and Max represent the minimum and maximum, respectively.

Using these variables, we constructed a model as follows:

$$EODB_{it} = \alpha + \beta_1 EODB_{i(t-1)} + \beta_2 CF/GDP_{it} + \beta_3 Controls_{it} + \delta_i + \varphi_t + u_{it}$$

where i and t denote the recipient country and year vectors, respectively. The terms δ and φ denote country and time fixed effects, while u denotes the error term. The abbreviation EDB represents the ease of doing business, while CF represents climate finance.

For our first hypothesis, we argue that climate finance would have negative effects on the ease of doing business, with all things being equal.

For our second hypothesis, we also argue that the negative effect of climate finance on the ease of doing business would be more pronounced for resource-rich countries as they would experience larger hits to their economic operations. Building on Sachs and Warner's (1995) resource curse thesis and North's (1991) institutional change framework, we argue that resource-rich countries face compounded institutional rigidities when adapting to climate finance conditionalities. Their economies' reliance on extractive sectors (Taden, 2021) creates path dependencies, making regulatory transitions costlier and politically contentious. Thus, the negative effect of climate finance on the EODB should be stronger in resource-rich contexts (H2). Thus, for this hypothesis, we implement our model on two separate samples, one consisting of countries that generate minimal revenues (under 12% of GDP) from natural resource rents and the other consisting of countries that generate substantial levels of revenues from natural resource rents (over 12% of GDP).

Countries whose natural resource rents account for more than 10% of their GDP can be considered resource-dependent, and while some studies have relied on thresholds as low as 10%, others have settled on thresholds as high as 35% (Sarkodie et al., 2023, 2024).

The data include 86 recipient countries and 16 different categories of major multilateral donors over a period of 20 years (2002 to 2021 inclusive), yielding an unbalanced total unit count of 27,520. The donors include DAC, Non-DAC, OECD, and the following multilateral institutions: the World Bank, AfDB, AsDB, CABEI, CAF, CEB, AIIB, CAF, CEB, EBRD, EIB, IDB, and IsDB (full names are shown in Abbreviations). Our models are employed as an unbalanced panel since some countries started receiving climate finance before others. We employ Generalized Methods of Moments (GMM) analyses to test our hypothesis while including fixed effects equations as robustness tests. We employ the Generalized Method of Moments (GMM) technique because our panel data structure (86 countries over 20 years) raises potential concerns of endogeneity, autocorrelation, and unobserved country-specific heterogeneity—especially in the presence of lagged dependent variables. The system GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998) is particularly well suited for such dynamic panels with relatively small time dimensions and large cross-sections. It allows us to use internal instruments to correct for simultaneity bias and omitted variable bias, which are key concerns in analyzing the effects of climate finance on economic outcomes.

We also opted for the fixed effects (FE) model for robustness testing because it allows for the control of unobserved, time-invariant heterogeneity across countries. To determine the suitability of FE over Random Effects (RE), we conducted a Hausman test. The result ($\chi^2(4) = 17.51$, $p = 0.0015$) strongly rejects the null hypothesis that the RE estimator is consistent. This indicates that unobserved country characteristics are correlated with the regressors, validating the use of the FE estimator in this context.

4. Results and Discussions

4.1. Benchmark Results—Impacts of Climate Finance on Ease of Doing Business

We display both the main and robustness test results for the two hypotheses in Tables 2 and 3.

We hypothesized that climate finance would have a negative effect on the ease of doing business, with all things being equal. However, as displayed in Table 2, the opposite result is obtained. We discover that a percentage point increase in the amount of climate finance as a share of the GDP leads to A 25.93-point increase in the ease of doing business score. However, this result is only statistically significant at the 90% confidence level ($p < 0.10$). Indeed, the robustness results from the fixed effects equation fail to corroborate this outcome, implying that the positive effect of climate finance on the ease of doing business is tenuous and only pertains under specific circumstances. Nonetheless, the result fails to affirm our first hypothesis that climate finance would negatively affect the ease of doing business. This outcome also fails to corroborate those in some extant studies such as that by Zhao et al. (2022).

