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# Climate Adaptation Finance in World Bank Economic Development Programs: The Challenges of Systemic Transformation via “Scaling Up”

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**Abstract:** Worldwide only about four percent of the estimated \$500 billion-plus in public and private climate finance in 2017 was destined for adaptation. However, institutions like the World Bank are positioning themselves for a transformation in adaptation finance, seeking to provide substantially more adaptation finance as distinct from financial support for greenhouse gas mitigation. This article explores the recent emergence of adaptation as a higher priority and how a longer-term time horizon is necessary if a transformation in climate change governance is to occur which places greater emphasis on sustainable development goals relating to improvement of circumstances of citizens in the most climate-vulnerable nations, mostly in the Global South. The article also considers the important debate in the climate change policy literature over the extent to which funds supporting adaptation are going to lower-income nations or people, as might be anticipated given the view that the poor are more vulnerable to the adverse impacts of climate change. Data linking World Bank project funding to climate change adaptation and mitigation, derived from a keyword-matching approach, show that from 2010 to 2018, the share of climate-change-related finance devoted to adaptation in World Bank projects increased considerably. The data indicate that adaptation funding tends to be directed more to more climate-vulnerable nations and those with greater state fragility, but not to low-income countries versus high-income countries. Implications are considered for how this change might be “scaled up” to achieve a transformational status.

**Keywords:** transformational change; climate change; adaptation finance; climate finance; World Bank; international lenders; climate adaptation; climate finance gap

## 1. Introduction

While climate change has been a source of international concern and action, at least since the United Nations Framework Convention on Climate Change (UNFCCC) drew worldwide attention to the problem in 1992, dedicated funding for “climate finance” has drawn increased international attention over the past decade. At the 2009 Copenhagen meeting of the Conference of the Parties (COP) to the UNFCCC, many developed nations agreed to contribute US \$100 billion per year by 2020 to address mitigation of greenhouse gas emissions (GHGs) and strengthen adaptation to climate change in the developing world. Prior to the 2015 Paris meeting of the COP, the Organization for Economic Cooperation and Development (OECD) and the NGO Climate Policy Initiative claimed that funding from the developed world to the developing world already had reached US \$52 billion by 2013 and US \$62 billion by 2014 (Weikmans and Roberts [1], page 98). Developing nation representatives questioned this sum, with an assertion from the Indian Ministry of Finance that the true amount of funds raised was only US \$2.2 billion, while the South African chief negotiator stated that “we don’t know the veracity, credibility and the methodology of the report or who was consulted” ([1], page 98). As of 2020, actual contributions have

been a tiny percentage of the amounts pledged at the Copenhagen COP and analysts were lamenting an “erosion of trust between developed and developing countries—precisely the gap the Copenhagen promise sought to bridge” (Roberts et al [2]).

Of the total amounts of climate finance provided by donors, adaptation funding has been a small fraction. For example, Buchner et al. [3] present figures for 2017–2018 indicating that support for adaptation was only a bit over 5 percent out of the total public-private mix of climate finance. Those authors add a strong caveat: “Tracked adaption finance represents only a partial estimate, as definitional challenges, accounting issues, confidentiality restrictions, and an absence of universally accepted impact metrics results in limited data availability, particularly with regard to the private sector”. Indeed, Weikmans and Roberts ([1], page 97) further argue that the controversy extends beyond the funding shortfall; they claim that “the lack of internationally agreed modalities to account for climate finance has given rise to . . . widely contrasting statements . . .”. They also argue that the lack of consensus on a financial accounting system means that UN nations are forever comparing apples and oranges in judging what even constitutes climate finance. (Weikmans and Roberts ([1], pages 100–102) also raise concerns about climate finance accounting taken from the Rio marker methodology, adopted by OECD Development Assistance Committee (DAC) countries in 1998. Via this methodology, development assistance from these nations is counted in several climate-related areas (mitigation, adaptation, biological diversity, and desertification), regardless of whether these climate areas are principal targets of funding, or just minor ones. Moreover, distinctions are not drawn between loans and grants).

Unlike mitigation finance, which has been considered an indivisible global public good (mitigation anywhere reduces GHG emissions everywhere), adaptation finance has been viewed as having only “indirect benefits to developed countries . . . many arguments in favor of adaptation are based on vulnerability and historical responsibility norms, unlike mitigation which can be argued for in terms of efficiency and effectiveness” (Skovgaard [4], page 155). Researchers have long treated adaptation as a distributive struggle for resources and, often, as a question of how to shift resources from the rich, mitigating countries to the poor, adapting ones. (Aklin and Mildenerberger [5] have asserted that in practice, the logic of mitigation also is more of a “zero sum” distributive conflict, not a “positive sum” collective action problem).

The question of how much funding would be needed to make adaptation finance “transformational” is a vexing one, especially since neither adaptation nor transformation are terms which can be readily measured. Development practitioners have repeatedly lamented that the inability to measure “gains from adaptation spending” as they could with mitigation (in the reduction in GHG emissions generated by any action) has meant that the efficiency of adaptation finance could be called into question and that it would be a challenge to integrate adaptation goals into development projects (Hallegatte interview [6]; Eisenstadt and MacAvoy [7], page 263), and while transformational change in climate governance is constantly discussed, “the conceptualization of transformational change in this research is rather generic and is used more ‘as a metaphor to convey the idea of fundamental, system, or radical change’” (Feola [8], cited in Bertilsson and Thörn [9], page 427).

