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Breaking the Negative Feedback Loop of Disaster, Conflict, and Fragility: Analyzing Development Aid by Japan and South Korea

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Abstract: Disaster risk reduction (DRR) has become an important element of donor policy, because numerous governments have expressed their commitment to helping countries vulnerable to natural hazards by mainstreaming DRR into their development programs. Meanwhile, countries that are considered fragile, as well as conflict-affected states, have faced a high risk of disasters brought on by natural hazards. However, there has been little research that addresses the complex relationship between disasters, conflict, and fragility in the context of development cooperation. Against this backdrop, this study analyzed the determinants of DRR aid allocation from Japan and South Korea—two East Asian countries that have shown a strong commitment to disaster resilience and peacebuilding—to investigate whether they are responsive to countries experiencing the combined risks of disasters and conflicts and/or fragility. Despite the vulnerable countries being in the most need, the study found that both Japan and Korea’s aid allocation has not been influenced much by the concurrence of disasters and conflict. Rather, it has been more driven by the level of a country’s climate vulnerability than the level of a country’s fragility. This suggests that developing countries facing multiple risks and challenges are at a major disadvantage in terms of the responsiveness of donors toward their needs and vulnerability.

Keywords: development cooperation; climate change; disaster risk reduction (DRR); fragile and conflict-affected states (FCSs); generalized method of moments (GMM); official development assistance (ODA)



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Citation: Lee, S.; Kwon, H.-j. Breaking the Negative Feedback Loop of Disaster, Conflict, and Fragility: Analyzing Development Aid by Japan and South Korea. *Sustainability* **2022**, *14*, 10003. <https://doi.org/10.3390/su141610003>

Academic Editors: Stefano Morelli, Veronica Pazzi and Mirko Francioni

Received: 17 July 2022

Accepted: 10 August 2022

Published: 12 August 2022

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1. Introduction

Although climate change affects every country, its effects are distributed differently across the globe. In this study, countries classified as low (with a GNI per capita of USD 1085 or less) and lower-middle income countries (with a GNI per capita between USD 1086–4255) by the World Bank are considered developing countries, while developed countries are high-income economies with a GNI per capita of \$13,205 or more. Developing countries are the most impacted by climate change given their large rural population, the pervasiveness of resource-dependent livelihoods, and poverty, as well as their lack of coping capacities to protect themselves against environmental shocks [1,2]. Future climate change effects will be more severe and pervasive, and bring will irreversible impacts on all [3]. Hence, without proper adaptation, people in developing countries are more likely to lose their livelihoods and homes during natural hazards, which would prevent their social mobility out of poverty. Furthermore, the risks associated with climate change are already affecting millions of people around the globe, aggravating already fragile situations, such as poverty and hunger.

In fragile and conflict-affected states (FCSs), there is a greater risk for climate change to cause instability and unrest, posing serious threats to human security [4,5]. This is due to the conditions of fragile and conflict-affected states, including extreme poverty, war, and the process of reconstruction to crises and disasters [6]. As such, these countries lack

the capacities to carry out basic governance functions, leaving their citizens vulnerable to a range of shocks [7–10]. In other words, a state's level of fragility and violent conflict increases people's likelihood to be harmed by natural hazards because it limits their ability to cope with the impact. The occurrence of a natural hazard in FCSs exacerbates existing challenges that people face on a daily basis, heightening sources of tensions, such as weak governance, historical grievances, mobilization, and poverty [11–13]. Put differently, there is a risk of a negative feedback loop emerging, where existing fragility and conflict undermine the ability of a government to manage or mitigate social, economic, political, security, or environmental risks, and this, in turn, potentially exacerbates the conflict itself, further reducing the ability of states to respond and recover from disasters. Within these contexts, climate change considerations must be integrated into peacebuilding and development interventions to promote climate-resilient peacebuilding in FCSs [13,14].

Disaster risk reduction (DRR) is a concept of the practice of “preventing new and reducing existing disaster risk and managing residual risk” [15]. Reducing exposure and vulnerability of people and assets, strengthening buildings and roads, improving forecasting and early warning systems, maintaining adequate emergency shelters, and strict land-use planning are all examples of disaster risk reduction [16]. In short, the omission of these acts can turn natural hazards into a disaster. While DRR has long been recognized as a powerful tool for strengthening resilience and, therefore, achieving sustainable development, DRR has rarely been integrated into development efforts. While several studies [17–19] assessed the environmental impact of overall development aid, there is little research that concentrates almost exclusively on the determinants of DRR aid. In addition, previous research has often only examined development policies focusing on DRR and, thus, studies based on empirical analysis on aid allocation in DRR are rather scarce.

Against this background, this study aims to examine the determinants of Japan and South Korea's aid allocation in relation to DRR. According to Stallings [20], Japan and South Korea share a set of characteristics that differentiate them from Western donors in terms of geographical and sectoral focus, grants and loans profile, and public-private links. The commonalities—including prioritizing economic growth and preference for subsidized loans rather than grant aid, infrastructure-centered programs, and the pursuit of mutual benefits—have created an image of Japan and South Korea's aid as self-serving. Amongst the OECD DAC donors, Japan and South Korea stand out as two of the most widely criticized donor countries based on allegations that they both prioritize national interests over the needs of recipient countries [21–23]. Indeed, what distinguishes them from other Western donors is that for both Japan and South Korea, aid has not been only altruistic, but also about mutual benefits, global recognition, and economic interests [23,24]. Meanwhile, both countries have committed to building disaster resilience in the international community by leading in, namely, DRR and green growth, while also committing to expand efforts for peacebuilding.

The previous literature that looked at Japan's foreign policy tended to focus on Japan's major DRR efforts, policy strategies, and funding trends [23,25,26]. In the case of South Korea, most of the climate literature has examined the process of green growth or SDGs mainstreaming into Korea's development portfolios, but these studies did not make policy connections to DRR despite the shared goals between the field of green growth, climate change adaptation, and DRR [27–29]. To the best of the authors' knowledge, no research has been conducted that compares the two donors' policy rhetoric in relation to DRR aid with their behavior as carried out in this study. The comparative approach allows us to examine the differences and similarities between these donors to provide a broader picture of DRR aid policy.

2. Literature Review

2.1. Disproportionate Risks of Climate Change

From 1990–2018, a total of 3734 disasters related to natural hazards were recorded in the emergency events database (EM-DAT). Figure 1 illustrates the frequency of each disaster

type from 1990 to 2018 in low, lower-middle, and upper-middle-income countries. Over the past 30 years, Asian countries have experienced more disasters than any other region. The cumulative number of disasters for East and South Asia between 1990 and 2018 was 3501, which accounts for 40.1% of the total reported disasters around the world in the same period. Floods occurred more often than any other type, accounting for 46.8% of incidents, followed by storms at 32.7%, and earthquakes at 9.2%. Bangladesh, Pakistan, and Vietnam have faced relentless floods over the past three decades. Because of under-reporting in low- and lower-middle income countries due to the difficulty of tracking disasters, the actual number of incidents in those places is expected to be higher.

