AFTER THE STORM, BEFORE THE CALM

The Determinants in the Selection and Allocation of Bilateral Emergency Relief to Disaster-Impacted Nations

Causing more than 3.3 million deaths and 2.3 trillion dollars in property damage since 1970, natural disasters have brought nations deadly and costly consequences in the immediate aftermath and in the long road ahead. As the global population grows and as the question of climate change becomes increasingly relevant, the motivation behind emergency relief provision from the top providers, bilateral donors, becomes more and more important in this day and age. How do bilateral donors decide *who* receives relief, and conditional on relief being provided, how do they then determine *how much* relief to allocate? Through limited dependent variable and panel data analyses, this paper affirms that *both* recipients' need and donors' strategic interests significantly determine the selection of relief recipients *and* the allocation of emergency relief. Further analysis also indicates that relief decisions do not appear to depend on the donor type. Contrary to previous thought, both traditionally big aid donors like the U.S. and traditionally small/middle aid donors like Sweden consider *both* their own interests and a recipient's need when deciding who will receive relief. Conditional on relief being provided, evidence suggests that the United States and Sweden are not heavily motivated, respectively, by their own interests and humanitarian concerns.

Ksenija Matijevic
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Introduction

Since 1970, more than 3.3 million have died due to natural hazards such as droughts, earthquakes, floods, storms, and extreme temperature changes.[1] With natural disasters on the rise since the new millennium, recipient need has heightened as seen in the increasing number of deaths and individuals affected by natural hazards.[2] In 2011 alone, natural disasters – led by New Zealand and Japan – cost a record number of $380 billion in insured and uninsured damages, an amount double the figure for 2010 and triple the average in the past decade.[3] In response to such devastating natural disasters, donors have only committed a little over $77.6 billion in emergency response, with only a fifth of total humanitarian assistance provided to countries impacted by natural disasters.[4,5] Given that a comparatively limited amount of relief has been provided in response to such tragic and expensive disasters, it becomes imperative to understand donors' motivations behind relief provision.

In fact, motivations must not be assumed to be only humanitarian, since aid literature in general has found that a bilateral donor's political and strategic interests are the major determinants behind who and how much aid a country overall receives.[6] When aid is further narrowed down to *just* disaster relief, the potential clash between a recipient's need and a donor's interests can still exist. Specifically, disaster relief is designed to address basic human needs through the provision of services such as rescue, food and water, medical assistance, clothing and provisional shelter to disaster victims.[7] However, bilateral donors' relief guidelines indicate that donors may in fact be providing

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[1] World Bank 2010: 10

[2] Since 2005, no less than 750 natural disasters have occurred, with 2010 breaking the new millennium record by having 970 in a given year alone. Furthermore, the amount of deaths vastly changes per year, with 296,000 deaths occurring in 2010 but just 11,000 in 2002.

[3] Thomson Reuters (The Knowledge Effect): 2012

[4] Disaster relief can be separated into 3 categories: emergency relief, reconstruction and disaster preparedness. Emergency response represents roughly 75% of aid given to natural disasters, respective to about 22% in reconstruction and 3% in disaster preparedness. Source: Disaster Aid Tracking Beta Version, using AidData.

[5] Humanitarian aid is "an intervention to help people who are victims of a natural disaster or conflict meet their basic needs and rights." World Bank staff based data from the Financial Tracking System (FTS) of the UN Office for the Coordination of Humanitarian Affairs (OCHA).

[6] A bilateral donor refers to a member state of the United Nations that provides direct assistance to another recipient nation.

[7] In order to be considered emergency relief, assistance must occur up to the first 6-12 months following a man-made or natural disaster. Alabala-Bertrand (1993): 29

disaster relief due to politics rather than just humanitarian concerns.[8] For instance, OFDA (Office of U.S. Foreign Disaster Assistance) claims that disaster-impacted nations can request US assistance not only "if it is of a magnitude with which the *affected community cannot cope*" but also if "it is in the U.S. government's *interest to respond*." Hence, if aid is provided to a recipient nation after a natural disaster, the motivation behind that bilateral donor's provision of disaster relief becomes unclear. This thesis enters this debate by seeking to answer: after a natural disaster, do bilateral organizations base the selection and allocation of emergency relief aid on the recipient country's need or on the donor's political and strategic interests?

In my study, I posit that *both* a recipient nation's need and a donor's strategic and political interests play a significant role in determining *who* receives relief as well as *how much*, conditional on relief being provided in the first place. This perception is based on the assumption that bilateral donors have a limited amount of funding and hence must *choose* to whom to provide relief.[9] I test this theory by looking at natural disasters that occurred in all recipient nations and the subsequent amount of relief provided by the top 5 bilateral donors from 1976 to 2008, inclusive.

My research substantiates that, as a whole, both recipient need and donor interests matter. In terms of recipient need, the greater the impact a natural disaster has on a recipient nation, both the probability that it will receive relief and (conditional on relief being provided) the amount that it will receive will rise. Bilateral donors will select and allocate more disaster relief to recipient nations who have a greater amount of deaths and population affected after a natural disaster. Donor interests also significantly explain who receives relief and how much. Regardless of whether a natural disaster devastates a recipient nation or not, a recipient nation will receive relief and more relief if it has similar state preferences and has had a colonial relationship with the bilateral donor. Furthermore, the more democratic a recipient nation, the greater the likelihood of receiving aid and the larger the amount of relief received. Finally, donor capabilities in

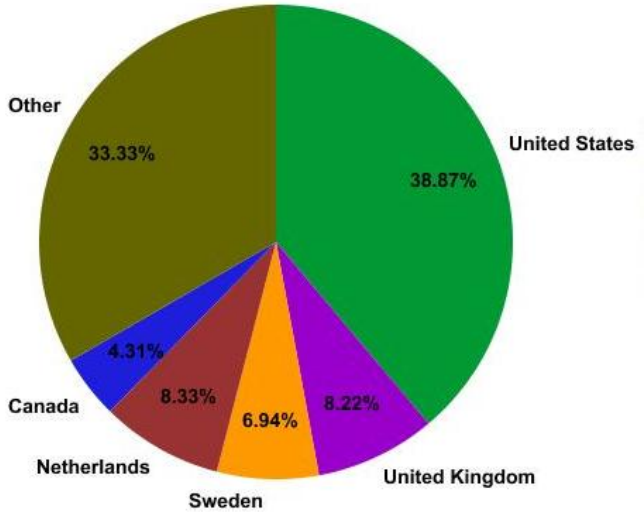
[8] Disaster relief is a subset under the umbrella term for emergency response. Emergency relief is designed as "rapid assistance and distress relief to populations temporarily needing support after natural disasters, technological catastrophes, or conflicts (generally known as complex emergencies)." Fink, G. and S. Redaelli 2009: 4

[9] While bilateral emergency relief budgets can increase year to year based on the level of devastation from disasters in a given year, there is a limit to the extent that funds can expand. For example, the US bilateral organization OFDA usually has roughly a $700 million to $1 billion budget in a given year.

being able to provide relief and recipient abilities in being able to react to a disaster without external assistance are also significantly important. The probability that a recipient nation will receive disaster relief and the amount that it will receive will rise if the recipient nation is larger or poorer and if the bilateral donor is wealthier. This paper thus determines that bilateral donors' selection and allocation of emergency disaster relief is dependent on *both* a recipient nation's need as well as a donor's own egoistic interests, following a natural disaster.

This paper limits its attention to bilateral donors since the latter, on average, provides the most aid amongst bilateral, multilateral, and private donors. When the distribution of aid amongst bilateral donors is analyzed, it is found that roughly 3 donors or fewer provide relief to ¼ of all emergencies.[10] In fact, a very small number of donors provide almost *all* of the emergency relief aid.[11] Roughly two-thirds of all bilateral emergency relief is provided by only 5 countries: the U.S., U.K., Sweden, Netherlands and Canada.[12] The allocation amongst bilateral donors can be seen below:

Percentage of Bilateral Emergency Relief Aid Allocation, 1976-2008



Because emergency relief is mostly provided by bilateral donors and furthermore because most bilateral relief is provided by a limited number of nations, my quantitative analysis

[10] Fink and Redaelli: 2009
[11] Stromberg 2007: 212
[12] AidData's Disaster Aid Tracking Beta Version

focuses on disaster relief provided to recipient nations by the top 5 bilateral donors: U.S., U.K., Sweden, Netherlands, and Canada.

The choice that these five as well as other donors have in deciding how much aid a recipient country receives if at all) will become increasingly important in the coming years, as more natural hazards occur due to climate change and population growth. It is predicted that exposure to cyclones and earthquakes in large cities alone will rise from 680 million people in 2000 to 1.5 billion people in 2050.[13] Even if climate change is an utter myth and the impact/number of natural hazards remains the same, property damages from natural hazards are still projected to increase from $58.3 billion in 2008 to $184.6 billion in 2100 due to income and population growth alone.[14] The increasing number of affected people and property damage from natural hazards, coupled with the small percentage of humanitarian aid allocated to natural disasters, makes this paper's findings, in how bilateral donors decide to whom and how much to give in emergency relief, of paramount importance.

Literature Review

There are currently five categories representative of natural hazards: droughts; earthquakes (including tsunamis, volcanoes and dry mass landslides); floods (including wet mass landslides caused by rain); storms (including cyclones and typhoons); and extreme temperatures (seen in heat and cold waves).[15] What separates a natural disaster from a natural hazard, however, is that a disaster constitutes "the intersection between a hazardous event, the elements at risk (i.e. population; infrastructure) and their vulnerability."[16]

To date, only a limited amount of research specifically examines post-disaster aid. Although a plethora of studies analyze how a nation state politically and strategically allocates relief to domestic communities after a natural disaster,[17] only a few studies go

[13] Brecht et al 2005
[14] Values are measured in 2008 USD/year. Mendelsohn and Saher 2010: 17
[15] World Bank Report: 2010
[16] Peduzzi and Dao (2005): 265-289
[17] There is evidence that governments only distribute the allocated relief to committed regime supporters. For instance, after the 2004 tsunami in Sri Lanka, while 9,120 out of 9,350 Sinhalese homes were rebuilt, only 2,080 out of 10,560 Muslim/Tamil homes were rebuilt in the Ampara region. For more information, read Eisensee, T. and D. Stromberg: 2007; Keefer, P., E. Neumayer and T. Plumper: 2009; Morris, S. and Q. Wodon: 2003.

one step back in questioning the reasons *why* these nation states got aid from bilateral donors in the first place.[18] Due to the limited amount of research, general aid-motivation literature is examined in order to see whether its general findings can be applied to emergency disaster relief.