An extensive literature exists regarding observed or anticipated trends in GHG mitigation (as measured by reduced or avoided tons of emissions) compared to emission targets for avoiding severe risks from climate change. Much less has been written about financing needs for adaptation or the amounts of funding available. More fundamentally, there is continued debate about the roles of various potential sources of adaptation finance. Individuals will take some actions themselves to anticipate and adjust to a changing climate, and national (and sub-national) governments also will take actions in situations requiring collective action (e.g., coastal storm barriers). However, the capacity for such actions in developing countries is constrained by poverty, difficulties in accessing knowledge and technologies for strengthening adaptation, and governance problems that can limit the flow of funding to where it is needed (see, e.g., Ayers [10], Bose [11], Eriksen et al. [12], United Nations Environmental Programme [13], Weikmans and Roberts [1]). Domestic

governments must implement climate adaptation projects, but often they are not full partners in decisions about which projects to prioritize or how to execute them (Skovgaard [4], pages 159–160).

An increased international recognition has emerged that resilience to climate change, and the capacity to adapt to impacts of climate change, are critical elements for success of policies and measures to advance sustainable economic development (Kuyper et al. 2018, 356–359). However, that increased realization also has brought into sharper focus debates over the relative efficacy of “mainstreaming” climate change vulnerability and support for adaptation into development finance generally, versus dedicated sources of finance for supporting climate change adaptation, and the conflict between “top down financialization of recipient countries” by development lenders and the international community (mostly addressed here) and the “country ownership and responsiveness” to the circumstances of recipient countries (Bertilsson and Thörn [9], pages 436–437).

In this article we address various reasons for the increased emphasis on adaptation and the growing availability of funding to finance adaptation in developing countries. We discuss how the view of adaptation has changed from a fatalistic acceptance of climate change inevitability that distracted from the key agenda of global mitigation of greenhouse gases (GHGs) to a priority in development assistance reflecting a shared investment for development partners. We then use a novel dataset to discuss the growing provision of adaptation funding by the World Bank and some factors that seem to correlate with how it is allocated across Bank projects in different countries and circumstances. We also address international governance of adaptation finance and the role of the World Bank as an international institution in that context. We conclude by stating that transformational change would require “scaling up” the kind of incorporation of adaptation as a priority of World Bank development projects and the widespread adoption of this approach by other international lenders besides the Green Climate Fund, which was explicitly created for this purpose. We consider the need for greater receptiveness to the development needs of climate-vulnerable countries, to accept strong climate justice and human rights rationales for prioritizing adaptation assistance, and we argue that efforts to measure gains in adaptive capacity need to continue so that the gains of adaptation projects can be fully and materially represented.

## 2. Literature Review: Changing International Perspectives on Climate Change Adaptation over Time

The United Nations Framework Convention on Climate Change (UNFCCC), which was opened for country signatures in 1992, focused mostly on mitigating GHGs in order to limit the adverse impacts of climate change that would necessitate adaptation in the future (Chan et al. [14], Jamieson [15], Victor [16], Eisenstadt and MacAvoy [7]). “Rio 1992 did not want to take on pre-existing weather risk, only the new weather risk afterwards”, according to Thomas E. Downing, CEO of Global Climate Adaptation Partnership and a former researcher at Oxford University’s Environmental Change Institute (Downing interview [17]). As a result, Downing reasoned, “The mitigation logic is really clear as there are details around measuring GHG emissions. The adaptation framework is more muddled because we don’t have the background information. There’s never been a baseline that was agreed upon or defensible”. In some corners, moreover, even discussing climate adaptation was seen at that time as giving ground on the priority for emissions mitigation Stéphane Hallegatte interview [6], Kuyper et al. [18]).

Our interviews with various climate-change policy experts and our reading of the history of international negotiations under the CoP, bolstered also by accounts by scholars like Jamieson [15] and Kuyper et al. [18], indicate that in conjunction with the methodological issues just mentioned, support for adaptation in the context of international climate change negotiations was hindered by two factors. Climate change actions in the 1990s and 2000s focused on international GHG mitigation agreements as a positive-sum game, as emissions are global in nature and reducing them benefits all parties. This was amplified by fear on the part of several donor countries that climate change would be both catastrophic and

unstoppable unless donors focused heavily on GHG mitigation in their international budgets for climate finance, and in their international politicking. As it turned out, international efforts in gaining the global public-good benefits of broad-based GHG mitigation made only limited headway because of deep underlying problems associated with free-riding, distributional dilemmas over who pays the costs of mitigation, and the inherent limits of international governance (Barrett and Toman [19], Aklin and Mildenberger [5]). However, practical appreciation of those challenges became more apparent only during the past decade.

Although a small adaptation fund was created as part of Kyoto Protocol implementation, for many years adaptation was viewed as more like a private good that mainly benefitted the country that undertook it, implying much less of a role for international negotiations about how to support national resilience (Sovacool and Linner [20], pages 14–15). Consequently, adaptation did not draw the same attention as emissions mitigation from international donors. Only more recently has an understanding of the importance of climate change resilience for economic development come to the fore, along with an understanding that national interdependence in a global economy implies benefits from adaptation measures beyond those reaped by the implementing country.