As evident in Figure 1, statistics reveal that more than half of the people affected by disasters have lived in a FCS, demonstrating a “deadly interdependence” between conflict, fragility, and disasters [30–32]. In 2018, Somalia experienced deadly flooding, which affected over 700,000 people and, in Nigeria, flooding took 300 lives and impacted nearly 4 million people [33]. Droughts were frequent in many Sub-Saharan African countries, as 37.6% of the total drought incidents occurred in this region from 1990 to 2018 alone; more than 3 million people were affected by drought in Kenya. Additionally, Afghanistan suffered a major drought that impacted 2.2 million people, causing the internal displacement of thousands [34]. According to the UN, the drought in 2018 displaced more Afghans than the conflict between the Taliban and the domestic government [35]. According to a 2020 report by the International Committee of the Red Cross (ICRC), 14 of the 25 countries that are considered to be fragile and conflict-affected states are currently facing environmental degradation and climate change. In summary, the intersections between disasters and conflict and fragility are manifold, and have become a source of massive human suffering and even more instability and conflict in FCSs [36,37]. If the international community is to build resilience and peace across the world, it must understand the negative feedback loop, where existing fragility and conflict raise people’s potential to be harmed by natural hazards, which in turn exacerbate the sources of tension and poverty; the international community must work together to confront these interrelated and mutually reinforcing risks [38].

Over the past decade, development research tried to capture the broad spectrum of a possible relationship between disasters and conflicts [5,31,37,39], and several aid projects have been conducted by development agencies to reduce the threats to human well-being from consequences of disasters and conflicts [40,41]. The sustainable development goals (SDGs), launched in 2015, recognize and reaffirm the urgent need to reduce the risk of disasters and promote peace, justice, and inclusion in FCSs. While ‘peace’ is explicitly mentioned in Goal 16, a peace dimension is found across the SDGs as a whole, and 25 targets in 10 of the 17 SDGs are related to DRR [42]. Indeed, building peace and resilience across the world is the priority. To this end, a more strategic and innovative approach that can break the negative feedback loop of disasters, conflict, and fragility is necessary for development aid to promise a meaningful path forward.

2.2. The Lead-Up to the Appearance of DRR in Development Assistance

Typically, DRR is a combination of measures that reduce exposure and susceptibility to natural hazards by enhancing coping and adaptive capacity [15]. The last two decades have seen intense global actions toward mainstreaming DRR principles in development planning and practices, due to the ongoing disasters in many developing countries. In fact, a series of UN conferences on disaster and climate risk management convened in Japan, namely in Yokohama in 1994, Hyogo in 2005, and Sendai in 2015.

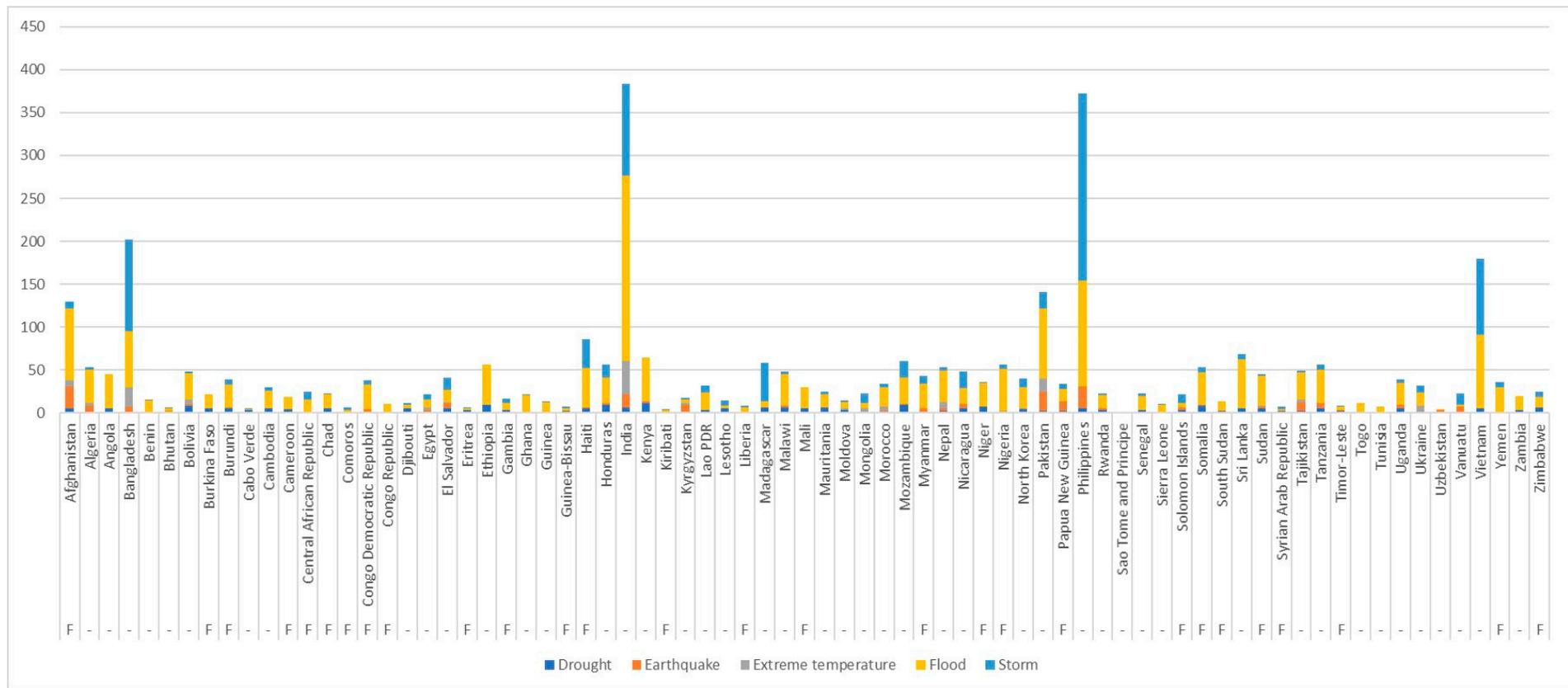


Figure 1. Frequency of disasters in low-income and lower-middle income countries in 1990–2018 (fragile states marked with “F” at the bottom). Note: The author used disaster occurrence data from the emergency events database (EM-DAT) and the World Banks’ 2020 harmonized list to specify fragile states.

The Sendai Framework for Disaster Risk Reduction 2015–2030 calls for a strong integration of DRR into development. One of the targets of the Sendai Framework seeks to accomplish the following:

‘Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030.’ [16]

Nevertheless, the mere ratification of international DRR agreements tells us little about how serious countries are in addressing climate change. To confirm whether their commitment has been converted into action, it is important to examine donor’s aid activities and track the exact amount of official development assistance (ODA) invested in DRR.

Many studies that attempted to analyze DRR via ODA reported that the lack of adequate DRR classification and information in the OECD development assistance committee (DAC)’s creditor reporting system (CRS) poses a major bottleneck in estimating the aid flows in DRR or climate-related areas [25,43]. There have been no standardized guidelines for tracking such investments. This is largely due to how DRR has rarely been seen as a stand-alone factor; DRR activities have been commonly included within wider programs and projects, including those related to rural development, food security, health systems, energy production, environmental protection, etc. Due to the cross-cutting nature of DRR, it was hard to quantify the exact amount spent on DRR, and donors were unsure of how to report it; thus, the data on DRR investment has been limited [25,43]. Against this backdrop, in 2018, OECD DAC members agreed to add a new marker called “Disaster Risk Reduction” to the CRS database to easily identify DRR-related ODA. However, scholars have questioned how accurately this marker conveys the true purpose of aid in practice based on the experiences with other environmental markers, namely the “Rio climate” markers [44]. For example, Roberts et al. [45] found that only 25% of projects with Rio markers were actually relevant to climate change, and Michaelowa and Micahelowa [46] and Junghans and Harmeling [47] later came to similar conclusions. Consequently, environmental markers lack reliability as well as validity [44,48].