For our second hypothesis, we hypothesized that countries that are considered resource-dependent—which earn a significant share of national income from natural resources—will experience a more severe negative impact of climate finance on their ease of doing business. Based on Table 3, this hypothesis is affirmed. A percentage point increase in the share of climate finance per GDP leads to a drop of 99.42 points in the ease of doing business score for resource-dependent countries, and this is significant at the 95% confidence level. This aligns with resource curse predictions: countries with >12% natural resource rents exhibit institutional rigidities that amplify transition costs. For example, oil-dependent states like Nigeria and Angola show a slower adoption of climate policies

due to fossil fuel lobbying (Tadadjeu et al., 2023), while diversified economies (e.g., Kenya) adapt climate policies faster via service sector growth. However, for resource-poor (or non-resource-dependent) countries, a point increase in the share of climate finance per GDP leads to an increase of 42.31 points in the ease of doing business score. This result is also significant at the 99% confidence level. This contrast between the resource-rich and resource-poor samples is further sustained when the hypothesis is tested using fixed effect equations. Particularly, we see that the positive effect of climate finance on resource-poor countries is not replicated for their resource-rich peers, indicating that the level of one's natural resource wealth dictates whether climate finance enhances or disrupts the business sector. Nevertheless, it is important to mention that the stark contrast between resource-rich and resource-poor countries may reflect deeper development divides. The negative coefficients for high-rent economies mirror patterns seen in other undiversified contexts (e.g., small island states dependent on tourism; see Thomas et al., 2020), suggesting that climate finance disruptions might correlate with structural economic vulnerability rather than resources per se.

Table 2. Analysis of climate finance and ease of doing business.

	Ease of Doing Business	**Ease of Doing Business**
	GMM	**FE**
L.Ease of doing business (score)	0.61 ***	0.56 ***
	(0.02)	(0.03)
Climate finance (% of GDP)	25.93 *	34.85
	(13.31)	(22.20)
FDI (log)	3.53 *	6.76 **
	(1.85)	(3.13)
Inflation (%)	−0.01	−0.04
	(0.03)	(0.03)
Trade (% of GDP)	0.03	−0.05
	(0.05)	(0.16)
Personal remittances (% of GDP)	−0.38	−1.20
	(0.23)	(0.92)
Total debt service (% of GNI)	0.05	0.47 ***
	(0.10)	(0.16)
GDP per capita ppp (log)	3.52	67.54 ***
	(2.31)	(18.22)
Population density	2.67 *	−61.81 *
	(1.45)	(34.70)
Completed upper secondary (% of population)	0.07	−0.18
	(0.06)	(0.16)
Political stability and absence of violence (est)	2.21	7.13
	(2.90)	(6.20)
Government effectiveness (est)	−11.31 ***	−28.19 ***
	(4.10)	(10.48)
Constant	−43.01 **	−336.83 ***
	(21.69)	(124.73)
Observations	1257	1257
Countries	86	86
Instruments	42	
AR(2) *p*-value	0.311	
Hansen test *p*-value	0.278	

Note: Standard errors are shown in parentheses, and * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$ represent statistical significance level at 10%, 5%, and 1%, respectively.

Table 3. Analysis of climate finance and ease of doing business by level of resource wealth.

	GMM		Fixed Effects	
	Resource Rich	**Resource Poor**	**Resource Rich**	**Resource Poor**
L.Ease of doing business (score)	0.90 ***	0.58 ***	0.72 ***	0.53 ***
	(0.22)	(0.03)	(0.19)	(0.03)
Climate finance (% of GDP)	−99.42 **	42.31 ***	−52.53	51.79 **
	(39.42)	(16.05)	(56.13)	(23.59)
FDI (log)	4.56	3.47 *	−0.92	9.24 ***
	(4.09)	(1.79)	(4.86)	(3.38)
Inflation (%)	0.74	−0.01	0.16	−0.03
	(0.83)	(0.02)	(0.50)	(0.04)
Trade (% of GDP)	−0.01	0.06	−0.30	0.07
	(0.13)	(0.06)	(0.27)	(0.22)
Personal remittances (% of GDP)	−2.08	−0.36 *	−7.43	−0.97
	(3.96)	(0.20)	(6.99)	(0.95)
Total debt service (% of GNI)	0.29	0.27	0.39 *	0.32
	(0.36)	(0.19)	(0.22)	(0.48)
GDP per capita ppp (log)	12.98	4.54	77.51	79.20 ***
	(13.68)	(2.78)	(85.27)	(21.09)
Population density	3.77	0.56	5.24	−92.07 **
	(6.61)	(1.58)	(63.48)	(45.33)
Completed upper secondary (% of population)	0.16	0.03	0.28	−0.32 *
	(0.36)	(0.07)	(0.42)	(0.18)
Political stability and absence of violence (est)	6.36	1.52	20.42	10.93
	(9.92)	(2.31)	(28.98)	(7.95)
Government effectiveness (est)	−48.87 *	−11.66 ***	18.99	−33.07 ***
	(26.46)	(4.21)	(49.75)	(10.93)
Constant	−153.19	−45.74	−627.57	−312.87 *
	(127.82)	(28.33)	(659.06)	(157.07)
Observations	426	831	426	831
Countries	31	55	31	55
Instruments	17	25		
AR(2) *p*-value	0.221	0.368		
Hansen test *p*-value	0.194	0.291		