Over time, increasing scientific understanding and agreement about the risks posed by climate change outpaced political willingness to act decisively to curb GHGs in many countries. In addition, severe weather events such as a dramatic heat wave in Europe in 2003, which killed many people, and Hurricane Katrina, which devastated parts of the Southern United States in 2005, were followed by increased advocacy for adaptation (Hallegatte interview [6]). As improvements in scientific understanding indicated that impacts of climate change likely would occur sooner and with greater severity than had been projected previously, adaptation has received more attention. By the Copenhagen COP in 2009, “All of a sudden adaptation was mainstream. Suddenly our work on vulnerability was mainstream. The problem wasn’t in theory, but learning what adaptation looked like on the ground” (Downing interview [17]).

Climate change presents an urgent challenge to the well-being of all countries and particularly to the poorest countries and the poorest people within them. Even if efforts to reduce greenhouse gas (GHG) emissions are successful, it is no longer possible to avoid some degree of impact from climate change. The poorest countries and communities are likely to suffer the most because of their geographical location, low incomes, and low institutional capacity. Climate resilient development entails scaling up investments in climate sensitive sectors, but it also means creating circumstances in which individual decisionmakers act differently.

By 2010, the World Bank’s International Development Association (IDA), the window for donor-provided development finance for the poorest and most fragile countries, had articulated the need to address climate change as a central focus (IDA [21], pages 11 and 13): The importance of climate change for IDA’s mission has become more prominent since, with links to poverty, health threats, state fragility, and the plight of indigenous peoples.

The developed countries that provide IDA finance include donors providing large amounts of climate finance as well. The highlighting since 2010 by the IDA of climate change as a central *development* challenge reflects a substantial shift in mindset internationally about the need to address climate change risks through support for increasing the resilience of vulnerable, lower-income, countries. Graham and Serdaru ([22], page 671) have argued that the weighted voting rules used by international climate finance institutions (ICFIs) associated with multilateral banks (like The World Bank) have allowed developed countries to limit donations to developing country climate finance, even as they “pursued permissive earmark rules at ICFIs within the United Nations system where egalitarian norms are strong”. They further argue that this allows donors to control allocation of the resources even when developing countries “appear to hold equal influence on governing bodies”. This argument may be sensible from a realist standpoint, but if it were true, we would expect to see little increase in dedicated funding from the ICFIs. Evidence from World Bank project documents described below indicates that funding for climate

adaptation projects, the contents of the Copenhagen promise, increased dramatically in the decade after the pledge was made.

As noted in the introduction, some have questioned the extent to which the amounts counted by donor countries as climate finance have represented “new and additional” contributions targeted to climate finance, versus general development assistance already committed but which could be shown to have some connection to climate change. Weikmans and Roberts ([1], pages 100–102) raise concerns about climate finance accounting taken from the Rio marker methodology, adopted by OECD Development Assistance Committee (DAC) countries in 1998. Using this methodology, development assistance from these countries is counted in several climate-related areas (mitigation, adaptation, biological diversity, and desertification), regardless of whether these climate areas are principal targets of funding, or just minor ones. Moreover, distinctions are not drawn between loans and grants.

With growing interest by donor countries in supporting climate change adaptation, international development finance institutions like the World Bank and the regional development banks have increased support to adaptation in their own programs. This is illustrated by the publication by the World Bank of a new action plan aimed at significantly scaling up financing for adaptation (World Bank [23]). As part of that plan, the World Bank pledged to spend \$50 billion over the succeeding five years on adaptation, which would double the estimated worldwide 2017 total. Even prior to announcing the new Adaptation Action Plan, the World Bank had introduced requirements to consider climate change risks as well as emissions mitigation in all of its projects.

What broader lessons might be drawn from the significant pick-up of interest in climate change adaptation over the past decade? There is more appreciation of the growing risks of climate change faced by developing countries due to growth over time of cumulative greenhouse gas emissions in the atmosphere, the overwhelming proportion of which come from developed country actions. There is also steadily increasing recognition that increased climate change adaptation is necessary for citizens in developing countries to try to preserve opportunities for improving their standards of living. These observations provide the rationale for developed countries to support improved adaptation capacities in developing countries.

In turn, that puts adaptation funding to reduce climate-change vulnerability at the center of discussions about broader challenges in effectively supporting the further economic development of lower-income countries. In Section 6 we show that adaptation-related funding in World Bank projects has increased, which is somewhat counter to what we would expect based on the argument by Graham and Serdaru [22]. However, when we analyze components of the adaptation finance, we do find that less goes to the most destitute countries (the IDA countries in World Bank parlance, which receive direct grants of assistance rather than loans) than to middle-income countries. (Note that Graham and Serdaru [22] focus on the apparent contradiction between egalitarian designs and discretionary practices at the Global Environment Facility (a World Bank-created but independent entity) and the Green Climate Fund (part of the United Nations system), rather than the World Bank and other development institutions).