Because of the newness of the DRR marker in CRS, not all projects have been screened against the DRR marker. As an alternative, this study uses five different sectors to identify DRR aid. While there is no single approach to track and evaluate DRR aid, this study will consider sectors commonly used in other studies [25,43] to evaluate DRR aid, such as (i) “disaster prevention and preparedness”, (ii) “reconstruction relief & rehabilitation”, (iii) “general environmental protection”, (iv) “energy generation and non-renewable sources”, and (v) “disaster risk reduction”, a subcategory of the multi-sector. Furthermore, “emergency response”—a category under “humanitarian Aid”—may appear directly related to DRR, but it has served multiple purposes, responding to a variety of needs including education, protection, and safety in conflict situations, health, pandemics, post-crisis refugees, etc. [25,49]. For this reason, “Emergency Response” will be omitted from further analysis. The sectoral name in (i), (ii), and (v) makes apparent its relevance to DRR by its name. The “energy generation and renewable resources” sector is included since the replacement of fossil fuels with various sources of renewable energy plays a crucial role in all stages of DRR, especially considering the importance of the energy sector in everyday activities [50]. The “general environment protection” sector is also added to the estimation of DRR aid, given that many development projects classified into this sector are designed with DRR-related intents, such as flood prevention and control, environmental policy, protection of ecosystems and biosphere, and environmental research [43,51]. Furthermore, despite the large number of sectors that may include an element of DRR, Spark’s research (2012) found that only three sectors—disaster prevention and preparedness, reconstruction relief and rehabilitation, and general environmental protection accounted for 80% of the entire DRR aid in the fiscal years 2006–2010 [25]. This method is prone to bias and omission, as the selection depends entirely on the sector description. It will be sufficient, however, to explain the recent trend of donors’ ODA spending in DRR.

2.3. Japan and Korea's Environmental Initiatives

In 2019, Japan's ODA stood at 15.5 billion USD, making Japan the fourth largest donor in absolute terms (OECD statistics). Being one of the oldest members of the OECD-DAC, Japan has been the only major aid donor not located in Western Europe or North America. On the other hand, South Korea only joined the OECD-DAC in 2010. In 2019, South Korea spent 2.5 billion USD on its ODA, making South Korea the 15th largest donor country (OECD statistics). Although Japan does not select priority partner countries, its recipient countries have been concentrated in the Asia region, with a slow expansion to sub-Saharan Africa in recent years [52]. In the case of South Korea, it has chosen priority countries every five years, allocating a large proportion of its ODA to them. In January 2021, the South Korean government re-selected priority partner countries for the next five years. The new priority partner countries are composed of 11 Asian countries, 8 African countries, 4 Central and South American countries, 2 Middle Eastern countries, and 1 in Oceania [53].

Japan and Korea share very similar developmental approaches. Both have allocated about three-quarters of their total ODA to bilateral ODA over the past decade (OECD statistics). Both countries have been subject to criticism for their self-serving features, including a high proportion of concessional loans and tied aid, often heavily tied to procurement of their own domestic contractors [54–57]. In addition, their aid has primarily focused on the hardware of development (i.e., infrastructure and industrial production) with less concern for the software (i.e., governance and institutions) [58]. In sum, Japan and Korea's ODA have been often regarded as instruments of growth rather than of relief and life-saving assistance.

Nevertheless, both countries deserve serious credit for actively promoting DRR and climate change adaptation, which is referred to as activities that reduce the vulnerability of human and natural systems to the impacts of climate change [59]. As a host country for all three World Conferences on Natural Disasters from 1994 to 2015, Japan has played a leading role in sharing its experience, knowledge, and techniques relating to DRR, and is strongly committed to building a sustainable and resilient international community [60]. Between 1991 and 2010, Japan spent the largest amount of ODA for DRR activities among the DAC donors, disbursing 64% (3.7 billion USD) of the total funding [61]. Furthermore, important synergies exist between the Sendai Framework and Japan's ODA Charter, revised in 2015 for the third time since its initial formulation in 1992. It outlines three basic policies, as follows: (i) contribute to peace and prosperity, (ii) promote human security, and (iii) emphasize self-reliant development and collaboration [62]. Japan's desire for peace, stability, and prosperity in the international community can only be realized when safe and resilient societies are built in developing countries, especially in fragile states. There is overlap in the thematic priorities of Japan's ODA and the Sendai Framework, as both are grounded in "human security" perspectives.

Whereas Japan has been at the forefront of DRR initiatives, South Korea has been at the front of green growth initiatives. In 2005, the concept of "green growth" was pioneered and brought into the discussion by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) during the Fifth Ministerial Conference on Environment and Development (MCED) in Asia and the Pacific held in Seoul, Korea. Regarded as the most appropriate approach for harmonizing economic growth with environmental sustainability, the principles and approaches of green growth attracted significant attention in many countries, and have been incorporated into various DRR activities [63–65].

South Korea is the first country to make green growth a national strategy [64,66]. In response to the 2008 global financial crisis, South Korea adopted "low carbon green growth" as the country's new development vision with the hope of getting the economy back on track. South Korea formulated two major national plans for green growth, as follows: the National Strategy for Green Growth (2009–2050) and the Five-Year Plan (2009–2013). These plans were implemented to ensure that green growth initiatives are pursued in a systematic and organized manner. Around the same time, South Korea launched the East Asia Climate Partnership (EACP), the most significant initiative under "green ODA", and dedicated

200 million USD for 2008–2012 in the form of ODA [67]. Notably, Korea turned its pledge into action to fight climate change and promote green growth. Attempting to establish South Korea as truly a global player, South Korea joined the OECD-DAC in 2010 and pledged to spend 30% of its entire ODA on green projects by 2020, up from 11% in 2007 [68]. Lastly, in the same year, South Korea established the Global Green Growth Institute (GGGI) as a way to extend its green growth strategies into “green ODA”, and to share its green growth experience with developing countries [66].

In South Korea, the presidential election takes place every five years, and the new foreign policy agenda set by a new office shapes the direction and strategies of development cooperation policies, often resulting in policy discontinuity and inconsistency [69]. Aid policy in Korea is strongly determined by the type of vision the new president has for the future of the country. The term “green growth”—a slogan that epitomized the national development policies from 2008–2013—has gradually disappeared in South Korea’s ODA agenda with the start of a new presidency in 2013, but the concept of green growth—reducing environmental impacts of society while still expanding the economy—remained in the ODA agenda under different names and purposes, such as “sustainable development” and “climate change adaptation” [69,70].

As for security and peacebuilding efforts, Korea pledged to increase its support for FCSs and least-developed countries following the endorsement of the New Deal for Engagement in Fragile States in 2011, which is an international guidance document on supporting FCSs. Specifically, South Korea formulated its own guidelines to support FCSs in 2012, a plan to implement the New Deal in 2015, and the Mid-term Assistance Strategy for Fragile States in 2016. South Korea expressed a strong willingness in recent years to contribute to institutional-building, peacekeeping, and the containment of transborder threats in FCSs.

Such evidence of climate, DRR, and peacebuilding initiatives by Japan and South Korea leads us to the following questions: how responsive are Japan and South Korea to the needs of low-income countries, specifically those experiencing compound risks of disasters and conflict? Are these donors more sensitive to the interplay of disasters and conflict, or are they more influenced by one type of risk over the other? For 50 years, developed countries used ODA as a strategic tool to respond to humanitarian crises. In the name of ODA, developed countries have delivered various forms of assistance including projects, trainings, the dispatch of experts and volunteers, and the import of equipment for development cooperation. Indeed, ODA has been the global standard for measuring donors’ responsiveness to the needs of recipient countries, as well as assessing their performance against their pledges. In this study, donors’ responsiveness to disaster risk is measured with the actual amount of ODA disbursed with DRR objectives.