In general, the foreign aid literature can be divided into two fronts: one stating that recipient need is an instrumental factor in foreign aid decisions, with the other front claiming that it is not humanitarian concerns but donors' political and strategic interests which matter. One of the first scholars to look at aid, Morgenthau (1962) argued that foreign aid did not really change the political and social conditions of recipient nations and further contended that donors like the U.S. needed to clarify their own political and strategic objectives before providing aid. In 1977 and 1978, the scholars McKinlay and Little tested the motivations behind American and British foreign aid provisions by analyzing aid through a donor's absolute commitment (the magnitude of aid granted), a donor's relative commitment (gross aid multiplied by the ratio of per capita GDP to population), and a recipient nation's degree of dependency (aid provided as a percentage of GDP). According to the scholars, the degree of dependency is meant to render the donor more in control of the recipient. In both works, the scholars determined that donor interests prevail over recipient need in determining the allocation of aid. The researchers, Cingranelli and Pasquarello further advanced the understanding of foreign aid in 1985 by distinguishing aid into selection (whether a country receives aid or not) and allocation (how much aid, conditional upon aid being received).

From there, the aid-motivation literature focused on recipient need and donor interests more in depth. While recipient needs denote the economic and social level of development of poor countries, donor interests refer to donors' political interests, national security interests and economic interests in the recipient. In 1988, McCormick and Mitchell argued that a good human rights record of a potential recipient nation had little influence in the probability that it would receive aid but was an important factor in how much aid it would receive once selected. In 1993, Lumsdaine posited that only the U.S.

[18] The largest amount of current research that addresses this question focuses on media coverage. Researchers have found that U.S. disaster relief may be driven by the media coverage of disasters. Specifically, for every person killed in a volcano disaster, 40,000 must die in a drought to receive the same probability of media coverage. Although this research is important, media analysis falls outside the current scope of this paper. For more information on media coverage, please refer to Eisensee, T. and D. Stromberg, 2007; Drury, A. et al, 2005; and the 2010 World Bank Report.

did not really provide more aid based on humanitarian concerns, thus causing aid-motivation literature to begin to differentiate motivations between different types of bilateral donors. Some scholars contended that while traditionally small/middle aid donors like Scandinavian nations based the allocation of aid on recipient need, traditionally big aid donors like the U.S. were only concerned by their own egoistic donor interests.[19] Throughout the years, though, this result has been questioned as some studies have found that Scandinavian aid is also motivated by politics but via trade benefits and pro-socialist ideology.[20] Despite all of this, scholars have generally determined (through a plethora of recent studies) that colonial ties, geographic proximity and similar state preferences significantly determine the selection and allocation of bilateral aid.[21]

Only a couple of papers have so far applied these general findings to emergency disaster relief. In Fink and Redaelli's 2009 paper, the researchers found that donor governments favor smaller, geographically closer, and oil exporting countries. In another 2007 paper, Stromberg discovered similar results and added that colonial ties also play a significant role. Furthermore, speaking a common language correlates to more aid given but has no effect on the selection of who receives aid. While both of these papers followed aid-motivation literature to a tee, the one stark difference is that both papers did not find a positive correlation between being politically aligned and receiving more aid. Fink and Redaelli determined that bilateral donors prefer to provide aid to politically less aligned countries; Stromberg assessed that a recipient with similar voting patterns to the donor is less likely to receive relief with the effect on the amount of aid being positive but only significant at the 10% level. Furthermore, the net effect was not significant whatsoever. Although both scholars determined similar patterns as those in the overall aid-motivation literature, they also did find results that clearly do not align with a plethora of general research in which aid provision is politically and strategically motivated.

Outside of these two papers, there has been an inadequate amount of research done that applies general aid motivation literature to emergency disaster relief. For both

[19] Lumsdaine (1993); Noel and Therien (1995); Olsen, G., N. Carstensen and K. Hoyen: 2003
[20] Schrader, Hook and Taylor (1998)
[21] For more on this literature, refer to Alesina, A. and D. Dollar: 2000; Bueno de Mesquita, B. and A. Smith 2010; Kuziemko, I. and E. Werker: 2006.

of the above-mentioned papers, the major concern lies in the quality of the aid data that is used in the research. In the former paper, Fink and Redaelli utilize the data from the Financial Tracking System (FTS) from the U.N.'s Office for the Coordination of Humanitarian Affairs (OCHA). While the data records how much international relief is provided after individual natural disasters, FTS is voluntary and hence incomprehensive.

The issue with Stromberg's paper is that he focuses on aid that is only committed the same year that a natural disaster occurs. Although emergency relief needs to be given the latest up to 6-12 months after a natural disaster, this does *not* necessarily mean that relief will be provided the same year a disaster occurs. In order to understand the slight difference, one should think of the Thai floods that occurred in late 2011. If a donor decided to provide aid up to the cut off of 12 months after the disaster, aid would technically have been registered in the year 2012 – and hence that aid data would not be used by Stromberg. It is furthermore unrealistic to assume that donors are able to fully coordinate all of the emergency relief just days or even weeks after a disaster strikes: oftentimes, bureaucracy stands in the way or the amount of aid that is needed is unclear in the beginning months. The recent case of the East African drought in 2011-2012 also indicates "a culture of risk aversion" where donors do not efficiently or quickly scale up their response to a crisis until there is enough proof that a humanitarian crisis exists – a crisis which may indeed carry on until the next fiscal year.[22] Hence, Stromberg does not allow for these probable cases and significantly reduces his data by looking at only relief provided in the year of a natural disaster.

Finally, both papers limit the years measured to after the Cold War, therefore further limiting the statistical significance of their respective results. While both Fink and Redaelli and Stromberg attempt to apply general aid-motivation literature to emergency disaster relief, the significance of their results become somewhat questionable, given the limited time frame analyzed and the quality of the aid data used.[23]

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[22] In the case of East Africa, humanitarian agencies and national governments only began to respond 6 months after the drought began until the crisis point had been reached. Tisdall (2012)

[23] As with all disaster relief data, there are certain biases that exist within hazard events and loss information data, some which may be even subject to this paper. These biases can be found in *hazard bias* where some hazard types (i.e. droughts) are underreported; *temporal bias* where losses are comparable over time although reporting procedures actually change; *threshold bias* where disaster data has inherent bias towards catastrophic/deadly events; *accounting* bias where disaster data includes indirect loss and thus skews loss to higher estimates; *geography bias* where losses are comparable across geographic units; and *systematic bias* where monetary reporting of losses varies. For more information, refer to Borden, K., S. Cutter, and M. Gall. 2009

Empirical Design and Theory

In my research, I apply the aid motivations literature to emergency disaster relief in order to examine whether recipient need or donor interests determine who receives relief and how much relief. I posit that both recipient need and donor interests are determinants in the selection and allocation of emergency disaster relief. For the sake of clarity, the term "select" is used to refer to the yes/no decision of whether a donor should provide aid to a country, and the term "allocate" refers to the decision of how much aid should be provided to a country, conditional on the donor providing any aid at all.

Hence, I hypothesize:

H_1. H_{11}: Following a natural disaster, the probability that a bilateral donor will provide relief (selection) and the subsequent amount provided (allocation) to a recipient will *increase*

H_1: as *more people are affected* within a recipient nation

H_2: as *more people die* within a recipient nation

H_3: when there is a *smaller number of disasters around* the world in a given year

H_4: as the *intensity of civil war increases* within a recipient nation

H_5: as there is *more domestic political violence* within a recipient nation

H_6: as a recipient nation's *polity score increases*

H_7: if both nations have had a *colonial relationship since 1945*

H_8: if both nations speak a *common language*

H_9: if the recipient nation is *geographically closer* to a bilateral donor

H_{10}: as a recipient nation's *more net oil exports* within a recipient nation

H_{11}: The *less alike the two nations' state preferences.* After a certain threshold, the *more alike the two nations' state preferences,* relief selection and allocation will *increase.*

I assume that while providing relief because of recipient need is considered humanitarian, doing so because of donor interests is more strategic and political.

Specifically, recipient need refers to the impact that a natural disaster has on a recipient nation and hence how much external assistance a recipient nation needs. Recipient need is measured by the number of deaths and by the number of population affected, following a natural disaster. Furthermore, the number of natural disasters in a given year also indicates recipient need. If more recipient nations are affected by natural disasters in a given year, bilateral donors must divide aid in order to respond to the needs of different recipient populations. Thus, because relief is provided to more recipient nations, the amount one specific recipient nation receives will decrease. Finally, because current aid data does not separate relief provided after natural disasters or man-made emergencies, I include the variables of civil war and domestic political conflict within my analysis. I assume that the more domestic and internal strife that exists within a recipient nation, the greater the recipient need and thus the greater amount of disaster relief.[24]

Donor interests equate to the egoistic concerns of bilateral donors, where bilateral donors provide relief based on their own strategic and political interests, regardless of the impact of a natural disaster or the need of a recipient nation. Because emergency relief restrictions make donors unable to directly stipulate that recipient nations must meet certain conditions,[25] politics plays out in a much less tangible way. Specifically, the underpinnings behind donors' political/strategic interests are that donors would like to either keep or boost the potential benefits from other recipient nations Donors utilize disaster relief allocation as a means to *maintain* or to *foster better* relations with other recipient nations. For instance, these bilateral relations can play out in policy agreements, trade benefits, or even political alliances. Thus, donors consider various variables such as whether both countries speak a common language, are geographically closer, or have had a colonial relationship since 1945; whether a recipient nation has net oil exports; and whether both nations have similar or different state preferences.

In terms of whether both nations have similar state preferences, I theorize that a curvilinear relationship exists. The more aligned the two nations, emergency relief

[24] For instance, if conflict leads to violence or political lockdown, the probability that a population will be unable to meet fully their basic needs (i.e. food; shelter) will increase.

[25] One example of an emergency relief restriction is that disaster relief cannot be a form of tied aid, where recipient nations must meet conditions before donors provide relief. Furthermore, because disasters are exogenous and unpredictable, bilateral donors are unable to forecast whether they will have to provide disaster relief to a recipient nation again. To a certain extent, donors' inability to predict the future makes it difficult for bilateral donors to strategize in how much relief to provide a recipient nation per disaster.

selection and allocation will *decrease.* Once a certain threshold has been reached, however, the more aligned the nations, disaster relief selection and allocation will *increase*. The reason behind why recipient nations who lie at the extremes (smallest and highest level of alignment) will receive the most amount of relief is two-fold. One, bilateral donors will select and allocate more relief to strong allies in order to maintain good relations (i.e., in trade, policy agreements, etc.) – in fact, the cost of a bilateral donor potentially losing this strong alliance outweighs the benefits of saving money by not providing a large amount of relief to the recipient nation. On the other end of the spectrum, a bilateral donor will provide a lot of emergency relief to a recipient nation with the least amount of similar state preferences (and who may even be considered an enemy versus an ally) in order to appease and potentially build a better relationship with the recipient nation. Similarly, the cost of potentially straining relations even more (which could, at the extreme, lead to trade embargos or war) is greater than the benefits of saving money by not providing a large sum of disaster relief to the recipient nation. Hence, the recipient nations that will receive the least amount of disaster relief will be those nations who lie in the middle – who are neither strong allies nor strong foes of the bilateral donor.