### 3. Materials and Methods: Assessing Climate Finance in World Bank Projects

In our empirical analysis we draw upon information from a set of World Bank projects that include climate change components to assess the amount of total project budgets committed to climate finance and its distribution across mitigation, adaptation, and disaster risk management (DRM). (In comparing these categories, note that much of the DRM funding is for expenditures after disasters to help nations rebuild, in contrast with efforts through adaptation-related expenditures to increase resilience going forward.) We also use the information to investigate patterns in the allocation of adaptation finance.

While some World Bank projects include specific components to support mitigation or adaptation, in other cases mitigation or adaptation are embedded along with other



objectives in project budgets. For example, a project to provide increased access to clean cooking fuel might involve expanding the supply of low-carbon bioethanol. A project to provide improved access by farmers to information about near-term drought risks also will increase longer-term resilience to climate change.

To get around this lack of specific budget information for mitigation or adaptation in projects, we estimated quantities of different types of climate finance within overall project budgets using a keyword-matching approach. (The authors thank World Bank Knowledge Management Analyst Harsh Anuj for providing the imputed climate finance data based on keyword matching.) World Bank projects are assigned various themes as per the World Bank's latest Theme Taxonomy and Definitions (<http://pubdocs.worldbank.org/en/275841490966525495/Theme-Taxonomy-and-definitions.pdf>, accessed on 16 September 2021). By counting in Project Appraisal Documents (PADs) (the key document describing a project that is submitted to World Bank Senior Management for approval of the project), the occurrence of certain keywords that represent different themes, one can get at least a rough idea of the different levels of focus on the themes, including themes related to climate change. As discussed further below, Michaelowa et al. [24] conduct a similar analysis with some similar conclusions, but their focus is on donor trust funds based at multilateral development banks like the World Bank. Our focus is on mitigation and adaptation aspects in World Bank project budgets in IDA and IBRD projects.

Because adaptation was only coded separately as a theme starting in 2010, before that year, one can only calculate the prevalence of climate as a broad umbrella category. Among projects from 2010 through 2018, we found somewhat more than 400 projects with coding for climate change adaptation (code 812), mitigation (code 811), disaster risk management (codes 75 and 331), or some combination of those themes.

Each theme (climate or other) is given a percentage reflecting the prevalence of associated keywords in the project description. Multiplying the percentages accorded to those climate change themes by the total size of the project expenditure provides us with estimates for dollar amounts of the project budget that can be related to those themes. For example, if a project involved total World Bank financing of US \$10,000,000, and the keyword matching assigned 14% to the climate change adaptation theme, then we would count US \$1,400,000 of the project budget as reflecting that theme. The themes are not mutually exclusive, so the amounts attributable to mitigation, adaptation, and DRM could add up to more than 100% of the total financing in the project. For example, some portion of the project budget could be supporting both adaptation and mitigation. However, we did not encounter any cases in which the amount attributed to adaptation finance was implausibly large.

One clear weakness of the approach is that we cannot control for how project team leaders might have responded to growing interest within the World Bank in different elements of climate finance. In particular, we cannot control for a potential increase over time, especially since 2015, in the utilization of specific language in PADs reflecting the growth of interest in adaptation without corresponding actual attention to the theme in the project. However, any effort to assign budget shares to specific themes when the project seeks to accomplish multiple objectives will reflect a degree of arbitrariness. We believe the figures generated by the keyword matching are useful for understanding relative levels of funding across the three broad climate change themes and that they are useful for assessing the allocation of adaptation finance to different countries based on their circumstances. (Our approach also differs from the requirement for World Bank project task team leaders to estimate "climate co-benefits" for all lending projects. In that context, "co-benefits" refers to components of projects focused on purposes other than climate change that contribute to GHG mitigation, strengthened adaptation capacity, or improved resilience to natural disasters. Those co-benefits are assessed using a different methodology than the one that provided our figures for the various components of climate finance, and they are not divided into the same themes we are investigating. Thus, there is no reason to expect that those co-benefit calculations would correspond to the calculations we make using keyword matching).