As disasters associated with natural hazards could compromise development and peacebuilding efforts in FCS, this study tests a hypothesis regarding an increase in responsiveness by Japan and South Korea to recipient countries with combined risks. The result of this study would answer our main question of whether Japan and Korea have become donors who are sensitive to the needs of developing countries with fragility and high risks of disaster, moving beyond self-interest by turning their pledges to disaster resilience and peacebuilding into real action.

3. Methodology

3.1. Data Description

We used several indicators to explore the determinants of Japan and Korea’s bilateral DRR aid. For reference, determinants of DRR aid by OECD-DAC donors as a group have also been looked at, which would help us understand in general whether donors’ policies are oriented toward disasters or man-made crises in terms of aid allocation.

As a dependent variable (DV), we used the disbursements of total bilateral ODA, as well as the one of the combined bilateral ODA in five DRR-related sectors. Both are converted to natural logs to account for the skewed distribution. The reason for focusing

on bilateral aid is because most climate aid is bilateral [44,71]. By 2008, bilateral aid represented two-thirds of the 15 million USD categorized as climate aid. According to a study by Victor [72], bilateral environmental aid is over 20 times larger than multilateral climate funds. Additionally, as previously mentioned, our main countries of interest, Japan and Korea, allocate about three-quarters of their total ODA for bilateral ODA. Thus, the bilateral ODA of Japan and Korea, and that of other OECD-DAC donors, is substantively more important and more likely to have discernible effects in the environmental field.

As for the core explanatory variables, we constructed four respective categories (disaster-prone countries, FCS, both, and neither). Countries in the reference category are neither FCSs nor disaster-prone countries, but either low or lower-middle income countries, having a GNI per capita below USD 4045 based on the World Bank country classification by income level.

As for constructing the dummy variable “FCS”, we used the Fragile State Index (FSI). The FSI is based on 12 key political, social, and economic indicators and over 100 sub-indicators. The 12 key risk indicators measure whether conditions with regard to security apparatus, fractionalized elites, group grievance, economic decline, uneven economic development, human flight and brain drain, state legitimacy, public services, human rights and rule of law, demographic pressures, refugees and internally displaced persons, and external intervention, are improving or worsening. developed by a US think tank, the Fund for Peace. Since 2005, the FSI has measured the social, economic, and political pressures facing countries around the world based on a scale of 0–120, with 0 being the lowest intensity (least fragile) and 120 being the highest intensity (most fragile). As a composite index, it is comprised of 12 primary indicators that create a representation of overall fragility and conflict. This is used extensively by government bodies and aid agencies to assess their contributions toward development initiatives [73]. The World Bank and OECD also refer to the FSI when creating their own list of fragile states. From 2016, KOICA, Korea’s ODA agency, also began to refer to the FSI to identify countries in need and to select priority fragile states for support, and now uses a cutoff value of 90 in the FSI score [74]. We apply the same rule and consider a country fragile if it has an FSI score greater than or equal to 90.

As for constructing the “disaster-prone countries” dummy variable, we used the Climate Risk Index (CRI). The CRI uses a country’s fatalities and economic losses to calculate the impacts on each country. The average ranking in four indicating categories, namely number of deaths, number of deaths per 100,000 inhabitants, sum of losses in USD in purchasing power parity, and losses per unit of gross domestic product, are used to calculate the CRI score. The CRI was developed by a German think tank, GermanWatch. This is one of the leading risk indices, and it is highly cited in scientific domain [75–77] The CRI analyzes to what extent countries have been affected by the impacts of extreme weather events based on four sub-indicators, such as fatalities and economic loss [78]. The higher the CRI score, the more vulnerable the country is to disasters associated with natural hazards. Since the average CRI score for around 180 countries in the period of 1990–2018 was 90, this number was used as a cutoff value to create a dummy variable, namely “disaster-prone countries.” In the end, there were a total of 66 low and lower-middle countries in 4 different groups, with 20 in the disaster-prone countries group, 14 in the FCS group, 14 in both, and 18 in neither.

Over the past 20 years, more than 4.4 billion people have been made homeless or injured [79]. According to the ‘Lost at home’ report by UNICEF, in 2019 alone, 33 million new people became internally displaced by conflict and disasters worldwide, around 25 million of which were due to disasters associated with natural hazards. Given that displacement associated with disasters is one of today’s most serious consequences of natural hazards, displacing millions from their home every year, the number of internal displacement cases, provided by the Internal Displacement Monitoring Center (IDMC), is used as an indicator to show the scale and severity of disasters within countries. We did not

put them in same regression model due to the nature of the strong correlation between the number of internal displacement cases and the “disaster-prone countries” dummy variable.

For control variables, we used 11 additional indicators across regression models. They include a population indicator from the UN Population Prospects, as well as fragility and conflict indicators, such as security threat, economic inequality, public services functioning from the Fund for Peace. Macroeconomic indicators, such as GDP per capita, foreign direct investment (FDI), trade openness, and remittances from the World Bank were also used.

Firstly, population is an important predictor of development assistance [24,80–82]. More populous developing countries are expected to be in greater need of development and more likely to receive aid [83] but, at the same time, large population tends to decrease marginal benefits of aid allocation and, thus, aid has been much higher for counties with small populations in relative terms [84]. Secondly, country’s income level (GDP per capita) is also an important factor to consider because the material need of recipient countries is measured by the level of income [85]. As countries with low per capita income have a greater need for foreign aid, donors tended to respond negatively to per capita income [86]. Third, there has been a notion that FDI and aid are complementary sources of capital [87]. While the aid allocation sends a signal to firms that donors have trust in local authorities, FDI decision signals the presence of good physical infrastructure in recipient countries to donor countries. We expect countries receiving larger FDI would attract more aid. Fourth, the degree of the recipient country’s trade openness has been one of the most frequently used determinants of development finance [83,88]. Trade liberalization policies would enhance competitiveness and send signals to donors of the country’s commitment to sound macroeconomic policies. In this study, we expect that donors allocate more aid to reward countries for the good quality of their economic policies, in particular their trade liberalization policies. Lastly, a number of past studies analyzed the relationship between aid and remittances, and found that development aid acts as a complement to remittances [18,89,90]. By improving household capacity to invest in education and healthcare, remittance does improve the recipient country’s absorption capacity, the lack of which has been often pointed out as a bottleneck to aid scaling up. Therefore, remittances can in fact lead to an increase in aid. In this study, we expect likewise.

As for proxies for fragility and conflict, security threats to a recipient country, the presence of basic state functions, and inequality within the economy are selected. Security threats refer to the level of danger associated with events, such as bombings, attacks, rebel movements, or terrorism [91]. Public service functioning refers to the presence of basic state functions in terms of providing essential services, such as health, education, water and sanitation, transport infrastructure, etc. The economic inequality indicator refers to structural inequality that is based on identity groups, such as racial, ethnic, or religious inequality. These proxies are carefully chosen based on the key characteristics of fragile states defined by several institutes [6,92–94] that, as follows: (i) fragile states are active in armed conflicts involving the use of weapons, violence, and force; (ii) they have weak governance, ineffective public administration, and rule of law and, therefore, their government cannot or will not provide its core functions to the majority of its people; and (iii) structural inequality is inherent in those states due to extractive institutions, which prevent some people from having economic opportunities to better their lives. Such inequality in return fuels communal tensions and violence, creating the ‘vicious cycle’. Indeed, all three indicators appear to be good proxies for describing the conditions of state fragility. The higher the score in each indicator, the worse the country’s fragility.