I finally theorize that polity is both a quasi-need and quasi-interest variable, potentially representing both humanitarian and egoistic rationale in disaster relief provisions. Under the recipient need argument, polity may be an important variable in indicating whether relief will be pocketed or whether it will be provided to a recipient's population.[26] If bilateral donors care about a recipient population's need, then they will be less likely to provide relief to a corrupt recipient nation (measured through a smaller polity score, as explained in the footnotes). Rather than providing relief directly to the corrupt nation, donors could instead allocate relief to NGOs or multilateral organizations, for example. Under the donor interest argument, bilateral donors will provide relief in order to foster more regimes similar to its own polity score. Ergo, because the top 5

[26] This argument follows the selectorate approach of W/S, where "W" represents the winning coalition (the leader's supporters), and "S" is the selectorate or the set of people with a potential say in who can become leader. While W/S can better technically explains whether a state would allocate money to its citizens versus pocketing it, the polity score can be a simple representation of W/S. Autocratic states generally have relatively small W over large S and hence are more likely more to pocket the money or use it for reasons outside of disaster relief. In democracies, W and S are much larger.

bilateral donors have high polity scores, the more democratic a recipient nation, the greater the likelihood that it will receive (more) disaster relief. Unfortunately, it is difficult to separate both arguments and determine whether recipient need or donor interest better explains why disaster relief is provided to a recipient nation. Thus, recipient polity remains a variable that is both quasi-need and quasi-interest.

Hence, I theorize that, as a whole, *both* a recipient's need and a donor's egoistic interests factor into bilateral donors' selection and allocation of emergency disaster relief.[27] Finally, I apply previous aid literature arguments to my data in order to address whether disaster relief motivations change based on the type of bilateral donor. Specifically, I consider Lumsdaine and other scholars' theoretical notions that, in terms of relief allocation, traditionally big aid donors like the U.S. care more about their own egoistic interests, while traditionally small/middle aid donors are more concerned about the humanitarian needs of the recipient nation. Applying these scholars' theoretical notions to emergency disaster relief, I attempt to clarify whether their results hold for a more specific form of bilateral aid. Hence, these scholars' arguments are translated into the following hypothesis:

H_{12}: *Traditionally big aid donors* (i.e. U.S., U.K) will base the allocation of disaster relief on their own *political/strategic interests* (H_6-H_{11}), while *traditionally small/middle aid donors* (i.e. Sweden, Canada, Netherlands) will base the allocation of disaster relief on *a recipient nation's need* (H_1-H_6).

I additionally conduct two Heckman selection models, separated by both donor types. As recommended by the scholars, Cingranelli and Pasquarello (1985), I re-analyze the analyses using the Heckman model in order to simultaneously assess both the selection and allocation of disaster relief. This estimation is conducted using Stata 12 (StataCorp 2011).

[27] Philosophically speaking, I assume that bilateral donor interests play a role because nations are self-seeking as well as humanitarian – hence, bilateral donors provide relief both because they are self-interested to gain *and* because they care about the devastating impact natural disasters may have on populations. Furthermore, because donors often times have limited emergency relief budgets, they must *choose* which of the needy nations to provide relief, causing both need and politics to play a role simultaneously.

Data Measurements

My data on natural disasters derive from the Emergency Events Database (EM-DAT), maintained by the Center for Re333search on the Epidemiology of Disasters (CRED) at the University of Louvain (Belgium).[28] According to EM-DAT, an event qualifies as a disaster if at least one of the following criteria are met: 10 or more people are reported killed; 100 or more people are reported affected, injured, and/or homeless; the government declares a state of emergency; and/or the government requests international assistance. I limit the data by only looking at natural disasters that occurred due to geophysical events (i.e. earthquakes) or hydro-meteorological events (i.e. floods) per country from 19876-2008, inclusive. In order to see the impact/magnitude of a disaster and thus the recipient's need, I also collect data from EM-DAT on the number of people killed,[29] number of people affected, as well as the total number of natural disasters in a given year.

For information on bilateral aid provided in a given year by the U.S., U.K, Canada, Sweden and Netherlands, I utilize AidData, a data source which aggregates emergency response aid to developing and developed nations from not only DAC donors but also non-DAC members and multilateral organizations.[30] The one shortcoming in AidData is that it does not separate emergency relief provided for countries that experience natural disasters, technological catastrophes or complex emergencies in a given year.

Unlike Stromberg's paper, I do not restrict my attention to relief given during years when natural disasters struck, given that aid may technically be provided the next year if a disaster occurs late the year before (i.e. November or December). Furthermore, because I cannot separate years that include both natural disasters and complex emergencies, it is more logical to look at all of the years as a whole. Because of this, I also control for recipient need during complex emergencies.[31] To measure domestic

[28] The private insurance companies, Swiss Re and Munich Re, respectively maintain the other two possible natural disaster datasets, Swiss and NatCat. These datasets are not in the public domain.
[29] There is more and more research that signifies that countries provide more aid based on deaths versus numbers of people affected. See Stromberg: 2007
[30] DAC donors refer to donors in the Development Assistance Committee, where 24 countries serve as DAC members along with the European Commission. The World Bank, the IMF and the UNDP act as observers. For the most part, DAC members encompass OECD members like the U.S., U.K, Sweden, Netherlands and Canada.
[31] According to the IASC, a complex emergency is a "humanitarian crisis in a country, region or society where there is total or complete breakdown of authority, resulting from internal or external conflict and which requires an

political violence, I use Banks' data set index, which looks at assassinations, general strikes, guerrilla warfare, government crises, purges, riots, revolutions and anti-government demonstrations. These components are then respectively multiplied by 24, 43, 46, 48, 86, 102, 148 and 200 and, once added, are multiplied by 9 to equal the weighted conflict index. I further normalize the data by dividing it so that it may range from 0 to 0.94 with 0.94 representing the highest possible amount of domestic political violence. For the civil war variable, I utilize the UCDP/PRIO Armed Conflicts dataset. My variable measures civil war by taking into account the temporal aspect of conflict. Specifically, the dummy variable codes for whether a conflict has exceeded 1,000 battle-related deaths since the onset of battle, with 1 representing that a conflict has reached the threshold and 0 that it has not.

For donor interests, the measured variables are state preference similarity, geographic distance, colonial history and common languages. I measure the similarity of state preferences by looking at UN General Assembly voting patterns through the Affinity of Nations index from 1980-2010, with 1 theoretically representing the highest possible level of affinity and -1 the least. To represent the curvilinear relationship of affinity, I also square the affinity variable. Geographic distance, colonial history and common languages are measured by using the dataset "CEPII" provided by the Centre d'Etudes Perspectives et d'Informations Internationales. The dyadic version of geographic distance measures distance through the geographic coordinates of the capital cities of both nations. Colonial history is a dummy variable that codes as 1 if two countries have shared a colonial relationship since 1945 and 0 if they have not. A common language dummy variable codes as 1 if at least 9% of the population in both countries speak the same language and 0 if they do not. Furthermore, I measure net oil exports of a recipient nation, as it may explain why some countries may receive more aid.[32] Finally, the quasi-variable polity is reported as -10, representing the most autocratic to 10 representing the most democratic by Polity IV (Marshall, Jaggers and Gurr 2002).

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international response that goes beyond the mandate or capacity of any single agency and/or the ongoing United Nations Program (1996)."

[32] Because the number of observations decreases when I control for oil, I include the oil variable in a separate analysis, which can be found in the Appendix Table.

A set of controls is used to analyze a donor's ability to provide disaster relief and a recipient's capability in relieving its citizens without outside assistance. Through the World Development Indicators, recipient need is measured per country year to control for the country's population in log, as well as the GDP per capita. Modeling after Fink and Redaelli's work, I control for donor capability by controlling for donor GDP per capita as well as donor growth. Finally, I control for the Cold War, given that aid probably decreased overall during this time frame. This variable is coded as 1 through 1989 and 0 after. More information on the descriptive statistics can be found in Table 1.

Table 1: Descriptive Statistics

Variable	Definition	#Obs	Mean	Std. Dev.	Min	Max	Source
Year	**Year**	33624	1992.11	9.55	1976	2008	
Dccode	**Donor country code** 2=United States 20=Canada 200=United Kingdom 210=Netherlands 380=Sweden	33624	162.395	139.3	2	380	World Bank
Rccode	**Recipient country code**	33624	467.8	254.54	2	990	World Bank
AnyAid	**Relief Selection** Binary variable for if any aid is provided 0=no; 1=yes	33624	0.15	0.36	0	1	AidData
logAid	**Absolute Commitment of Bilateral Relief** Natural logarithm of amount of relief provided	5024	13.74	2.01	6.97	20.48	AidData
AidGDP	**Degree of Dependency** Aid provided as a percentage of recipient GDP if aid > 0	4323	0.16	0.76	4.05E-07	22.98	AidData
logAffected	**Population Affected** Natural logarithm of number of people who require immediate assistance after disaster	30404	3.91	5.31	0	19.65	EM-DAT
logDead	**Number of deaths** Natural logarithm of number confirmed or presumed dead	30404	1.96	2.48	0	12.61	EM-DAT
Banks' Conflict Index	**Domestic Political Violence** Normalized value for number of incidents in a given year	27658	0.001	0.02	0	0.21	Banks
Civil War CumInt	**Civil War Intensity** Binary variable for cumulative intensity of civil war since the onset of fighting 0<1,000 battle deaths 1=1,0000+ battle deaths	33624	0.09	0.28	0	1	UCDP Armed Conflict Dataset