Note: Standard errors are shown in parentheses, and * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$ represent statistical significance level at 10%, 5%, and 1%, respectively.

4.2. Further Robustness: Heterogeneity Analyses of Sectoral Impacts

We conducted further robustness tests by disaggregating the impact of climate finance according to economic sectors. Our objective was to ascertain what sectors of the economy benefit or suffer from the inflow of climate funds. Understanding how climate finance affects the various sectors will deepen our understanding of the channels through which the funds affect the ease of doing business and the entire economy.

Since we expect that climate finance will negatively disrupt resource-rich countries more significantly, we argue and expect that climate finance will more negatively affect the resource sector than other sectors of the economy. Accordingly, we separately tested the impact of climate finance on the service, industry, manufacturing, and resource sectors. Table 4 displays the results of the tests by sector for Hypothesis 1, while Table 5 displays the results for the tests by sector for Hypothesis 2.

Table 4 shows that while climate finance enhances the growth of the service sector, it impedes the growth of the resource sector. However, while the impacts on industry and manufacturing are negative, these are statistically insignificant. This outcome affirms our argument that resource-dependent countries will experience more severe negative effects of climate finance than their resource-poor peers. Beyond that, the result, indeed, indicates that countries whose economies are driven by service operations are more positioned to benefit from climate finance than others. The relationship between climate finance and

service growth should not be a surprise, however. Extant studies show that climate finance might inspire technological innovations that discourage the destruction of the environment in favor of service-based business activities (Kerr et al., 2016; Steckel et al., 2017).

Table 4. Analysis of climate finance and ease of doing business by sector.

	(1) Service	(2) Industry	(3) Manufacturing	(4) Resources
Climate finance (% of GDP)	4.23 ***	−5.28	−3.71	−4.47 **
	(1.29)	(4.90)	(5.31)	(2.07)
FDI (log)	−0.29	0.69	0.97 *	−0.05
	(0.18)	(0.57)	(0.56)	(0.28)
Inflation (%)	−0.02 ***	−0.04 ***	−0.05 ***	0.01
	(0.00)	(0.01)	(0.01)	(0.01)
Trade (% of GDP)	−0.01	0.09 *	0.13 ***	0.08 **
	(0.01)	(0.05)	(0.04)	(0.03)
Personal remittances (% of GDP)	−0.00	−0.16	−0.49 **	0.03
	(0.04)	(0.14)	(0.22)	(0.04)
Total debt service (% of GNI)	−0.02 *	−0.06	0.03	−0.04
	(0.01)	(0.03)	(0.04)	(0.03)
GDP per capita ppp (log)	1.06	2.94	−0.84	−1.77
	(1.10)	(4.15)	(4.51)	(2.01)
Population density	−6.76 ***	−9.07	2.96	6.18
	(2.36)	(7.95)	(7.78)	(5.37)
Completed upper secondary (% of population)	−0.00	0.04	−0.05	0.02
	(0.01)	(0.04)	(0.04)	(0.02)
Political stability and absence of violence (est)	0.31	0.22	1.09	0.23
	(0.38)	(1.49)	(1.29)	(0.59)
Government effectiveness (est)	−1.67 ***	−1.24	1.57	−0.19
	(0.49)	(2.58)	(2.45)	(0.97)
L.Services, value added (% of GDP)	0.67 ***			
	(0.05)			
L.Industry (including construction), value added (annual % growth)		−0.19 **		
		(0.07)		
L.Manufacturing, value added (annual % growth)			−0.18 ***	
			(0.05)	
L.Total natural resource rents (% of GDP)				0.49 ***
				(0.09)
Constant	37.03 ***	10.40	−4.37	−13.52
	(9.27)	(31.92)	(34.03)	(13.73)
Observations	960	945	915	872
Countries	86	86	86	86
Instruments	41	43	45	39
AR(2) *p*-value	0.266	0.183	0.209	0.392
Hansen test *p*-value	0.241	0.188	0.301	0.276

Note: Standard errors are shown in parentheses, and * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$ represent statistical significance level at 10%, 5%, and 1%, respectively.