Lastly, we added a couple of regional indicators in regression models on Korea and Japan, such as South and East Asia, and Africa, hoping that our core explanatory variables, fragile states and disaster-prone countries dummy variables, do not spuriously capture the effects of regions since both Korea and Japan tend to favor countries in these two regions in terms of aid allocation. Given that many of these indicators are available from 2008 up to 2018, we conduct a regression analysis based on the 2008–2018 data.

3.2. Methodological Framework

In this study, we use dynamic panel data, meaning that the current behaviors of the dependent variable depend upon past behavior. In addition, some of our explanatory variables are endogenous. For instance, the direction of the causality flow of bilateral ODA to the characteristics of recipient countries remains uncertain.

The quantity of ODA is likely to be endogenous to each recipient country's characteristics. Often, donors are reluctant to interfere in states characterized by low democratic activity, absence of public services, corruption, and a weak legal system [95,96]. There is evidence that poor countries with thorough policies received more financing than equally poor countries with weak economic management and political instability [88]. Besides the situations associated with fragility, countries differ in several ways, such as their colonial history, political regimes, ideologies, religious affiliation, and geographic locations. Failing to take this heterogeneity into account will inevitably produce bias in the results.

Using a lagged dependent variable in panel data regression does come with complications, since lagged dependent variables are correlated with the disturbance term, which is due to unobserved effects, resulting in a bias, particularly in the "small T , large N " context [97]. If individual-level error terms are correlated with the lagged dependent variable to some degree, their coefficients are likely to be biased as well.

The generalized method of moments (GMM) estimators help overcome this problem by utilizing a set of instruments to deal with the potential problem of correlation between the lagged dependent variable and the disturbance term [98]. The Arellano and Bond estimator works by taking the first difference of the regression model to sweep out the individual fixed effect and its associated omitted variable bias; it then uses lagged levels of the dependent variable as instruments for differenced lags of the dependent variable. This is the standard first-difference GMM estimator. A potential weakness in the difference GMM is that the lagged levels are often rather poor instruments for first-differenced variables, and the dependent variable is close to a random walk. Arellano and Bover (1995), and later and Blundell and Bond (1998), identified this weakness and modified the estimator to include lagged levels as well as lagged differences, naming this the system GMM estimator. The introduction of more instruments at both levels and first-differences in the estimation process can dramatically improve efficiency. We will employ the two-step robust option, since it is more efficient than the one-step robust in system GMM [99].

For the possible weaknesses in the estimation results, such as unobserved heterogeneity, endogeneity, autocorrelation, and weak instruments, we conduct the Arellano–Bond AR test for autocorrelation and the Hansen J tests for over-identifying restrictions to provide some evidence of the instruments' validity.

Given the considerations presented above, the GMM is specified as follows:

$$y_{it} = \alpha_1 y_{it-1} + \alpha_2 X'_{it} + \beta_1 D_{it} + \beta_2 F_{it} + \beta_3 C_{it} + u_i + \varepsilon_{it}$$

where y_{it} is the dependent variable (DV) which is either log of per capita ODA or DRR aid of country i at time t . Additionally, y_{it-1} is the one-period lagged dependent variable; X'_{it} represents a vector of control variables; the dummy variable D_{it} captures natural hazard vulnerability, taking 1 for environmentally vulnerable states and 0 otherwise; F_{it} is a measure of fragility and conflict, taking 1 for fragile states and 0 otherwise; C_{it} captures the concomitance of natural hazards and conflicts, taking 1 for countries under compound risks and 0 otherwise; u_i is an unobserved country-specific effect; and ε_{it} is the remainder error term that varies over both country and time.

4. Results

4.1. General Trend of DRR Aid over 2006–2019

Between 2006–2019, 86 billion USD of official ODA was reported as DRR, which constituted approximately 5.8% of the total ODA (1.5 trillion USD) spent by the OECD DAC donor countries over the same period. This DRR aid has increased considerably from

2006 to 2010, rising from 3.3 billion to 7.9 billion USD in 2010, but since then the amount has been up and down around 7 billion USD, standing at 7.3 billion USD in 2019. The increase in DRR aid in 2010 may partially be due to the improved reporting of expenditure to DRR, as 21 out of 24 donors began to report their DRR funding from 2010, compared to only 10 in 2006 [25]. Although a new marker, “disaster risk reduction”, was added to the CRS reporting format in 2019 for 2018 data, there was no significant change in DRR amount from 2017 to 2018.

The DRR aid has been marginal for all donor countries. Table 1 shows that only two donors, Norway and Germany, have spent more than 10% of their total ODA on DRR between 2006–2019. Seven donors (France, Finland, Denmark, Spain, Japan, New Zealand, Czech Republic, and the UK) have allocated around 5–8% of their budgets, and the remaining donors have allocated below 5%. However, in absolute terms, Japan was the second largest donor to DRR, spending 12 billion USD throughout 2006–2019. Korea’s DRR aid has amounted to 4.57%, which is the average percentage for all DAC members in 2006–2019. Overall, data suggest that the majority of OECD donors have not met the wide range of commitments they have made in the DRR framework.

Figure 2. compares the top 10 recipient countries of Japan and Korea with those of OECD-DAC members as a reference. The main recipients of Japan’s DRR aid throughout 2006–2019 were Asian countries, with 7 out of 10 being in East and South Asia; none of these countries were FCSs. In the case of South Korea, the composition of the top 10 recipient countries were more diverse, with four East and South Asian countries, two Central American countries, two Sub-Saharan African countries, and one Middle East country; three of these were FCSs (marked with [F] in the figure). However, 6 out of these 10 are Korea’s priority partner countries (Vietnam, Mongolia, Lao PDR, Nepal, Indonesia, and Mozambique), meaning they were meant to receive Korea’s aid regardless of their state of danger. As for the OECD countries, only one recipient country was a fragile state.

In addition, for both Japan and Korea, a heavy concentration of DRR aid in relatively few countries and perhaps in a small number of projects is found as a pattern. Both countries allocated about 75% of the total DRR aid to their top 10 recipient countries for 2006–2019, whereas OECD-DAC members as a whole allocated about 45% of their total DRR aid to their top 10 recipient countries, meaning that, compared to Japan and Korea, many more high-risk countries shared little funding across many projects. In an exact number figure, 30 countries shared about 75% of the total DRR aid throughout 2006–2019. However, in terms of income classification, only about 18% went to low-income countries, whereas lower-middle income and upper-middle income groups received about 44% and 37% of OECD-DRR aid, respectively. For instance, China, Brazil, and Mexico—classified as upper-middle income countries, received around 6%, 5.1%, and 3.6% of the total DRR aid throughout 2006–2019, respectively, for various types of disasters, which may suggest that, when allocating DRR aid, donors’ main priority is recipient countries’ exposure to natural hazards alone, ignoring the potential for a far greater risk that may arise from the interplay between natural hazards and poverty, as well as conflict in the recipient country.

Figure 3 shows that none of the five DRR sub-sectors exceeded 5% of the total ODA in 2006–2019. Korea’s allocation for reconstruction and rehabilitation and Japan’s allocation for general environment protection rose close to 5% immediately following their endorsement of the Hyogo Framework in 2005, but this did not sustain over time. While investment in all DRR sectors was marginal, constituting less than 1% of the total ODA over time, the amount allocated for the sector of energy generation and renewable sources has fluctuated the most for both countries. Overall, there was no sign of sufficient support for DRR from both countries.

Table 1. The OECD-DAC member's total ODA spending towards DRR in 2006-2019 (unit: USD in millions).