#### 4. Basic Descriptive Statistics for Measures of Climate Finance

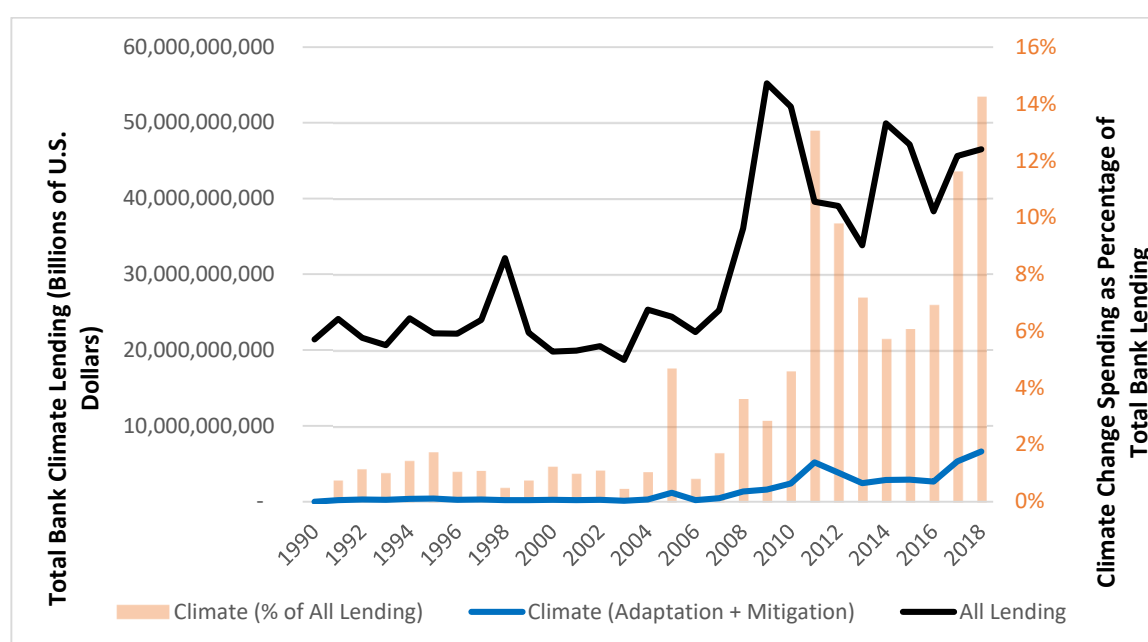
Table 1 shows quantities of World Bank climate finance by theme as derived from the keyword matching. The table shows climate finance amounts for all projects active in 2018, in the six geographic regions around which the World Bank structures its operations. The figures indicate that adaptation finance reaches at least 80 percent of the figures for mitigation finance, except in Africa, where adaptation is closer to 60 percent of mitigation finance. Africa is also the most important region for climate finance in the sample of World Bank projects, accounting for about one-third of total project funding across the six regions.

**Table 1.** World Bank climate finance components by region and category (for all projects active in 2018).

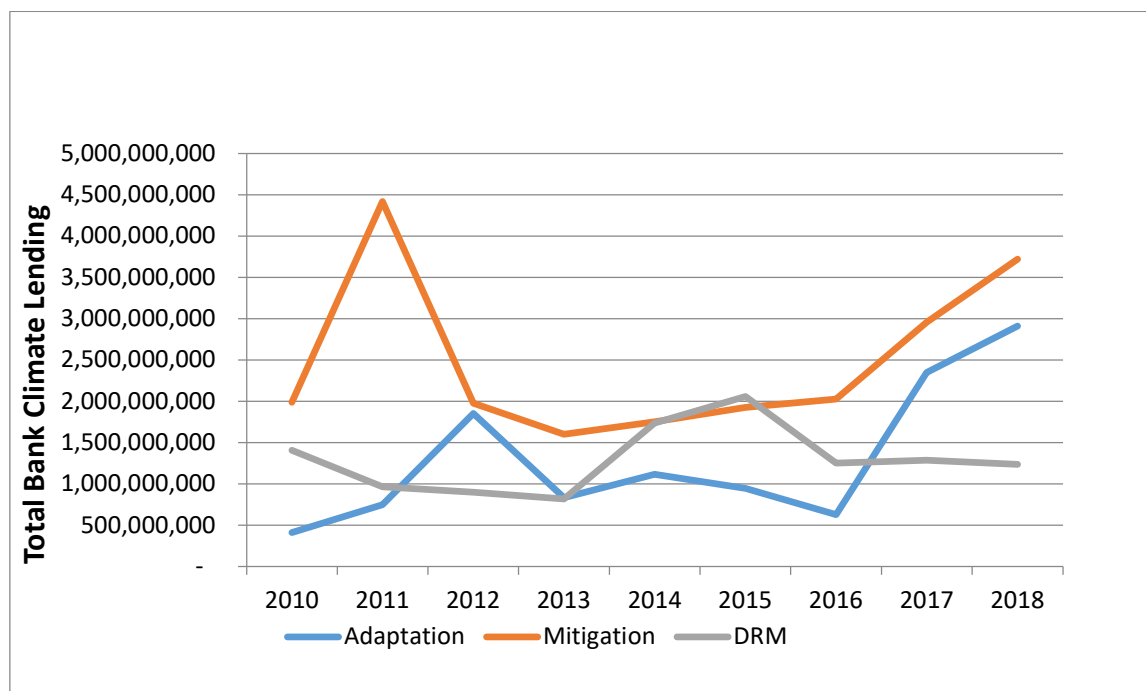
Region	Adaptation Total	Adaptation + DRM Total	Mitigation Total
Africa	19,654,950,000	21,394,770,000	28,140,460,000
East Asia and Pacific	9,331,560,000	12,034,930,000	11,182,780,000
Europe and Central Asia	4,829,050,000	6,051,970,000	6,351,750,000
Latin America and Caribbean	6,997,170,000	9,475,180,000	8,356,790,000
Middle East and North Africa	5,840,100,000	5,850,900,000	7,660,680,000
South Asia	16,610,860,000	21,799,960,000	20,206,560,000
Grand Total	63,264,220,000	76,608,240,000	81,900,040,000

Source: Author data from keyword matching in World Bank project documents. The grand total is about 0.06 percent higher than the six regional sums because some \$530,000 in adaptation funds is not classified into any region, as is about 1.2 percent of mitigation funds (\$1,020,000). There was no unclassified DRM funding.