Variable	**Definition**	**#Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Source**
Total Disasters	**Total number of disasters around the world in a given year**	30404	2.42	5.82	0	102	EM-DAT
Recipient Polity	**Recipient Polity Score** -10=autocracy 10=democracy	24544	0.89	7.39	-10	10	Polity IV Project
Alignment w/Donor	**Affinity of Recipient Nation to Bilateral Donor**, measured through voting patterns in the UN General Assembly	33190	0.295	0.39	-1	1	Affinity of Nations
(Alignment w/Donor)^2	**Squared value of Affinity of Recipient Nation to Bilateral Donor**	33190	0.241	0.24	0	1	Affinity of Nations
Colony (<1945)	**Colonial Ties** Binary variable for if two countries shared a colonial relationship since 1945 0=no; 1=yes	29749	0.06	0.24	0	1	CEPII
Common Language	**Common Language** Binary variable for if at least 9% of both state populations speak the same language 0=no; 1=yes	29749	0.23	0.42	0	1	CEPII
Ln(Distance)	**Geographic Distance** Natural logarithm of the distance between two country capitals	29749	8.69	0.75	5.15	9.86	CEPII
Recipient Oil	**Recipient Net Oil Export** Recipient oil "exports - imports" as percentage of recipient gross domestic product	14872	-11.27	24.25	-341.4	91.57	OECD
Ln(Donor GDP per capita)	**Donor Wealth** Natural logarithm of donor gross domestic product per capita	33624	10.01	0.24	9.6	10.55	OECD
Donor Growth	**Donor Wealth**	33624	1.93	1.78	-4.02	6.27	Penn Table
Ln(Recipient Population)	**Recipient Population** Natural logarithm of recipient population	30049	15.38	2.06	9.4	21	Penn World Table
Ln(Recipient GDP per capita)	**Recipient Wealth** Natural logarithm of recipient gross domestic product per capita	25831	7.59	1.59	4.15	11.67	Penn World Table
Recipient FDI as % GDP	**Foreign Direct Investments** Amount of recipient FDI as percentage of gross domestic product in a year	23801	4.06	18.95	-82.89	564.92	Penn World Table
Middle East	**Middle East Region** Binary variable 0=no;1=yes	31205	0.11	0.31	0	1	EM-DAT

Variable	Definition	#Obs	Mean	Std. Dev.	Min	Max	Source
Europe	**Europe Region** Binary variable 0=no; 1=yes	3120	0.24	0.43	0	1	EM-DAT
Africa	**Africa Region** Binary variable 0=no; 1=yes	31205	0.25	0.43	0	1	EM-DAT
North America	**North America Region** Binary variable 0=no; 1=yes	31205	0.06	0.24	0	1	EM-DAT
South America	**South America Region** Binary variable 0=no; 1=yes	31205	0.11	0.31	0	1	EM-DAT
Asia	**Asia Region** Binary variable 0=no; 1=yes	31205	0.21	0.41	0	1	EM-DAT
Cold War	0=1989-2008; 1=1976-1989	33624	0.42	0.49	0	1	

To look at the relevant importance of different variables such as donor interest and recipient need, I introduce them into the respective regressions sequentially – both with and without controls included. Selection is calculated in a "yes" and "no" format (with 0 = no and 1 = yes), while allocation is measured through *absolute commitment*, which measures the natural logarithm of the amount of relief committed to various recipient nations. The natural logarithm is used to measure the amount of committed relief because as a donor continues to increase the amount of relief, the impact decreases more and more until it is virtually no longer as important. Furthermore, I apply McKinlay and Little's previous work into this thesis by examining aid allocation through the *degree of dependency* that a recipient nation has on the amount of relief committed, in order to see whether any results statistically change.

Specifically, the selection of emergency disaster relief is analyzed through a limited dependent variable model. Without controls, the selection model can be illustrated through the following equation:

$$AnyAid_{i,t} = \beta_0 + \beta_1(Ln(Affected))_{it} + \beta_2(Ln(Dead))_{it} + \beta_3(Bank's\ Conflict\ Index)_{it} + \beta_4(Civil\ War\ Cumulative\ Intensity)_{it} + \beta_5\ (Total\ Disasters)_{it} + \beta_6(Recipient\ Polity)_{it} + \beta_7(Donor\ Alignment)_{it} + \beta_8(Donor\ Alignment)^2_{it} + \beta_9(Colony)_{it} + \beta_{10}(Common\ Language)_{it} + \beta_{11}(Ln(Distance))_{it} + \varepsilon$$

With controls, the equation is illustrated below:

$$AnyAid_{i,t} = \beta_0 + \beta_1(Ln(Affected))_{it} + \beta_2(Ln(Dead))_{it} + \beta_3(Bank's\ Conflict\ Index)_{it} + \beta_4(Civil\ War\ Cumulative\ Intensity)_{it} + \beta_5\ (Total\ Disasters)_{it} + \beta_6(Recipient\ Polity)_{it} + \beta_7(Donor\ Alignment)_{it} + \beta_8(Donor\ Alignment)^2_{it} + \beta_9(Colony)_{it} + \beta_{10}(Common\ Language)_{it} + \beta_{11}(Ln(Distance))_{it} + + \beta_{13}(Ln(Donor\ GDP\ per\ capita))_{it} + \beta_{14}(Donor\ Growth)_{it} + \beta_{15}(Ln(Recipient\ Population))_{it} + \beta_{16}(Ln(Recipient\ GDP\ per\ capita))_{it} + \beta_{17}(Ln(Recipient\ FDI\ as\ \%\ GDP))_{it} + \beta_{18}(Cold\ War)_{it} + \varepsilon$$

When allocation is examined, a panel data regression model, illustrating a cross-country time series model with fixed effects, is utilized. Specifically, for absolute commitment, the equation representative of the model is illustrated below:

$$Ln(Aid)_{i,t} = \beta_0 + \beta_1(Ln(Affected))_{it} + \beta_2(Ln(Dead))_{it} + \beta_3(Bank's\ Conflict\ Index)_{it} + \beta_4(Civil\ War\ Cumulative\ Intensity)_{it} + \beta_5\ (Total\ Disasters)_{it} + \beta_6(Recipient\ Polity)_{it} + \beta_7(Donor\ Alignment)_{it} + \beta_8(Donor\ Alignment)^2_{it} + \beta_9(Colony)_{it} + \beta_{10}(Common\ Language)_{it} + \beta_{11}(Ln(Distance))_{it} + \varepsilon$$

Below is the model with controls added:

$$Ln(Aid)_{i,t} = \beta_0 + \beta_1(Ln(Affected))_{it} + \beta_2(Ln(Dead))_{it} + \beta_3(Bank's\ Conflict\ Index)_{it} + \beta_4(Civil\ War\ Cumulative\ Intensity)_{it} + \beta_5\ (Total\ Disasters)_{it} + \beta_6(Recipient\ Polity)_{it} + \beta_7(Donor\ Alignment)_{it} + \beta_8(Donor\ Alignment)^2_{it} + \beta_9(Colony)_{it} + \beta_{10}(Common\ Language)_{it} + \beta_{11}(Ln(Distance))_{it} + \beta_{13}(Ln(Donor\ GDP\ per\ capita))_{it} + \beta_{14}(Donor\ Growth)_{it} + \beta_{15}(Ln(Recipient\ Population))_{it} + \beta_{16}(Ln(Recipient\ GDP\ per\ capita))_{it} + \beta_{17}(Ln(Recipient\ FDI\ as\ \%\ GDP))_{it} + \beta_{18}(Cold\ War)_{it} + \varepsilon$$

When examining allocation via a recipient nation's degree of dependency, the model runs the same as the absolute commitment models above, except that now instead of using Ln(Aid), aid as a percentage of GDP (if aid is greater than 0) is utilized.

Results and Interpretation

As a reiteration, I analyze whether recipient need or donor interests determine *which* nation receives relief, following a natural disaster. Conditional on relief being provided, I then analyze whether donor interests and recipient need impact *how much* relief a recipient nation receives. The reason these two results are separated is because recipient need and donor interests may impact selection and allocation in different ways. Below, I first examine selection (*who* receives relief) and then allocation *(how much* relief*).*

TABLE 2
Limited Dependent Variable Analyses of Whether Nations Receive Bilateral Disaster Relief

	MODEL 1 Is Relief Provided?	MODEL 2 Is Relief Provided?	MODEL 3 Is Relief Provided?	MODEL 4 Is Relief Provided?
Ln(Affected)	0.010 (0.001)**	0.006 (0.001)**	0.010 (0.0006)**	0.006 (0.0006)**
Ln(Dead)	0.015 (0.001)**	0.011 (0.001)**	0.015 (0.001)**	0.011 (0.001)**
Banks' Conflict Index	1.650 (0.136)**	1.271 (0.144)**	1.790 (0.138)**	1.275 (0.146)**
Civil War Cumulative Intensity	0.103 (0.007)**	0.097 (0.007)**	0.108 (0.007)**	0.100 (0.008)**
Total Disasters	-0.002 (0.0004)**	-0.001 (0.0004)**	-0.002 (0.0004)**	-0.001 (0.0005)**
Recipient Polity	-0.003 (0.0004)**	0.002 (0.0005)**	-0.003 (0.0004)**	0.002 (0.0005)**
Alignment w/Donor	-0.042 (0.008)**	-0.040 (0.010)**	-0.043 (0.008)**	-0.043 (0.010)**
(Alignment w/Donor)^2	0.102 (0.012)**	0.070 (0.014)**	0.101 (0.012)**	0.068 (0.014)**
Colony (<1945)	0.074 (0.010)**	0.052 (0.011)**	0.075 (0.010)**	0.052 (0.011)**
Common Language	-0.003 (.006)	-0.016 (0.007)*	-0.003 (0.006)	-0.017 (0.007)*
Ln(Distance)	0.031 (0.004)**	0.006 (0.005)	0.031 (0.004)**	0.007 (0.005)
Ln(Donor GDP per capita)		0.068 (0.019)**		0.066 (0.019)**
Donor Growth		0.006 (0.002)**		0.006 (.002)**
Ln(Recipient Population)		0.006 (0.003)*		0.005 (0.003)*
Ln(Recipient GDP per capita)		-0.070 (0.002)**		-0.071 (0.002)**
Recipient FDI as % GDP		0.001 (0.0004)**		0.001 (0.0004)**
Cold War		-0.030 (0.008)**		-0.027 (0.008)**
Observations	21,534	18,389	21,534	18,389

Note: z statistics in parentheses (robust standard errors); GDP = gross domestic product; FDI = foreign direct investment
Model 1 and Model 2 are logit analyses while Model 3 and Model 4 probit analyses. All results show marginal effects, where an increase in an independent value by one unit results in a change in the probability of whether disaster relief is provided.
*significant at 5 percent; **significant at 1 percent

Selection:

The first part of my analysis addresses why some recipient nations and not others receive emergency relief, following a natural disaster in their country. My findings support my theory that *both recipient need and donor interests determine* whether a country is selected to receive any relief. Table 2 illustrates how recipient need and donor interests are significant determinants in the selection of disaster relief, with Model 1 demonstrating a direct representation of the theoretical variables of interest. A recipient nation's need matters. After a natural disaster strikes a recipient nation, the probability that that nation will receive disaster relief will *increase* as the impact of a natural disaster becomes greater. These findings are statistically significant at the 99% confidence level. The likelihood that a recipient nation will receive bilateral emergency relief will increase with the more deaths that occur in a recipient nation and the more that its population is affected. For instance, an increase in the number of deaths by one order of magnitude greatens the probability that a nation will receive relief by roughly 2%. Also, a one order of magnitude increase in the number of people affected by a natural disaster increases the likelihood that the recipient nation will receive relief by 1%. These findings are especially relevant in this day and age, given that natural disasters have increasingly killed and impacted a substantial number of people around the world in the past years – this can be seen in the prominent examples of the 2004 South Asian tsunami, the 2010 Haiti earthquake, and the 2011 Japan earthquake/tsunami.