OECD-DAC Members	Energy Generation, Renewable Sources (1)	General Environment Protection (2)	Disaster Risk Reduction (3)	Reconstruction Relief & Rehabilitation (4)	Disaster Prevention & Preparedness (5)	Total DRR Funding (a = 1 + 2 + 3 + 4 + 5)	ODA Total (b)	% of DRR in ODA (a/b)
Germany	9235	8212	189	3199	492	21,328	201,190	10.60%
Japan	4521	3824	1356	1605	874	12,180	183,753	6.63%
United States	463	7154	15	1038	1516	10,185	410,941	2.48%
France	2420	7219	108	306	35	10,088	117,424	8.59%
United Kingdom	841	5528	61	790	786	8006	134,267	5.96%
Norway	1120	4860	43	270	280	6575	43,699	15.04%
Sweden	228	1706	51	188	198	2371	48,116	4.93%
Netherlands	496	1093	81	601	22	2292	59,151	3.88%
Spain	786	742	7	415	118	2068	30,718	6.73%
Canada	776	616	50	216	188	1846	42,999	4.29%
Denmark	285	1259	0	159	41	1744	25,580	6.82%
Australia	42	679	18	492	386	1618	39,428	4.10%
Switzerland	115	799	25	172	165	1276	30,994	4.12%
Italy	435	358	12	327	41	1172	24,599	4.77%
Korea	402	285	43	101	87	918	18,470	4.97%
Finland	283	268	5	186	31	773	10,023	7.71%
Belgium	141	266	2	221	77	707	20,944	3.38%
New Zealand	138	43	4	71	57	312	4898	6.38%
Ireland	7	57	3	152	69	289	8202	3.52%
Austria	89	76	5	40	19	229	10,832	2.11%
Portugal	120	21	0	8	1	150	4056	3.69%
Luxembourg	4	21	4	64	35	129	4186	3.08%
Czech Republic	14	6	2	19	3	45	710	6.27%
Greece	4	26	0	2	0	32	1929	1.65%

Table 1. Cont.

OECD-DAC Members	Energy Generation, Renewable Sources (1)	General Environment Protection (2)	Disaster Risk Reduction (3)	Reconstruction Relief & Rehabilitation (4)	Disaster Prevention & Preparedness (5)	Total DRR Funding (a = 1 + 2 + 3 + 4 + 5)	ODA Total (b)	% of DRR in ODA (a/b)
Iceland	14	1	0	1	2	17	396	4.30%
Poland	2	5	1	5	2	16	1328	1.17%
Hungary	1	1	0	8	0	10	479	2.07%
Slovenia	1	3	0	1	2	8	245	3.37%
Slovak Republic	0	0	0	2	0	2	169	1.32%

Note: Numbers and letters in parentheses in each column are inserted to show how the total DRR funding in column 7 and % of DRR in ODA in column 9 are calculated.

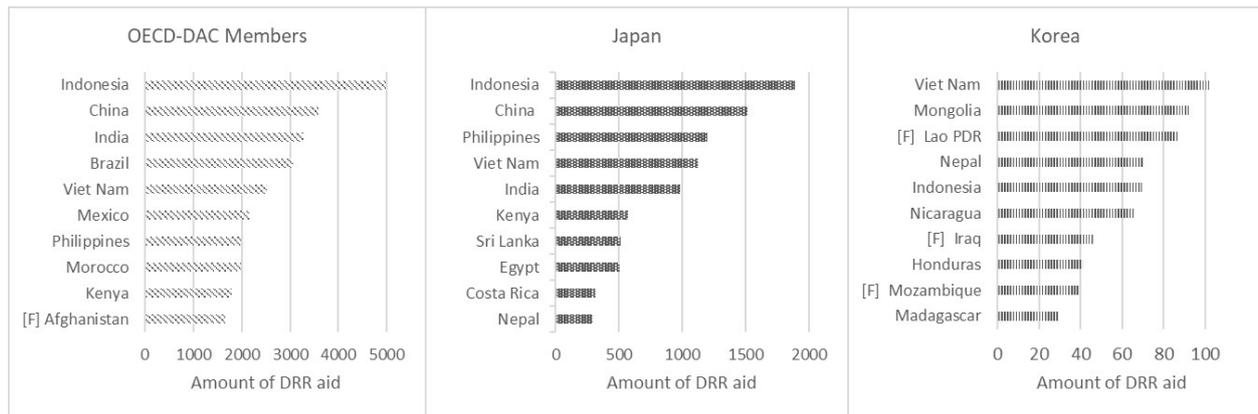


Figure 2. Top 10 DRR recipient countries, 2006–2019 (unit: in USD millions). Note: the author used data from OECD Creditor Reporting System (CRS). Here, [F] indicates fragile states.

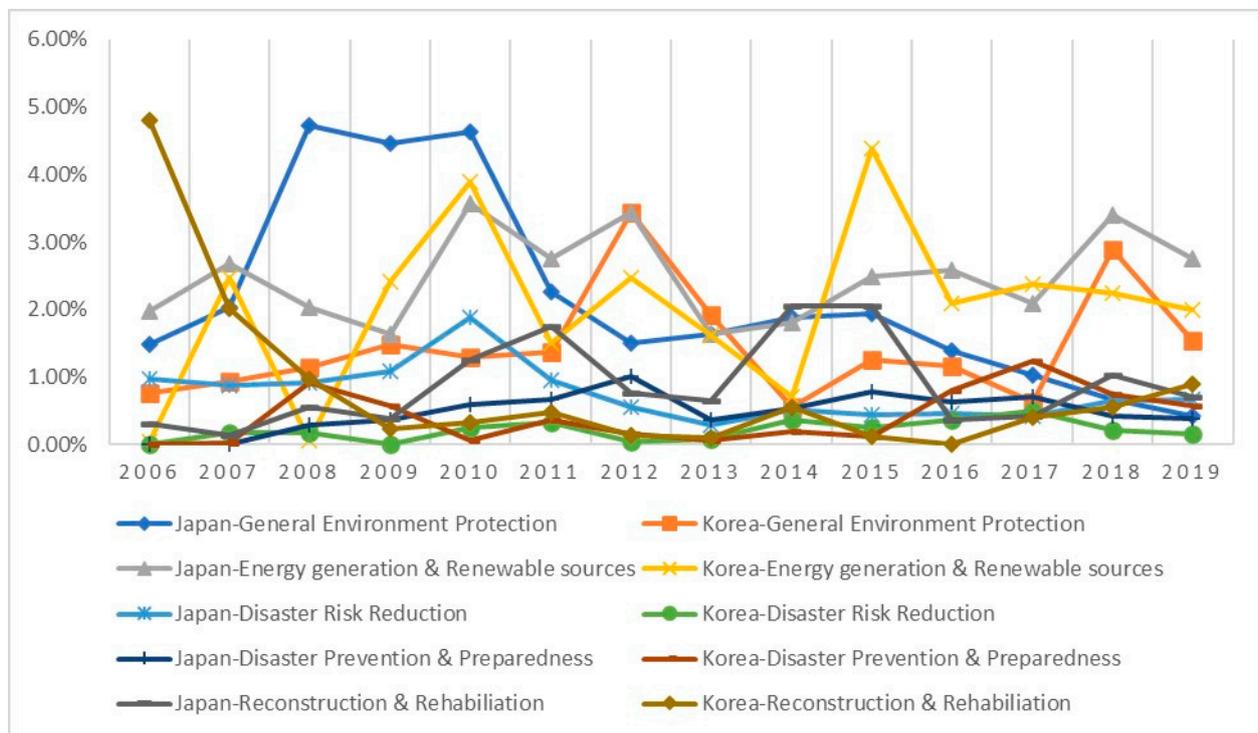


Figure 3. Changes in Japan and Korea’s DRR spending as % of total ODA in 2006–2019. Note: author used data from OECD Creditor Reporting System (CRS).