We tested the impact of climate finance on the various sectors of the economy for both resource-rich and resource-poor countries. The results in Table 5 show that the impact of climate finance on the service sector is positive for both resource-rich and resource-poor countries, indicating that even as climate finance is shown to negatively affect resource-rich countries, the service sector will always benefit regardless of the resource wealth of the country.

Table 5. Analysis of climate finance and ease of doing business by economic sector in resource-rich versus resource-poor countries.

	(1)	(2)	(3)	(4)
	Service		Industry	
	Rich	Poor	Rich	Poor
Climate finance (% of GDP)	10.34 ***	3.74 ***	−23.86 **	−5.92
	(3.37)	(1.13)	(11.02)	(5.49)
FDI (log)	−0.91	−0.26 **	0.02	0.65
	(0.56)	(0.13)	(0.79)	(0.68)
Inflation (%)	−0.10 *	−0.02 ***	0.04	−0.04 ***
	(0.05)	(0.00)	(0.22)	(0.01)
Trade (% of GDP)	0.01	0.01	−0.13	0.11 **
	(0.04)	(0.01)	(0.11)	(0.05)
Personal remittances (% of GDP)	−0.12	−0.01	−0.12	−0.16
	(0.41)	(0.04)	(0.90)	(0.15)
Total debt service (% of GNI)	−0.02 *	−0.03	0.06	−0.02
	(0.01)	(0.02)	(0.04)	(0.10)
GDP per capita ppp (log)	−17.63 ***	1.88 *	8.02	1.81
	(6.12)	(1.02)	(27.06)	(4.48)
Population density	−5.24 *	−6.73 **	−5.84	−6.95
	(3.02)	(2.61)	(11.85)	(8.57)
Completed upper secondary (% of population)	0.02	0.00	0.03	0.05
	(0.02)	(0.02)	(0.03)	(0.05)
Political stability and absence of violence (est)	0.76	0.25	12.65 **	−0.92
	(1.76)	(0.48)	(5.43)	(1.63)
Government effectiveness (est)	6.42 ***	−1.77 ***	−15.62	0.45
	(2.02)	(0.50)	(11.12)	(2.86)
L.Service	0.53 ***	0.62 ***		
	(0.10)	(0.06)		
L.Industry			0.09	−0.22 ***
			(0.18)	(0.08)
Constant	196.45 ***	31.78 ***	−37.41	10.11
	(46.55)	(10.47)	(240.03)	(36.90)
Observations	426	534	426	519
Countries	31	55	31	55
Instruments	17	25	17	25
AR(2) *p*-value	0.174	0.336	0.268	0.349
Hansen test *p*-value	0.221	0.248	0.196	0.284

Note: Standard errors are shown in parentheses, and * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$ represent statistical significance level at 10%, 5%, and 1%, respectively.

The results also show that the impact of climate finance on industry is negative for resource-rich countries but insignificant for resource-poor countries. As the industry and construction sector is associated with the destruction of nature as well as the intensive utilization of energy for operation, it is no surprise that climate finance depresses its growth.

Finally, we also discovered that the impact of climate finance on the manufacturing sector is negative for resource-rich countries but insignificant for resource-poor countries. By interpretation, manufacturing operations in resource-rich countries face negative disruptions with the inflow of climate finance. Furthermore, as expected, the results show that the impact of climate finance on the resource sector in resource-rich countries is negative. While the impact on the resource sector of resource-poor countries is also negative, this outcome is insignificant. Mandatory ecological restoration costs—a common climate finance conditionality—impose disproportionate burdens on resource sectors. Mining and drilling

projects face steep reclamation costs (Grainger, 2020), which depress profitability and deter investment. This explains the significant negative coefficient for the resources shown in Table 4.

5. Conclusions, Practical Policy Implications, and Recommendations

5.1. Conclusions

This study assessed the effects of climate finance on the ease of doing business in recipient nations. In contrast to the first hypothesis, the findings reveal that climate finance had a positive but weak association with the overall ease of doing business. However, with a comparative analysis of the results between resource-rich and resource-poor countries, climate finance was found to have a negative and significant effect on the ease of doing business in resource-rich countries.