Figure 1 indicates that the amount of project budgets attributable to climate finance, according to the keyword matching, has increased to encompass nearly 15 percent of total World Bank financing. This is up from less than 1 percent in 1990. Over 2010–2018, when the sub-categories of climate finance were coded separately, adaptation finance has increased markedly. Figure 2 indicates that adaptation finance has risen to nearly equal the amount of mitigation finance, while DRM funding has remained mostly flat, except for fluctuations related to disaster responses in particular years. Note that the figures for adaptation finance are much higher than the roughly five percent of global climate finance attributed to adaptation in Buchner et al. [3].



**Figure 1.** Climate finance as a proportion of World Bank lending (1990–2018). Source: author data from keyword matching in World Bank project documents.



**Figure 2.** Breakdown of World Bank climate finance by category. Source: author data from keyword matching in World Bank project documents.

## 5. Materials and Methods II: Factors Influencing Allocation of World Bank Adaptation Finance across Countries

We consider various factors that could influence the allocation across countries of adaptation finance in World Bank projects. Addressing this question using the figures described above adds new findings to the previously mentioned debates based on OECD bilateral aid, namely the extent to which the poorest and/or most climate-vulnerable countries tend to receive more adaptation funding (Betzold and Weiler [25]), or whether there is no such clear pattern, as argued most recently by Saunders [26]).

Our approach has several similarities with a recent analysis by Michaelowa et al. [24] of factors influencing the distribution across countries of trust fund disbursements and bilateral assistance to support climate change mitigation and adaptation. Their analysis of the allocation of fund disbursements for adaptation considers log(GDP per capita), log(population), land area less than 5 m above sea level, the Notre Dame GAIN indicator of risk exposure (see <https://gain.nd.edu/our-work/country-index/>, accessed on 16 September 2021), and an indicator of government effectiveness. (see Michaelowa et al. [24], Appendix A). The authors also include a variable reflecting certified emissions reductions (CERs) associated with mitigation expenditures to compare their mitigation and adaptation-related findings).

We consider the following potential channels of influence on the allocation across countries of adaptation finance in World Bank projects:

1. Countries that are more vulnerable to climate change receive greater adaptation finance. We represent vulnerability with the Germanwatch Climate Risk Index, or CRI (<https://germanwatch.org/en/cri>, accessed on 16 September 2021), which measures property damage and deaths from extreme weather events. The CRI assigns lower scores to countries with higher levels of vulnerability, a point to keep in mind in interpreting the findings below. The index ranges from a high of 116 in 2017 (Denmark), which has low climate vulnerability, to a low of 1.50 for Puerto Rico, which was assessed separately from the rest of the United States, or 10.5 for Nepal, both



of which have high vulnerability. We use the Global Climate Risk Index 1998–2017, which is an average value over twenty years for each country. That means that differences in the index across countries reflect systematic differences in risk exposure, versus the impacts of extreme weather events in a particular year. (We also tried the Notre Dame GAIN score, but that index, composed of a broader range of indicators, was not statistically significant. The GAIN index relies more on coder interpretation than on direct empirical data (insurance reports on mortalities and property damage).

2. Countries with low income per-capita receive more adaptation finance. This reflects the idea that low per-capita income implies more individual vulnerability, which the World Bank has pledged to mitigate as part of its IDA commitments. To test this hypothesis, we use a dummy variable that takes the value 1 if a given nation is a member of the IDA, which includes the world's 76 poorest countries; otherwise, it takes the value 0. The IDA countries are listed at <http://ida.worldbank.org/about/borrowing-countries> (accessed on 16 September 2021).
3. Countries with higher levels of democratic governance and lower levels of corruption (as determined by the V-DEM project) tend to receive greater adaptation funding. The transparency of this index has been critiqued, but it was the best expert-determined index we could find assessing political stability and instability.
4. We also use an index of state fragility (Fund for Peace [27]) to examine its effect on allocation of World Bank adaptation finance. Fragile states may have more need for adaptation finance, but their ability to absorb it also may be lower, so we have no prior expectation on the sign of this relationship.

In addition, we have included dummy variables for each of the world regions (using Europe and Central Asia as our baseline region), to test for purely geographical differences in the allocation of World Bank adaptation finance.

Our analysis of potential influences on adaptation finance uses the total value of adaptation finance in World Bank projects for each country as of 2018, considering all projects active in 2018 which opened in 2010 or later. We consider the cross-section of adaptation finance across countries because World Bank projects involve disbursements over many years, and it is not possible to assign the adaptation finance imputed to a project by the keyword matching approach to disbursements in particular years. Thus, we were not able to use the panel data approach of Michaelowa et al. [24]. Because we are using a cross-section, we cannot make definitive claims as to causality in the empirical analysis reported below. Nevertheless, the findings are suggestive of some of the key influences on the distribution of adaptation finance across different types of countries.

## 6. Results

The results of our regression analyses are reported in Table 2 below. As noted above, the dependent variable is the total amount of adaptation finance for each country in 2018 in World Bank projects initiated over 2010–2018, using the approach described in Section 3.

The results in Table 2 show that an increase in the Climate Risk Index (CRI Score), implying lower vulnerability as noted above, leads to a decrease in adaptation funding. This variable remains significant when regional dummies are included.