4.2. Empirical Results

Table 2 provides the estimation results for the allocation of both total bilateral ODA and DRR aid. The coefficients for the three dummy categories show a clear-cut pattern. The results in models 3, 7, and 11 show that OECD-DAC donors, Korea, and Japan provided approximately 36%, 11%, and 39% more of DRR aid to disaster-prone countries, respectively, than those low-income countries in the reference group throughout 2008–2018. This indicates that donor states significantly increase their DRR aid with respect to the recipient countries’ level of disaster risk, but not to their level of fragility and conflict. This reveals that, at least for utilizing DRR aid, the underlying orientations of donor countries are focused on the recipient country’s vulnerability to climate-induced natural hazards rather than being strategically deployed to respond to risks from a combination of disasters, conflict, and fragility. The result that donors do not respond to the DRR needs of

FCSs, could be a reflection of difficulties and challenges in implementing DRR work in FCSs because of violence, social and political instability, weak governance, and a generally unsafe environment [100,101]. Yet, there was no indication that FCSs, nor countries with both frequent conflicts and disasters, receive significantly less aid than those in the reference group.

Given the strong correlation between those dummy groups and their country characteristics, the dummy groups are omitted from models 2, 4, 6, 8, and 10 and, instead, characteristics that describe different dimensions of countries' fragility and conflict are included. As a proxy for vulnerability to natural hazards, internal displacement is included. Korea's aid responsiveness to the recipient country's internal displacement situation was much stronger via its total bilateral ODA. In model 6, a 1% increase in internal displacement cases resulted in a 0.053% increase in the amount of Korea's bilateral ODA but, ironically, such responsiveness disappears in its DRR aid. However, in the case of Japan, internal displacement was an important determinant of its DRR aid. The result of model 12 shows that countries that experienced large internal displacement received larger amounts of DRR aid from Japan. This suggests that Korea's DRR aid may have a specific purpose of strengthening recipient countries' adaptive capacity to climate change, whereas Japan intends to help the victims in post-crisis situations, who are generally poorly assisted by their own government. While recipient countries' internal displacement situation did not have a significant influence on Japan's total bilateral ODA allocation, one must not forget that the amount of Japan's ODA specifically allocated for DRR sectors is significantly larger than that of Korea. For instance, Japan's DRR aid for 2006–2019 was approximately 13 times greater than that of Korea, meaning Japan has spent a significant amount of money for post-crisis situations over the past decade with their DRR aid. Overall, the internal displacement situation is an important factor that influences the ODA budget allocation of bilateral donors.

The population size of the recipient county is included across all models, assuming that larger countries receive more overall aid. While large countries received more DRR aid from Japan and other DAC countries, they received less in terms of overall development assistance, meaning donors are likely to have multiple motivations across different types of aid [102]. The total bilateral aid with multiple objectives may be more likely to be associated with donors' self-interest and, thus, less likely to be used for populous countries where the marginal benefits of aid decrease [84]. However, in the context of DRR aid, donors' altruistic humanitarian motivation tends to play a bigger role because what really matters is helping as many people as possible that are devastated by wars and natural hazards. In case of Korea, population size did not influence its DRR aid allocation.

The most common indicator used in ODA development assistance studies is GDP per capita, which approximates the economic needs of the recipient country's population. The effect of the economic hardship was not strong on Japan and Korea's aid allocation decisions, which is rather surprising since both Japan and Korea have a reputation of favoring countries with growth potential and, thus, growing GDP [24,103]. However, Japan does appear to pursue self-interests in the sense that it has assisted countries with higher FDI. Perhaps such a result can be explained by the fact that institutions and financial systems tend to be better in countries receiving a high level of FDI [104,105] and, thus, more effective use of ODA is guaranteed to some degree. A slight tendency for increased aid for countries with higher FDI and a higher trade share is found for OECD-DAC donors. Both variables are significant at the 0.1 level. This confirms the results of various studies that showed the United Kingdom favored countries that have a high trade share relative to their GDP [58,106].

Table 2. Determinants of bilateral ODA in the period of 2008–2018.

	OECD DAC				South Korea				Japan			
	Bilateral ODA per Capita		DRR Aid		Bilateral ODA per Capita		DRR Aid		Bilateral ODA per Capita		DRR Aid	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Lagged D.V	0.595 *** (0.076)	0.523 *** (0.151)	0.476 *** (0.0765)	0.593 *** (0.167)	0.999 *** (0.100)	0.441 *** (0.078)	0.669 *** (0.153)	0.743 *** (0.125)	0.222 * (0.093)	0.166 ** (0.082)	0.229 ** (0.084)	0.239 ** (0.102)
Disaster-prone countries	0.116 (0.101)		0.362 * (0.184)		0.041 (0.061)		0.113 * (0.051)		−0.034 (0.14)		0.388 * (0.191)	
FCS	0.085 (0.109)		−0.0948 (0.169)		−0.135 (0.495)		0.007 (0.031)		−0.151 (0.141)		−0.0632 (0.123)	
Countries with compound risks	0.141 (0.176)		−0.0730 (0.177)		0.116 (0.479)		0.02 (0.046)		−0.107 (0.153)		0.109 (0.190)	
log of cases of internally displaced persons		0.014 (0.017)		0.045 ** (0.017)		0.053 * (0.024)		−0.002 (0.006)		0.021 (0.016)		0.0604 ** (0.0216)
log of population	−0.175 *** (0.049)	−0.180 * (0.079)	0.309 *** (0.063)	0.293 ** (0.111)	−0.024 (0.387)	−0.297 * (0.16)	0.009 (0.020)	0.006 (0.019)	−0.253 *** (0.051)	−0.242 *** (0.054)	0.200 *** (0.057)	0.192 *** (0.057)
log of GDP per capita	−0.113 (0.07)	−0.225 * (0.099)	−0.108 (0.090)	−0.223 ** (0.083)	−0.033 (0.032)	0.043 (0.145)	0.024 (0.031)	−0.051 (0.032)	−0.026 (0.131)	0.049 (0.104)	0.162 (0.0925)	−0.057 (0.088)
FDI (% of GDP)	0.004 (0.002)		0.0005 (0.003)		0.00005 (0.00011)		0.001 (0.003)		0.008 *** (0.002)		−0.002 (0.003)	
Trade openness (% of GDP)	0.002 (0.001)		0.005 ** (0.002)		−0.0001 (0.049)		0.001 (0.0009)		0.002 (0.001)		0.0006 (0.003)	
log of inflow remittances	−0.006 (0.005)		0.007 (0.009)		−0.031 (0.018)		0.0003 (0.003)		−0.003 (0.0075)		0.012 (0.009)	
Security threats		−0.097 * (0.041)		0.030 (0.041)		−0.199 * (0.1002)		−0.012 (0.012)		−0.078 * (0.04)		0.052 (0.042)
Public Services		−0.211 (0.141)		−0.008 (0.095)		−0.087 (0.111)		−0.019 (0.019)		0.108 (0.087)		−0.547 (0.403)
Economic Inequality		0.020 (0.091)		0.042 (0.065)		−0.037 (0.137)		0.006 (0.027)		−0.079 (0.044)		0.0095 (0.057)
South and East Asia *					0.004 (1.252)	0.212 (0.145)	0.004 (0.105)	0.0001 (0.073)	0.869 *** (0.239)	0.661 * (0.308)	0.993 *** (0.280)	0.632 *** (0.192)
sub-Saharan Africa **					0.859 (1.183)	0.236 (0.256)	−0.075 (0.058)	−0.081 (0.052)	0.109 (0.208)	0.008 (0.151)	−0.0102 (0.252)	−0.130 (0.141)

Table 2. Cont.