Furthermore, fixed budgets restraints are important determinants. If more natural disasters occur around the world in a given year, the probability that one specific recipient nation will receive aid will decrease. For example, if the number of natural disasters increases to just one more, the probability that a recipient will receive relief that year will decrease by 0.2%. Considering there have been at least 700 natural disasters per year since 2000, this finding is especially significant. For complex emergencies, recipient need also increases the likelihood that a recipient nation will receive relief. This finding can be illustrated in the variables representing both domestic political conflict and civil war intensity. In fact, if a country goes from experiencing less than 1,000 battle-related deaths from the onset of the conflict to 1,000 or more, the probability of receiving aid increases by 10% at a 99% confidence level.

In addition to recipient need, my findings also support that donor interests matter. After a natural disaster strikes a recipient nation, the probability that that nation will receive disaster relief will *increase* if the recipient is of greater political or strategic interest/importance to the bilateral donor. Donor interests can be seen by whether the recipient nation and a bilateral donor have similar state preferences. As theorized, I find a curvilinear relationship between dyadic affinity and disaster relief. The *less alike* a recipient nation's state preferences are to those of a bilateral donor, the probability that the recipient will receive relief will *increase.* However, after a certain level of alignment (0.21), the *more alike* the two state preferences, the probability that the recipient will receive relief will *increase.* Thus, as predicted, the recipient nations who have the least likelihood of receiving relief are those who lie in the middle (who are neither strong allies nor strong foes to the bilateral donor). One thing that should be noted, though, is that, based on the coefficients found in Model 1, the curvilinear relationship appears very minimum. Specifically, the slope is not very steep, hence indicating that the probability for a recipient nation with a 0.21 affinity to receive relief is not dramatically smaller than for a recipient nation whose affinity level is closer to the theoretical extremes of -1 or 1.[33] Additionally, if a recipient nation has had a colonial relationship with a bilateral donor since 1945, the probability that it will receive relief will increase by 7%.

I discover three surprising results in Model 1 that contrast some of my original hypotheses. I find that a recipient nation has a higher probability of receiving relief if it is farther from the bilateral donor and if it is more autocratic (has a smaller polity score). Also, speaking a common language holds no statistical significance in determining whether a recipient nation will receive disaster relief. In order to analyze the robustness of these and the other general findings, I include control variables and add them both sequentially and in groups to the original model. Once control variables are added (as seen in Model 2), I find that geographical distance holds no statistical significance in

[33] When one analyzes which countries fall in this affinity level for the United States, there seems to be a very small number since 2000. However, for donors like the United Kingdom or Canada, some recipient nations that lie in this affinity level are Romania, Cambodia, Saudi Arabia, Iraq and Morocco. It can be argued humanitarianly good that these recipient nations do not have a significantly smaller chance in receiving aid, given the substantial number of people affected by natural disasters within these countries. For example, I find that a total of 435 disasters have affected 2,215,110 people in Romania, and 445 disasters have impacted 2,184,665 people in Morocco since 1976. These natural disasters have furthermore led to an estimated $22.1mn and $7.8mn dollars worth of property damage in Romania and Morocco, respectively.

determining whether a recipient nation will receive aid. However, even if it did, these results may be explained by the fact that a majority of the nations that are geographically close to the 5 bilateral donors are rich OECD countries. Furthermore, with controls added, I surprisingly find that speaking a common language actually decreases the probability that a recipient nation will receive relief. However, these results are minimum at best, leading to only a 1.6% decrease in the probability of receiving aid. When this is coupled with the fact that only *9%* of the two populations need to speak the same language for the variable to hold and that 3 of the 5 bilateral donors speak the common language, English, this finding no longer appears to hold much weight.

Furthermore, recipient polity goes from a negative to a positive coefficient at the 99% confidence level once controls are added into the model. This means that the higher a recipient's polity score – or the more democratic it is – the greater its chances in receiving disaster relief. In fact, the importance of a recipient's polity score becomes especially apparent when one looks at an average recipient nation in the dataset. I predict how a change in polity score will affect the likelihood for an average recipient nation to receive emergency relief:

Table 3: The Impact of Polity on the Selection of Emergency Disaster Relief

Natural Disaster	Recipient Polity Score	Probability of Receiving Relief
Yes	-10	63.8%
Yes	10	77.5%
No	-10	28.1%
No	10	43.2%

As the table above shows, if a disaster strikes a recipient nation in a given year, the probability that it will receive disaster relief will increase from 63.8% to 77.5% if that recipient nation, ceteris paribus, changes from being fully autocratic (-10 polity score) to fully democratic (10). Furthermore, even if the average country in the dataset is not affected by a natural disaster and only by internal strife, the probability that it gets aid will still increase from 28.1% to 43.2% if that country, ceteris paribus, changes from being a fully autocratic country to a fully democratic one. What is interesting to note is

that, while a high polity score increases the probability that a nation will receive emergency relief, the change in the probability is slightly less when a natural disaster strikes a recipient nation compared to when no disaster occurs at all. For instance, a change in a recipient's polity score from -10 to 10 leads to roughly a 13.7% increase in its probability of receiving relief after a natural disaster strikes, versus a 15.1% increase if no disaster occurs. These results hence demonstrate that polity is slightly more important for complex emergencies, seen in man-made disasters like civil wars, versus for natural disasters.[34] My results illustrate that democratic countries are more likely to receive emergency disaster relief after a natural disaster occurs.

Besides changing the impact of polity, common language, and geographic distance, the inclusion of control variables still sustains the findings that *both recipient need and donor interests matter in determining whether a recipient nation will receive relief,* following a natural disaster. Specifically, the control variables added in model 2 account for both a donor's capability to provide relief, measured through a donor's GDP per capita and a through donor's growth in a given year, as well as a recipient nation's ability to relieve its population without external assistance, measured through the size of the recipient population and through the recipient's GDP per capita in a given year. I also include foreign direct investments (FDI) to control for the fact that bilateral donors may be more likely to provide disaster relief to recipient nations with a high FDI as a percentage of its GDP if the bilateral donors either are one of the existent investors in the recipient nation *or* are interested in investing in the recipient nation in the near future. Furthermore, the dummy variable for the cold war is included in model 2, since I expect the likelihood that a recipient nation will receive disaster relief will decrease during the cold war. The reason is two-fold: both sides (democratic v. communistic) would have consistently and expensively tried to outnumber the amount of relief provided to a recipient nation, *and* the pool of potential aid recipients would also have significantly decreased to just pro-democratic ones, considering the make-up of the 5 bilateral donors studied in this paper.

[34] Note that it is entirely possible for natural disaster relief to be provided technically in the year after a disaster strikes. As previously mentioned, it is outside of this paper's ability or scope to separate whether disaster or complex emergency relief is provided in the years that do not experience natural disasters.

Model 2 shows that both donor capability and recipient ability play a significant role in deciding which country receives emergency disaster relief. A donor who has a high GDP per capita and is economically growing is more likely to provide aid to a country. A recipient nation with a greater population to assist and with a smaller GDP per capita in which to do so is more likely to be given relief from outside bilateral donors. As expected, the more foreign direct investment that exists within a recipient country, the greater the chances a bilateral donor will provide relief. The Cold War era alone explains a 3% decrease in the probability that a donor would provide any relief to a recipient nation, following a natural disaster. Finally, models 3 and 4 in Table 2 analyze the motivations behind why a country receives relief after a natural disaster through a probit model. Similar to the results in models 1 and 2, all results remain significant once controls are included. Furthermore, the magnitude and the direction of the variables in the probit analyses are similar to those in the logit analyses.

In general, the results in Table 2 support my prediction that both donor interests *and* recipient need determine whether a country receives emergency disaster relief. Hence, when a natural disaster strikes a recipient nation, a recipient nation will receive disaster relief either if it is strategically important to the bilateral donor or if the impact of the disaster is so great that a recipient nation needs external assistance. Furthermore, the less capable a recipient nation is in relieving its population and/or the more able a donor nation is in providing disaster relief, the probability that that recipient nation will receive disaster relief will rise.

Allocation:

I now look at the question of what factors into *how much* aid a donor provides to a country, conditional on any aid being given in the first place. As a whole, my findings support my theory that *both recipient need and donor interests* determine how much relief is provided to a nation, following a natural disaster. Table 4 represents cross-sectional time series regression models that control for donor country fixed effects. While Models 5 and 6 examine a donor's absolute commitment via the magnitude of aid provided, Ln(Aid), Models 7 and 8 analyze a recipient country's degree of dependency by measuring the provided aid as a percentage of that recipient's GDP.

TABLE 4
Amount of Bilateral Disaster Relief (Fixed Effects Panel Regression)

	MODEL 5 Absolute Commitment Ln(Aid)	MODEL 6 Absolute Commitment Ln(Aid)	MODEL 7: Degree of Dependency Aid as % GDP	MODEL 8: Degree of Dependency Aid as % GDP
Ln(Affected)	-0.018 (0.007)**	-0.021 (0.007)**	-0.005 (0.003)	-0.007 (0.003)*
Ln(Dead)	0.070 (0.015)**	0.036 (0.017)*	-0.013 (0.007)*	-0.001 (0.007)
Banks' Conflict Index	7.027 (1.433)**	6.906 (1.541)**	1.046 (0.643)	1.635 (0.653)*
Civil War Cumulative Intensity	0.729 (0.072)**	0.698 (0.077)**	0.045 (0.032)	0.057 (0.033)
Total Disasters	-0.006 (0.004)	-0.014 (0.005)**	-0.003 (0.002)	0.003 (0.002)
Recipient Polity	-0.028 (0.005)**	-0.014 (0.006)*	-0.007 (0.002)**	0.002 (0.002)
Alignment w/Donor	0.512 (0.147)**	0.340 (0.153)*	0.208 (0.064)**	0.154 (0.065)*
(Alignment w/Donor)^2	-0.003 (0.158)	-0.172 (0.163)	-0.100 (0.070)	-0.143 (0.069)*
Colony (<1945)	0.321 (0.130)*	0.316 (0.141)*	-0.134 (0.059)*	-0.151 (0.060)*
Common Language	0.003 (0.083)	-0.059 (0.086)	0.167 (0.037)**	0.125 (0.037)**
Ln(Distance)	0.119 (0.062)	0.035 (0.065)	0.051 (0.027)	0.009 (0.027)
Ln(Donor GDP per capita)		2.408 (0.327)**		0.140 (0.138)
Donor Growth		-0.035 (0.020)		0.003 (0.009)
Ln(Recipient Population)		0.098 (0.034)**		-0.066 (0.014)**
Ln(Recipient GDP per capita)		-0.331 (0.032)**		-0.173 (0.014)**
Recipient FDI as % GDP		0.008 (0.005)		0.004 (0.002)*
Cold War		0.223 (0.120)		-0.033 (0.051)
Constant	12.011 (0.545)**	-10.703 (3.425)**	-0.279 (0.240)	0.846 (1.452)
Observations	4,034	3,511	3,624	3,511