The IDA membership control variable indicates that belonging to the IDA significantly *reduces* adaptation funding. This somewhat surprising finding indicates that World Bank adaptation finance tends to go more to higher-income non-IDA countries. This could be the result of higher-income countries having more “value at risk” in terms of income and assets. The IDA variable is statistically significant with as well as without regional dummy variables.

The idea that higher levels of transparency and democratic governance are associated with more adaptation funding also is not borne out by the estimates, which are statistically insignificant and have the wrong sign. We are not able to ascertain a reason for this. We do find, however, that greater state fragility is associated with more adaptation finance at a statistically significant level. Finally, none of the regional dummy variables are significant.

**Table 2.** Regression results for cross-country differences in adaptation finance. Dependent variable: WB adaptation finance (all projects active in 2018).

Variables	Without Regional Dummies	With Regional Dummies
CRI Score	−0.213 (0.074) ***	−0.223 (0.095) **
IDA	−24.911 (7.497) ***	−26.496 (8.850) ***
Level of Democracy	−0.043 (17.382)	10.961 (20.579)
Corruption	−21.362 (15.902)	−14.288 (17.824)
Fragile State Index	0.997 (0.294) ***	0.759 (0.367) **
Africa		2.053 (13.935)
East Asia and Pacific		0.221 (13.791)
Latin America and Caribbean		−18.119 (13.973)
Middle East and North Africa		1.142 (17.351)
South Asia		5.517 (15.385)
Constant	2.824 (25.869)	15.770 (30.249)
Observations	484	484

Standard errors in parentheses \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ .

## 7. Discussion: International Governance of Climate Change Adaptation and the Role of the World Bank as an International Institution

Part of the challenge in prioritizing adaptation as a core part of the development agenda has been debate among the parties to the UNFCCC on operationalizing demands from vulnerable countries that they receive compensation from high-emitting countries for “loss and damages”. These demands began even before the ratification of the UNFCCC, though the convention did not contain language addressing the issue, and they have continued through the negotiation of the Paris Agreement (Broberg and Martinez-Romera, [28]). The Alliance of Small Island States (AOSIS) has been an especially active proponent.

In 2013, the UNFCCC created the Warsaw Mechanism to adjudicate loss and damages, which had been discussed at several prior meetings of the Conference of Parties to the UNFCCC. A more consequential step was the incorporation of loss and damage provisions in Article 8 of the 2015 Paris Agreement, an international agreement subject to international law governing treaties (Broberg, [29,30]), though specific provisions for implementation have not yet been developed.

For our purposes, the key implication of the ongoing debate over loss and damage provisions is that it creates significant ambiguity about what constitutes international financial support for adaptation undertaken by vulnerable countries, versus obligatory payments by high-emitting countries to compensate vulnerable countries for loss and damages. The legal ambiguity is discussed in Broberg [29,30]. Broberg and Martinez-Romera ([28], pages 662–663) illustrate the challenge by considering three potential definitions of responsibility under a loss and damage provision: the responsibility for all residual damages after adaptation has been undertaken; for impacts that remain after a vulnerable country undertakes a level of adaptation it can manage, but not measures with outside costs; or for whatever residual damages reflect an “intolerable level of risk” for a vulnerable country. Given reluctance on the part of higher-emitting, higher-income countries in any event to accept a loss and damage provision because of the challenge in gauging the resulting liability, this conceptual ambiguity adds to concerns that support for adaptation could become a de facto acceptance of liability.

In light of these and other continuing implementation challenges for addressing adaptation in the context of the UNFCCC, it is of interest to reflect on the role the World Bank has played as an international institution in defining, assessing, and acting upon the need for increased support for climate change adaptation. Since its creation in the wake of World War II, the stated objective of the institution has been to provide reconstruction and economic development assistance that contributes to an international order based on shared benefits from international cooperation, peace, stability, and prosperity. Individual countries that are members of the World Bank (and represented on the institutions Board of Governors) will advocate for their own national self-interests, but they also are expected to support the common good.

Thus, in the language of International Relations (IR), the World Bank seems to fit best into the postwar doctrine of liberalism. The founding Articles of Agreement of the World Bank emphasize that it is an organization set up to help member countries in economic contexts, not to attempt to interfere in political issues of member countries (see in particular Article III, Section 2, and Article IV, Section 10, at <https://www.worldbank.org/en/about/articles-of-agreement>, accessed on 16 September 2021). However, liberalism is not a perfect fit; the governance of the World Bank has been heavily influenced by the US as well as other OECD countries. One could argue that this reflects the us-versus-them IR model of realism. (Kahn [31] provides a useful overview of IR concepts in the context of climate change.

The World Bank has undergone some fundamental changes in its mode of operation since its founding, including a commitment to engage with non-governmental stakeholders across the board on a variety of issues deriving from particular historical and social contexts, such as safeguarding rights of indigenous peoples. Moreover, in formulating various action plans for addressing climate change, most recently one on adaptation, the World Bank has become a participant, not just an observer or instrument, in international debate around climate change.