Additional sectoral breakdowns showed insightful intricate results. The service sector gains from climate finance regardless of the country's resource dependence, whereas the resource sectors suffer disruption, especially in resource-dependent countries. The findings also point to a decline in the ease of doing business in industry and the manufacturing sector as climate funding increases. This implies that climate finance may deter formal sector investments while marginalizing informal enterprises. Small-scale miners, farmers, and manufacturers often lack the capacity to comply with climate conditionalities (Jakob et al., 2015), creating an uneven playing field. This exclusionary effect—absent from EODB metrics—warrants policy attention.

Hence, while climate finance may not harm business competitiveness where recipient countries are led by the service sector (or non-resource-dependent economies), it might present a severe disruption where economies are heavily dependent on natural resources (fossil fuel and minerals).

These findings underscore the need for strategic planning in implementing climate finance, advocating policies that support both environmental sustainability and economic resilience. Specifically, the findings highlight the importance of tailoring climate finance policies to the specific economic structures of recipient countries, ensuring that climate goals are achieved without undermining business competitiveness. Policymakers must consider these dynamics to balance environmental objectives with economic development, especially in resource-dependent nations facing significant transitions.

Our findings also reveal underexplored institutional dynamics: climate finance's negative effects are not merely economic but stem from political economy constraints. Resource-rich countries face a 'double burden'—complying with climate conditionalities while overcoming path-dependent institutions (North, 1991). Future research should model these feedback loops using political economy frameworks.

5.2. Practical Policy Implications

The empirical results demand nuanced policy solutions tailored to recipient countries' economic structures and development stages. For resource-rich nations, severe negative impacts on extractive sectors (Table 3) necessitate institutionalized just transition mechanisms. These could take the form of nationally administered transition funds, co-financed by climate finance providers and a percentage of fossil fuel revenues, following the model of South Africa's Presidential Climate Commission, which allocates 30% of mining taxes to worker retraining programs. Such funds should incorporate graduated compliance timelines—for instance, Indonesia's 10-year coal phase-out paired with World Bank technical assistance—to mitigate the institutional shocks documented in our resource curse analysis.

Service-dominated economies, by contrast, should capitalize on their positive EODB outcomes by directing climate finance toward integrated digital–green infrastructure. India's success in deploying climate funds for AI-optimized renewable grids and Kenya's blockchain-based carbon credit platforms demonstrate how digitalization can amplify the service sector advantages shown in Table 4. These efforts require complementary policies, like matchmaking platforms connecting green tech startups with international investors, modeled after Chile's CORFO program, which increased clean energy FDI by 40% through targeted venture capital partnerships.

At the international governance level, the findings call for reforming climate finance conditionality to reflect recipient countries' institutional capacities. The Green Climate Fund could adopt tiered disbursement systems where partial funding is released upon intermediate milestones (e.g., fossil fuel subsidy reductions of 15% annually) rather than binary compliance checks. Real-time monitoring mechanisms—such as satellite tracking for forest funds or blockchain-enabled expenditure verification, as piloted in Ecuador—would improve accountability while respecting national policy autonomy. These reforms align with our institutional economics framework by creating adaptive compliance pathways that account for political economy constraints in resource-dependent states.

It is also important to create tiered compliance systems for SMMEs with simplified reporting and targeted green technology grants while ensuring that informal sector representatives are included in climate funds from governance structures.

5.3. Limitations and Recommendations

Although this study provides insightful new empirical evidence, some limitations can be addressed in future studies to further expand the knowledge in this field. First, subsequent studies should strive to provide information regarding energy policies, carbon prices, and other measures associated with international climate finance over time and prove causality in relation to the sectoral effects. Also, future research should consider qualitative methods to provide further insights into some of the subtle differences between the positive and negative impacts of climate finance by sector and their concomitant political economy considerations.

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Abbreviations

AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
AsDB	Asian Development Bank
CABEI	Central American Bank for Economic Integration (Spanish: Banco Centroamericano de Integración Económica)
CAF	Development Bank of Latin America and the Caribbean (Formerly: Corporación Andina de Fomento)
CEB	Council of Europe Development Bank
DAC	Development Assistance Committee
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
IDB	Inter-American Development Bank
IsDB	Islamic Development Bank

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