Note: t statistics in parentheses (robust standard errors); GDP = gross domestic product; FDI = foreign direct investment
*significant at 5 percent; **significant at 1 percent

When looking at relief in terms of absolute commitment, I find that recipient need is an important determinant of *how much* relief is provided to a nation, following a natural disaster. Once controls are added (Model 6), absolute commitment increases the more a natural disaster impacts a recipient nation. Hence, the amount of relief allocated will increase if more people die, following a natural disaster. An increase in the number of deaths within a recipient nation by one order of magnitude will increase the amount of relief committed (measured in natural logarithm) by 0.07. As expected, fixed budget restraints also matter, with an increase in the total number of natural disasters in a given year decreasing the amount of relief provided to a natural disaster. For complex emergencies, as well, recipient need is important: the more domestic political violence and the more intense a civil war within a nation, the amount of aid committed will increase, a result statistically significant at the 99% confidence level. The one surprising result, though, is that as more people within a recipient nation become affected by a natural disaster, the amount of relief committed by bilateral donors will decrease.

There are different ways in which to understand why the amount of aid will increase as more deaths occur but not as more people become affected by a natural disaster. One way to understand these results is to look at them through a political lens and consider that countries may not truly care about the impact a natural disaster may have on individuals. In fact, a donor may have only provided aid in the first place as a face-value attempt to demonstrate that recipient need is important (due to the various types of pressure by the international community, its domestic constituents and the media on the donor to give aid to a country in need). However, once it has provided disaster relief, the donor has done its job by showing the public its face-value commitment to the recipient. Because it does not truly care about the need within a recipient nation, a donor will not provide more relief as more people become affected within a recipient nation. Hence, while the selection of relief recipients would rise, the allocation of relief would decrease as more people in a recipient nation became affected. Another possible reason for why there is an inverse relationship between population affected and allocated disaster relief is that, while a *bandwagon effect* occurs in the selection of aid where a donor chooses to provide relief to a country if it perceives that other donors are doing the same thing, a *free rider problem* exists in aid allocation, where a donor decreases the

amount of aid, since it knows that there will be many other nations that will also be providing relief. Finally, a third logistical explanation is that bilateral donors often provide a typical fixed amount of relief to recipient countries – since the number of people affected can greatly vast from the hundreds to the millions, the impact of a significantly rising affected population on a fixed amount of relief can make it *appear* that donors provide less relief to nations whose population is greater affected. Despite this intriguing result, my findings as a whole support that recipient need determines how much relief is provided to a recipient nation, conditional on relief being provided in the first place.

In addition, donor interests as a whole significantly determine the amount of relief a recipient nation receives after a natural disaster. While statistical significance drops to the 95% confidence level (compared to 99% in the selection models), affinity remains an important indicator. However, unlike the expected curvilinear relationship, it appears that affinity is more linear. Thus, as a recipient nation's state preferences become increasingly similar to those of a bilateral donor, the amount of relief committed (measured in the natural logarithm) will *increase* by 0.34. These results hence become interesting when compared to the findings in the selection model. While nations who are either strong allies or strong foes to bilateral donors have a greater likelihood to receive aid, once relief is provided, the amount of relief increases only as nations become more and more aligned to a bilateral donor.

Furthermore, colonial ties also significantly influence the amount of relief a bilateral donor provides to a recipient nation, following a natural disaster. Being in a colonial relationship with a donor after 1945, ceteris paribus, increases the amount of relief by a 0.32 order of magnitude. However, other variables that measure donor's political and strategic interests are of no statistical importance in determining how much relief is provided. For example, speaking a common language or being geographically close to a bilateral donor has no statistical relevance in deciding how much disaster relief will be committed to a recipient nation, following a natural disaster. Finally, recipient polity is found to matter in the allocation decision of emergency disaster relief. However, the findings run contrary to my previous theories. Statistically significant at the 95%

confidence level, the higher a recipient nation's polity score (a.k.a., the more democratic a recipient nation), the *less* aid a donor provides to a recipient nation.

Recipient ability and donor capability once again play an important role in determining how much relief a bilateral donor provides to a recipient nation. The larger the population and the smaller the GDP per capita of a recipient nation, the more relief it receives. The larger a donor's GDP per capita, the more relief a donor provides. Finally, donor growth, the amount of foreign direct investments within a recipient nation and the Cold War do not play any statistical significance in determining how much relief is provided, conditional on any relief being allocated to a recipient nation after a natural disaster.

Even when regional effects are controlled for, both the selection and allocation of aid in general produce roughly the same results found in Tables 2 and 4. The only differences are that once I control either for the Middle East, Asia or Africa, polity no longer becomes a determining factor for how much aid is given. In fact, when I control for regional effects sequentially, I find that *being Middle East alone increases the probability as well as the amount of relief* to be received – a result that is similar to other findings in the overarching bilateral aid research.[35] *Being African decreases the probability* that a nation will receive aid (most likely due to the fact that Africa receives so much other humanitarian aid), but once aid is provided, *being African increases the amount* of aid given. *Being Asian, however, decreases the probability* that a nation will receive any aid *as well as how much*– an interesting finding, given the significant number of disasters that occur in Asia alone. While being *South American increases the probability* that a nation will receive aid, it *decreases the amount* of aid received once aid is provided. Finally, *being European or North American does not hold any statistical merit* in determining either the selection or allocation of emergency relief.

If regional impacts are dissected even further by looking at the selection and allocation of relief to only nations within a specific region, all of the regional results are the same as the global findings, with the exception of the findings in the Middle East, Africa and Asia. In the Middle East and Africa, I find that having similar state preferences to a bilateral donor is not a significant determinant for either relief allocation

[35] Once again, please refer to Alesina, A. and D. Dollar: 2000;

or selection. Furthermore, the relevance of polity changes depending on the region. For the Middle East, the *more* democratic a country, the larger the likehood in receiving aid and the greater the amount of aid provided.[36] However in Africa, the *less* democratic a country, the greater the chances in receiving disaster relief, with polity playing no role in determining disaster relief allocation. Finally, the only difference between Asia and the global sample is that a recipient's polity score is not a significant factor in determining how much aid is provided.

Outside of just looking at relief allocation through a donor's absolute commitment (the natural logarithm of aid committed), I also analyze whether donor interests and recipient need determine a recipient's degree of dependency on the emergency relief provided, measured by aid as a percentage of its GDP. Here is where the results become strikingly different from the findings found in the absolute commitment models. Once controls are added (Model 8), recipient need is virtually no longer important, as the number of deaths and disasters in a given year are no longer statistically significant. The only result that remains the same is the finding that an inverse relationship exists between an affected population and the amount of disaster relief. Hence, for a one order of magnitude increase in the number of people affected by a natural disaster, the amount of relief received as a percentage of a recipient's GDP will decrease by 0.7%. Even in complex emergencies, recipient need is of less consequence. While domestic political conflicts increase the amount of relief at a now smaller 95% confidence level, cumulative civil war intensity is no longer relevant. Finally, in terms of the quasi-need, quasi-interest variable, recipient polity no longer significantly determines how much relief is provided (although the coefficient does indicate the assumed hypothesis that a recipient nation with a higher polity score will receive more relief than a recipient nation with a lower score).

In order to explain why recipient need may be an important determinant behind absolute commitment but not behind relief provided as a percentage of a recipient's GDP, I take one step back by examining what the degree of dependency even means. A

[36] Given that oil is an important variable that measures donor interest and given that most oil is produced in the statistically relevant Middle East, Appendix Table 1 re-examines selection and allocation of disaster relief by including an oil variable. Note that the number of observations has decreased from 18,389 to roughly 12,112 and 3,522 to 2,065 in the selection and allocation models, respectively. The oil variable represents a recipient's exports-imports as a percentage of the recipient's GDP. Models 14 and 15 include control variables and add a dummy variable to control for the Middle East. Note that the results are roughly similar to what was found in Tables 2 and 4. Whenever there is disparity, it is most likely due to the Middle Eastern regional impacts playing a more significant role in the analysis.

reiteration of the literature review, McKinlay and Little utilized this measurement in order to illustrate the level of leverage that a donor can have on a recipient nation – if a donor provides a relatively large amount of relief to a recipient, then a recipient becomes highly dependent on the bilateral donor, since the donor gives such a large amount of relief relative to a recipient's GDP. However, McKinlay and Little's assumptions behind the degree of dependency variable may not hold well though for emergency disaster relief. As mentioned before, in the case of natural disasters, relief both cannot be tied and depends on the unpredictable nature of natural hazards. Because of this, donors cannot effectively hold leverage over a recipient since a donor cannot ask for tangible conditions and since a recipient does not know if it will ever again even need disaster relief from the bilateral donor. Therefore, donors will not attempt to increase the amount of aid (and hence its own costs) so that relief is a higher percentage of a recipient's GDP after a natural disaster. By providing aid as a higher percentage of a recipient's GDP, the donor cannot effectively and hence does not have more leverage over the recipient because of the emergency relief restrictions set in place by the United Nations and international community. Thus, under this argument, recipient need should not really determine how much relief is provided to a recipient nation, following a natural disaster.