	OECD DAC				South Korea				Japan			
	Bilateral ODA per Capita		DRR Aid		Bilateral ODA per Capita		DRR Aid		Bilateral ODA per Capita		DRR Aid	
AR(1)	0.003	0.042	0.000	0.000	0.001	0	0	0.043	0.015	0.027	0.000	0.002
AR(2)	0.132	0.653	0.325	0.739	0.148	0.313	0.463	0.421	0.231	0.462	0.623	0.874
Hansen test of over-identifying restrictions	0.318	0.312	0.543	0.892	0.319	0.516	0.331	0.679	0.164	0.442	0.343	0.607
Observations	500	309	504	313	482	411	504	420	488	412	504	427
Number of groups	60	53	60	53	58	60	60	59	60	61	60	61
Number of instruments	19	28	19	19	21	20	21	19	21	29	21	19

Note: Robust standard errors in parenthesis. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; * South and East Asia countries are as follows: Bangladesh, Bhutan, Cambodia, India, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Timor-Leste, and Vietnam; ** Sub-Saharan Africa countries are as follows: Angola, Benin, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, DR Congo, Congo Republic, Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

The level of recipient country's trade openness had an effect on neither Japan nor Korea, which does not seem very intuitive, as one would expect that Japan and Korea would provide more aid to countries with stronger commercial ties, counting on forming or strengthening trade partnerships [107,108]. However, this study found no evidence that either Japan or Korea tried to pursue national interests by strategically allocating ODA to countries with higher trade flows.

The estimation results show that OECD donors, Japan, and Korea have been reluctant to support states with higher security threats. The allocation of their total bilateral ODA was lesser for those states. However, no such indication was found with their DRR aid. Such mixed results raise the following question: if development aid in general does not work in countries with high-security threats, why should DRR aid should fare any better? Previous studies on environmental aid may answer this question. For instance, Connolly [109] notes that "donors do not always provide aid in order to solve environmental problems . . . sometimes care more about the appearance of doing something . . . than about finding genuine solutions." This image-focused motivation explains why many of the environmental projects marked with the "Rio marker" were unrelated to climate-related projects, which was found in a study by Michaelowa and Michaelowa [46]. The results of our study reinforce their viewpoint that donors have political motives for linking their aid to environmental markers, simply to show that they are "doing something good".

The regional indicators show that Japan has strongly favored countries in South and East Asia when allocating their bilateral aid, including DRR aid. Countries in South and East Asia received a disproportionate quantity of Japan's ODA compared to the rest of the world during 2008–2019. This is consistent with recent statistics that Japan's ODA is still mainly concentrated in the Asian region [110]. In the case of Korea, its priority ODA partner countries have been more diverse in recent years, beyond its traditional Asian partners [111].

5. Conclusions

The study focused on the role of development aid in breaking the negative feedback loop between disasters, conflict, and fragility. Many studies have shown that disasters and conflicts have occurred alongside one another over the past decades. The nexus of disasters, conflict, and fragility have severely undermined peaceful development and poverty reduction because most the world's poor lives in fragile and conflict-affected states. The effects of climate change will only intensify the situation and bring unintended consequences in the future. Despite this relationship, few studies have evaluated the combined risks from disasters and conflict in the development literature. The literature gap is jarring, given that disasters are also a driver of conflict.

In this context, this study examined how two East Asian donors, Japan and Korea, with reference to OECD-DAC donors as a group, have responded to disasters and conflict in their aid allocation. First, the proportion of DRR aid in the total bilateral aid is found to be small for all donors. Most OECD-DAC members spent less than 5% of development aid on DRR activities. Further, DRR aid, particularly of Korea and Japan, has been heavily concentrated in a few developing countries; this especially holds for those located in Asia. Only a fraction of the aid went to FCSs. Thus, DRR aid has not always reached people in most need.

The GMM estimators showed that neither Japan nor Korea is responsive to the compound risk of disasters and conflict. Both donors are found to have been more influenced by recipient countries' disaster vulnerability than their fragility and conflict, implying that the climate aid policies of both Japan and Korea are more oriented toward building resilience in disaster-prone countries. This answers the main question of the study, namely whether Japan and South Korea have moved beyond their self-serving behaviors and responded more effectively to the development needs of FCSs, despite their characteristics of being dysfunctional, fragile, and high-risk, to help them achieve climate-resilient peacebuilding, thereby lessening their ODA policy orientations toward economic consideration. Unfor-

unately, there was no such indication that FCSs and countries with compounding risks received more aid from either Japan or Korea.

In the era of climate change, addressing the root causes of disasters is a strategic priority to end extreme poverty and promote growth in developing countries. Yet, this study found that the topics of fragility and conflict, which have the potential to disrupt governance and the implementation of DRR or any other development programs, are barely considered by Japan and Korea in the DRR program design process. Consequently, no matter the size of DRR funding and efficiency of DRR program design, fragility and conflict make operating environments too difficult for DRR strategies and programs. Indeed, the lack of fragility and conflict considerations in DRR program design becomes a contributing factor that reduces the probability of program success.

As noted earlier, DRR programs in both Japan and Korea are conducted in relatively peaceful and stable contexts. Though conflict makes the attainment of DRR outcomes more challenging, it is necessary to offer opportunities to FCSs to advance DRR and help find innovative ways to manage the impacts of natural hazards. It is time to design a DRR roadmap for fragile and conflict situations, train staff accordingly, and have much patience. In the process, it is vital to build synergies between local and scientific knowledge to establish the right policies and procedures, as the other scientific literature has already suggested [112]. This is the only way to break the negative feedback loop between disaster, fragility, and conflict. Now, the question becomes whether Japan and Korea are willing to acknowledge the link between disasters, conflict, and fragility, and if they can act accordingly. We know that the Sendai Framework and SDGs can only be realized in a world of peace, security, and respect for human rights. Japan and Korea have shown a strong commitment to disaster resilience over the past decade, but still need to reflect on the complexities of conflict and disasters and respond to them in a holistic and integrative manner.

Despite the conclusions and implications drawn from the findings, certain limitations of this study must be noted. It is too early to assess the disbursement and recipients of DRR aid, especially regarding Korea's small DRR aid quantity and, more importantly, there is an overall lack of reliable data relating to aid with DRR objectives. Without accurate coding, donors may over-report or under-report their efforts related to DRR and climate change adaptation to varying degrees. As there is no system in place to verify their claims, identifying aid whose core purpose is clearly climate-relevant and, thus, measuring its true impacts, would be exceedingly difficult. Addressing limitations relating to DRR aid data remains a task for all donors to conduct meaningful studies about the development–disaster–conflict nexus.

Furthermore, this study has limited its analysis to Japan and South Korea's bilateral aid. With various innovative financing mechanisms becoming more prominent in funding developing countries to address climate change issues, it would be necessary to compare the aid delivery and effectiveness via different financial mechanisms in the future.

Author Contributions: S.L. conceived the presented idea and wrote the manuscript with support from H.-j.K. All authors discussed the results and contributed to the final manuscript. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the Global Development Institute for Public Affairs (Research Grant 2020), the Graduate School of Public Administration, Seoul National University.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

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