Nevertheless, we argue that the World Bank has retained a largely liberalist agenda. The emphasis on the global common good is apparent in the “Twin Goals” the World Bank has embraced over the past decade: drastically reducing the number of people living in abject poverty and increasing significantly the economic fortunes of those currently in the bottom 40 percent of national income distributions across the world (World Bank 2015). This is also the general context in which the World Bank has addressed climate change and other environmental problems: by reframing them as part of the general challenge of improving the common good by seeing these problems as globally relevant development issues. With respect to human rights and other safeguards, the World Bank seeks (with varying success) to apply a common set of legal principles within the specific contexts of particular problems.

Graham and Serdaru’s [22] argument might suggest that post-war liberal-appearing lenders, led by the World Bank, have actually used realist shareholder norms to curtail spending on the most vulnerable countries. However, unlike the institutions Graham and Serdaru [22] address, the World Bank and other international development lending institutions are not exclusively climate lenders. World Bank adaptation-related project expenditures have increased dramatically (as per the liberal egalitarian perspective), but poorer countries are receiving smaller shares (as per the realist shareholder logic, which is also consistent with the results of Michaelowa et al. [24]).

Over the decades since the creation of the World Bank, the ways and means used by the international community to pursue a liberalist agenda (international cooperation, peace, stability, and prosperity) have changed, as national objectives and understanding of the key prerequisites for sustainable economic development also have evolved. In the wake of the 1992 UNFCCC, there was increased international appreciation for the threats posed by climate change and increased effort to provide a global public good through GHG mitigation—a goal in the mainstream of liberalist global development. Especially since about 2005, when the World Bank first committed to investment targets for renewable energy and energy efficiency, the World Bank has been an active proponent of low-carbon

development. Given its degree of focus on the common good, its reframing of climate change threats as a challenge to sustainable economic development, and its independence from UN negotiations of agreement on national responses to climate change, the World Bank (and by extension, other such international development finance institutions) has increased support for national efforts to strengthen adaptation capacity and advocated that international support for such efforts should increase.

## 8. Conclusions

We have argued that increased practical attention to the aims of adaptation and the means for strengthening it is timely. The growing understanding of climate change as a development challenge has led to an increase in emphasis on financing adaptation as a means for systematically addressing a major source of costly development risk, rather than just in terms of specific projects (Hallegatte et al. [32]). Still, as Michaelowa et al. [24] point out, this emphasis on adaptation has not translated into financial support for the poorest nations.

Our empirical findings indicate that the allocation of adaptation finance by the World Bank tends to be related to vulnerability to climate change and to state fragility more than poverty. However, given our keyword search approach to indirectly assess climate finance components, the inferred amounts of expenditures may not reflect actual levels of funding.

The limited availability of concrete data on adaptation finance (and on climate finance more broadly), which necessitated the need to use an indirect method for assessing project budget shares for adaptation, implies an inherent difficulty in assessing the effectiveness of international climate policies. To overcome this worldwide data problem, international organizations involved in providing and setting the rules for climate finance need to find ways to obtain and provide timely and accurate data from those involved in providing international climate finance. Roberts et al. [2] remind us that estimates of expenditure flows of climate finance from developed to developing countries vary wildly, making transparency and accountability all but impossible under the present system.

Debate continues to the extent to which climate change risks to development can be addressed primarily through support mainstreamed into development assistance such as the IDA and how much dedicated international funds for addressing market failures or policy failures and institutional weaknesses also are needed. Related to this is the issue of how to expand and improve the delivery of support for climate change adaptation. To date, much of the focus has been on traditional public-sector support within countries, combined with traditional donor-to-recipient-countries financing. However, incentives for private actors to adapt can be strengthened, and adaptation financing can take other forms (such as the “catastrophe bonds” used by countries around the Caribbean to insure hurricane risks, or even private-sector options contracts) (Malik and Smith [33]). Such a broadening of instruments for addressing climate-change-related risks would allow donor-provided adaptation finance to focus more on countries and sectors with greater needs.

Regardless of where the adaptation finance comes from, future research should address ways to better measure the “quality,” or impact, as well as the quantity of adaptation finance. The surprising lack of actual climate finance and expenditure data needs to be remedied if international donors are to be more effectively held accountable for climate finance pledges and expenditures. In addition to data on adaptation finance expenditures, criteria are needed to better measure what adaptation finance is accomplishing, using qualitative as well as quantitative assessments. Moreover, the demands of transformational change in the rate of delivery of climate change relief requires that other public lenders accept that the provision of adaptation is increasingly considered within the purview of human rights and climate justice (see, for example, Skillington [34] and Toussaint and Martinez Blanco [35]).

While a few scholars have begun systematically studying the types of assistance preferred by citizens of recipient countries (see, for example, Eisenstadt et al. [36]), many analysts observe in international climate lending patterns some of the same limitations they have noted for decades in development lending, which some claim is a tool by countries

and private companies to exert political influence more than a means of helping implement sustainable development goals (see for example Bertilsson and Thörn [9], pages 428–429). A stronger emphasis on the effect of climate change on climate-change-induced migration from the Global South’s climate-vulnerable countries to the leading emitters in the Global North would encourage lending nations to better emphasize adaptation finance, as would the implementation of a more meaningful loss and damage regimen to hold industrial emitters responsible. Until such norms are integrated, and with a more urgent time horizon for climate action, generalized transformational change in climate adaptation, extending beyond traditional development lenders such as the World Bank, may be elusive.

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