Furthermore, as a whole, donor interests seem to matter more for relief allocation, when relief is viewed through a recipient nation's degree of dependency versus through a donor's absolute committed amount of relief. As an extension of the above arguments, while donors would not increase costs by having relief be a greater proportion of a recipient's GDP due to humanitarian concerns, they would do so if it meant that donors could either maintain or foster better relations with the recipient nation. Having similar state preferences, speaking a common language, and having a colonial relationship in the past all impact how much aid will be provided as a percentage of a recipient's GDP. When looked in depth, however, the results become interesting, as affinity is once again curvilinear (as seen in the selection model). In fact, as a recipient nation becomes more similar to the bilateral donor, more aid will be provided as a percentage of a recipient's GDP. However, after a certain threshold (0.54), the amount of relief provided decreases no matter how much a recipient tries to become more similar to a bilateral donor. Speaking a common language also increases a recipient's degree of dependency, while

geographic distance remains insignificant in determining how much relief is allocated. Furthermore, colonial relationships play a significant role but now in the opposite direction (compared to the findings in the absolute commitment model). While a colonial relationship between a bilateral donor and recipient nation *increases* the absolute amount of money provided, it now *decreases* the money provided as a percentage of a recipient nation's GDP. Hence, once allocation of aid is considered the amount of relief provided as a percentage of a recipient's GDP, some of the findings do change. While donor interests still determine how much relief is provided to a nation, following a natural disaster, recipient need no longer seems to be much of an important indicator.[37]

In sum, Table 4 supports my theory that *both recipient need and donor interests determine how much relief is provided* (to the extent that absolute commitment is concerned) after a natural disaster strikes a recipient nation. When I measure the degree of dependency (aid as a percentage of recipient GDP), I find that recipient need matters less than when measured through a donor's absolute commitment – a finding which may be explained simply by the nature of natural disasters and of international emergency relief restrictions.

Big v. Middle/Small Donors

I finally turn my attention to the question of whether previous aid-motivation findings that large aid donors like the U.S. and the U.K. allocate relief based on their own egoistic donor interests, while small/middle aid donors like Sweden, Netherlands and Canada only consider the humanitarian needs of a recipient nation. I find that while need matters for traditionally small/middle aid donors, donor interests do not significantly explain relief allocation by traditionally big donors. In fact, recipient need better explains how much relief these donors allocate to nations. I also look at relief selection in order to determine whether my results in Tables 2 and 4 change when different donor types are separated. I learn that while donor interests and recipient need seem to prominently influence donors like the U.S., Sweden as a whole is more concerned about recipient need. Controls are added in all four models in Table 5, with models 9 and 10 respectively

[37] Outside of the scope of this paper, further research should be done to analyze the discrepancy behind whether recipient need is a significant indicator in the decision behind the absolute commitment of relief but not in the amount of relief provided as a percentage of recipient GDP.

TABLE 5
Bilateral Disaster Relief: Big v. Small/Middle Donors

	Big Donors		**Small/Middle Donors**	
	MODEL 9 Selection Equation: Is Relief Provided?	MODEL 10 Allocation Equation: Ln(Aid)	MODEL 11 Selection Equation: Is Relief Provided?	MODEL 12 Allocation Equation: Ln(Aid)
Ln(Affected)	0.007 (0.001)**	-0.021 (0.014)	0.006 (0.001)**	-0.023 (0.008)**
Ln(Dead)	0.009 (0.002)**	0.070 (0.033)*	0.011 (0.002)**	0.018 (0.018)
Banks' Conflict Index	0.672 (0.238)*	6.376 (3.243)*	1.710 (0.183)**	6.771 (1.620)**
Civil War Cumulative Intensity	0.060 (0.012)**	0.917 (0.158)**	0.116 (0.009)**	0.577 (0.082)**
Total Disasters	0.001 (0.001)	-0.008 (0.008)	-0.028 (0.001)**	-0.022 (0.006)**
Recipient Polity	0.004 (0.001)**	-0.003 (0.011)	0.0001 (0.001)	-0.020 (0.006)**
Alignment w/Donor	-0.030 (0.013)*	-0.048 (0.198)	-0.023 (0.055)	-0.735(0.646)
(Alignment w/Donor)^2	0.114 (0.21)**	-0.197 (0.271)	-0.160 (0.049)	0.758 (0.562)
Colony (<1945)	0.109 (0.013)**	0.447 (0.188)*	0.059 (0.053)	-0.476 (0.368)
Common Language	-0.012 (0.009)	-0.113 (0.136)	-0.042 (0.010)**	-0.222 (0.124)
Ln(Distance)	-0.038 (0.008)**	-0.243 (0.127)	0.032(0.007)**	0.238 (0.073)**
Ln(Donor GDP per capita)	0.270 (0.032)**	2.542 (0.732)**	0.007 (0.026)	1.845 (0.353)**
Donor Growth	0.013 (0.003)**	-0.072 (0.050)	0.006 (0.002)**	-0.015 (0.021)
Ln(Recipient Population)	-0.004 (0.004)	0.005 (0.063)	0.014 (0.003)**	0.156 (0.038)**
Ln(Recipient GDP per capita)	-0.071 (0.003)**	-0.378 (0.061)**	-0.070 (0.003)**	-0.312 (0.036)**
Recipient FDI as % GDP	0.002 (0.001)**	0.012 (0.009)	0.001 (0.001)	0.008 (0.005)
Cold War	0.005 (0.015)	0.042 (0.308)	-0.044 (0.010)**	0.107 (0.118)
Constant	----------	-7.999 (7.699)	----------	-7.461 (3.729)*
Observations	7,352	1,382	11,037	2,129

Note: z statistics in parentheses (robust standard errors) in Models 9 and 10; t statistics in parentheses (robust standard errors) in Models 11 and 12; GDP = gross domestic product; FDI = foreign direct investment

Selection Models analyze marginal effects through a logit model, while Allocation Models follows a fixed effects panel regression.

*significant at 5 percent; **significant at 1 percent

analyzing the selection and allocation of disaster relief provided by the United States and United Kingdom and 11 and 12 the selection and allocation of relief provided by Sweden, Netherlands and Canada. Note that allocation in Table 5 refers to the absolute amount of relief committed by a donor, as measured by the natural logarithm of aid.

When selection is analyzed in both donor types (Model 9 and 11), I find that recipient need is an important determinant in the selection of relief by both donor types. As more people die and more people are affected within a recipient nation, both types of donors will more likely provide relief to the recipient country. For instance, a one order of magnitude increase in deaths and a one order of magnitude increase in the number of people affected result in almost a 1% increase in the likelihood that a recipient nation will receive relief from either type of donor. For complex emergencies, need also matters, as seen in the positively significant coefficients for both domestic political violence and civil war. Hence, if a recipient nation goes from less than 1,000 battle deaths to 1,000 or more since the onset of civil war, the likelihood that it will receive relief from the U.S. will increase by 6% and from Sweden by 12%. In fact, the only difference between both types of donors is that the number of total disasters is not a significant determinant for bilateral donors like the U.S. For donors like Sweden, though, if there is an additional disaster in the world in a given year, the likelihood that one specific recipient nation will receive relief will decrease by a significant 3%, a result statistically significant at the 99% confidence level.

Donor interests as a whole appear to more relevantly indicate how donors like the U.S. decide whether a nation should receive relief, following a natural disaster. For example, having similar state preferences remains curvilinear, as found in the selection model for the aggregated donors. Hence, the *less* similar a recipient nation and a bilateral donor, the probability that it will receive relief will increase. After a certain threshold however, the *more* similar are the both nations the greater the probability that a recipient nation will receive relief. When these results are compared to the overall ones found in Table 2, I interestingly find that the threshold for the United States is much lower than for all 5 donors. Hence, while countries with a 0.21 affinity level have the smallest chances of receiving relief from the 5 bilateral donors as a whole, countries now with a 0.13 affinity level have the smallest chances of receiving relief from the United States,

specifically. However, when the data is further analyzed to see which countries currently fit this level, I find that there are almost no nations today with this level of affinity for the United States in the past decade. Furthermore, colonial ties and geographic proximity are important determinants for the U.S. and the U.K. in deciding which nation receives disaster relief. A recipient nation having a colonial relationship with one of the two donors since 1945 can increase the probability that a nation will receive by almost 11%, while an order of magnitude decrease in geographic proximity can increase the probability of receiving relief by almost 4%. Furthermore, speaking the same common language does not seem to impact whether a nation receives relief – a logical finding, given the prevalence of the English language around the world.

Contrary to donors like the U.S. and U.K, donor interests for traditionally small to middle aid donors, in general and as a whole, do not seem to statistically determine whether relief is provided to a nation. Donors like Sweden do not consider the level of state preferences or the existence of colonial ties between both nations when determining whether to provide relief to the recipient nation. However, speaking a common language *does* decrease the probability that a recipient nation will receive relief by almost 4% -- however, this finding may not be because small/middle donors do not want to provide relief to its brethren but may be more due to the fact that the languages are very different for these 3 donors (Swedish, Dutch, and French) and due to the fact that not many people around the world speak the former two languages. Finally, the one donor interest that does hold statistical significance for donors like Sweden is geographic proximity. While being closer to a donor *increases* the likelihood of receiving aid from the U.S. and U.K., it *decreases* the chances of receiving aid from Canada, Sweden and the Netherlands. Since previous literature has found that donors care politically more about closer countries, it is interesting that proximity decreases the likelihood of a recipient nation receiving relief from the latter countries. However, this result may simply be an indication of the importance of recipient need, since richer OECD nations lie closer to Canada, Sweden and Netherlands, versus the United States who is close to many of the poorer Caribbean and South American nations.

For allocation, I find that nations like Sweden *to a certain extent* care about a recipient's need than do donors like the United States. For Sweden, for example, a

recipient's need is important to a certain extent. Conditional on aid being provided, Sweden will provide more relief to nations who have larger complex emergencies and hence are in more need. For instance, having 1,000 or more battle deaths since the on-set of civil war increases the amount of relief committed by a 0.58 order of magnitude. Having one more disaster in a given year will also decrease the amount of relief provided to a nation by 0.02. However, the number of people who die within a recipient nation does not significantly determine how much relief a recipient will receive from Sweden. Furthermore, as shown in the aggregate results in Table 4, as more and more people are affected by a natural disaster, the probability that Sweden will provide relief to a recipient nation will decrease. Finally, donor interests do not seem to hold much weight for Sweden. Neither affinity nor colonial ties nor common languages determine how much relief a recipient will receive from Sweden. In fact, the only result that does seem to significantly determine how much relief is provided is geographical distance – where the closer a nation is from a bilateral donor, the less relief it will receive from a donor. The result, however, may be influenced by recipient need, as nations closer to these donors tend to be richer than ones farther away.

Previous literature findings that the U.S. is self-seeking in deciding how much relief to provide *cannot* be supported by the findings in table 5. In fact, donor interests seem to make no significant impact on the U.S. and the U.K. in deciding how much relief to provide to a recipient nation, following a natural disaster. Neither similar state preferences nor geographic proximity nor speaking a common language determine how much relief a recipient nation will receive. The only donor interest variable that does seem to be relevant is colonial history, where having a colonial relationship after 1945 increases the amount of relief allocated by 0.447 – this high coefficient is especially important, given that the importance of colonial history is heavily skewed to Great Britain that had much more colonies than the United States. Furthermore, contrary to theories by scholars such as Lumsdaine, recipient need *does* matter for nations like the United States in deciding how much relief to provide to a recipient nation, following a natural disaster. For example, the more emergency conflict that exists, the more relief the United States will provide. In fact, when compared to Sweden, the U.S. may arguably care even more, given that a one order of magnitude increase in the number of people

who die in a recipient nation will cause relief (natural logarithm) to increase by 0.07. Furthermore, the confusing finding, where a nation receives less relief from Sweden as more of its population is affected, no longer holds any significant merit for nations like the United States.

What is interesting to note in Table 5 is the impact that polity has on both the selection and allocation of aid amongst the donors. In donors such as the U.S. and the U.K., the probability that aid will be provided to a recipient *increases* if the recipient is democratic but bears *no significance* for a donor in determining the amount of aid, conditional on aid being provided. For instance, a one unit increase in a recipient's polity score results in a roughly 0.4% greater likelihood that a recipient will receive relief from the United States or the United Kingdom. On the other hand, for donors such as Canada, Netherlands and Sweden, the recipient's polity score has *no bearing* on whether a country will receive aid, but once aid is provided, the more democratic a nation, the amount of aid that will be given to that nation *decreases*. In fact, a one-unit increase in recipient polity decreases the amount of relief provided by nations like Sweden by a 0.02 order of magnitude.

Finally, the analyses in Appendix Table 2 and 3 are preliminary attempts in using the Heckman sample selection model. Specifically, the Heckman model allows for the possibility that errors in each of the selection and allocation equations are correlated, hence potentially changing results. Similar to the rationale in Table 5, I apply Lumsdaine and other scholars' logic, where nations like Sweden allocate relief based on a recipient nation's humanitarian need while the U.S. base relief allocation on their own egoistic interests, in order to see whether their theory and findings still hold when looking at emergency disaster relief. Hence, this difference provides an exclusion restriction, necessary in order to be able to identify the Heckman model. As a reiteration, this analysis is done in order to clarify previous aid findings and to further deepen the analysis of bilateral emergency relief allocation. Like Table 5, relief allocation is measured through absolute commitment.

The results in Appendix Table 2 and Table 3 support my earlier findings in Table 5. With controls added (Models 18 and 20), I still find that both recipient need and donor interests determine why a nation receives relief, in the first place. In fact, the Heckman

model even strengthens this finding, since nations like Sweden appear to actually care about donor interests – as seen in the significant coefficients for affinity, common language and distance. Once selection and allocation of emergency relief by different donor types is analyzed via the Heckman model, I find results similar to my aggregated results, found in Table 1. Hence, *regardless of the donor type,* recipient need and donor interest determine whether a recipient will receive relief, following a natural disaster. Furthermore, the Heckman model debunks Lumsdaine and other scholar' findings that nations like Sweden or Netherlands heavily care about recipient need. Neither the amount of deaths or the level of internal conflict impact the amount of relief a donor provides to a recipient nation. For big donors like the United States, donor interests also do not seem to clearly determine how much relief a donor will provide – outside of affinity (which is only important for recipient nations who have similar state preferences) and colonial ties, donor interests do not significantly determine whether a country receives any relief after a natural disaster. Conditional on aid being provided, more aid is likely to be given to countries based on recipient need.

Hence, the Heckman model is able to clarify some questionable results found in Table 5 and is furthermore able to help debunk previous literature findings that the motivations behind aid allocation depend on the donor type. Previous findings, where humanitarian concerns motivate relief allocation by Scandinavian nations, are simply not true. Furthermore, donor interests do not 100% dominate allocation decisions by countries, such as the United States. While these findings may be more due to the humanitarian nature of disaster relief rather than the makeup of a bilateral donor, the results found in the Heckman model calls into question the assumptions that only the United States is self-interested and only Scandinavia is humanitarian.

To recap, the findings in general have supported the theoretical predictions that *both recipient need and donor interests as a whole* determine the selection and allocation of bilateral emergency relief after a natural disaster strikes a country in a given year. As predicted, recipient needs and donor interests are significant determinants in deciding *who* gets relief and *how much* relief, conditional on a country receiving the aid in the first place. Even when we include variables such as oil, my results tend to remain the same.

Furthermore, it appears that regions are important in determining who and how much a country gets – while being Middle Eastern alone increases a country's chances of receiving money as well as how much money it will receive, being Asian decreases the probability as well as the amount of money received. This is especially a startling find, given that Asia has been home to many recurring as well as recently significant natural disasters (i.e. the 2004 Asian tsunami/cyclone; the 2011 Japanese tsunami/earthquake; and the 2011-2012 Thailand floods).

When the 5 donors are separated into the U.S. and the U.K. (traditionally big donors) v. the Netherlands, Canada and Sweden (traditionally small/middle donors), the results at first do not seem to indicate that both need and donor interests impact relief selection for both donor types. In fact, Table 5 indicates that while donor interests and recipient need are major determinants for countries like the United States, countries like Sweden care more about humanitarian need. However, once a Heckman model is included, the results are closer to my overall findings, where *both recipient need and donor interest generally determine who receives aid, regardless of the makeup of the bilateral donor.* Furthermore, the Heckman model results call into question previous findings that Scandinavian nations base allocation decisions on just humanitarian need and the United States on just egoistic donor interests. While the lack of significance may be a result of a decrease in the amount of observations, it may also be a result of donor types not having such different motivations as previously thought.

Thus, my analyses shows preliminary evidence to support my predicted hypotheses that *both recipient need and donor interests* as a whole determine *who* receives disaster relief and *how much* relief does a country receive, after a natural disaster strikes a nation in a given year.

Conclusion

In sum, this paper seeks to understand the motivations behind bilateral emergency relief aid provision to recipient nations, following a natural disaster. Because emergency relief accounts for roughly ¾ of all disaster relief aid, this measure is used to investigate decisions behind disaster relief selection and allocation. As the results have shown, both recipient need and political interest are important factors for donors in deciding *who*

receives relief and *how much* relief. It is an important finding that recipient need has some bearing on the selection and allocation of emergency relief in an a world where natural disasters have recently ravaged countries like Pakistan, Haiti, Somalia and Japan and where the number of individuals exposed to disasters is expected to globally double to 1.5 billion people by 2050.

For the currently provided data, it is important to note that countries can only be selected and allocated money *if they request donor assistance.* Because of this underlying assumption, our sample size in our data may be much smaller than currently assumed and hence may skew our results.[38] In the case of affinity, the most recent example can be seen in the 2011-2012 famine in Somalia, where the Islamist group, al Shabaab halted all non-Islamic NGOs and other organizations from providing relief to drought victims.[39] Furthermore, in the case of Cuba and the United States, there have been 4 recent opportunities to provide disaster relief that did not occur due to the two nations not wanting to accept aid from the other.[40] Hence, future research should examine how much the sample size of countries in which a donor will be able to provide aid is limited, and to what extent does this information alter the findings. At this point in time, the current aid data does not provide information on whether a country requested aid from the international community and whether it rejected aid from a potential donor.

Another one of the underlying assumptions in the data is that the aid measures the amount *committed* by donors versus the amount actually *distributed.* In this study, commitment is more of the relevant measurement, since it illustrates whether a state decides to register support for another state. With that said, though, the result that donor interest does not seem to play a role in the allocation of aid may very well be because the measurement of commitment versus distribution is used. Given that a donor may feel

[38] One way in which our results may be skewed is that only low-income nations ask for assistance. In a recent Reuter's report (Thin Lei Win), this type of situation is illustrated in the recent example of the 2011 Asian floods. According to Oliver Lacey-Hall, the regional head of the U.N. humanitarian agency OCHA, "a reluctance is seen to be asking for external assistance." As these Southeast Asian countries grow richer and more developed, there may be a reluctance to ask for aid due to culture or due to fear of damaging their attractiveness to foreign direct investments. With that said, it is unclear whether this reluctance to ask for assistance would be shown in both bilateral and multilateral aid requests. Although the governments of Thailand, Cambodia, and Vietnam were unwilling to request aid from the United Nations in 2011-2012, they did accept relief assistance from bilateral donors, such as the United States, Japan and China to name a few.

[39] National Post: 2012

[40] These four cases occurred after Hurricane Michelle in 2001 as well as Hurricanes Dennis, Katrina and Wilma in 2005. Kelman: 51

pressure by the international community to provide humanitarian relief or may just pressure itself to join the bandwagon of other donors, a donor's committed amount may illustrate what the donor feels it *needs* to do versus what it actually distributes illustrating what the donor *wants* to do. In fact, the potential disparity between both amounts has been seen in the recent case of Haiti. According to a recent U.N. report, as of September 2011, donors have distributed only 43% of the total $4.6 billion pledged for reconstruction in 2010 and 2011.[41,42] The U.S. alone, who was one of the countries to promise the lion's share of relief, has in fact only distributed 30% ($278 million).[43]

Even when money is distributed though, the quality of aid amongst countries needs to be further questioned. In a Swiss Info Videos interview with Louis Eliphate, the Haitian citizen points out that "much of the rebuilding is not really sustainable. These houses donated by the United States don't provide particularly safe roofs over people's heads. We didn't even have a home before but the problem is that the walls of this home is made of plastic so it doesn't make us feel very safe." Hence, further research needs to be done into looking at the distribution of aid both in terms of monetary value as well as quality of relief. At this point in time, however, the data is very limited, since the distribution amount does not specify which disaster it is going towards and since donors often do not provide more relief than usual. In fact, the World Bank 2010 report illustrates how money that would have been spent in a country often times gets rechanneled for disaster related reconstruction purposes. However, once the distribution data improves, research in the near future should compare the commitment versus the distribution of disaster relief.

Finally, this paper looks at the top 5 donors – the United States, United Kingdom, Sweden, Netherlands and Canada – which provide roughly 2/3 of all emergency relief bilateral aid. More analysis can be done in the future by increasing the amount of bilateral donors, but as the law of large numbers suggest, the average of the obtained results from a larger sample should be close to the predicted value from these 5 donors. Once

[41] Webster 2012
[42] Similar to why aid may not be committed to countries, countries may also halt donors from distributing aid. In a 2012 LA Time's article, western NGO officials have stated that "the Pakistani government waited five weeks before allowing international aid organizations to provide relief to floods…due to suspicions of foreign aid groups rising last year after the CIA staged a fake vaccination campaign to catch Osama bin Laden."
[43] Phillips and Provost: 2012

selection and allocation of emergency relief is separated by donor type – the traditionally big aid donors (U.S., U.K.) and the traditionally small/middle aid donors (Canada, Sweden, and Netherlands), I find that both recipient need and donor interests are important for both donor types in deciding *who* receives aid *regardless of the donor type*. In the question of relief allocation, I find results contrary to previous findings by scholars such as Lumsdaine. Conditional to aid being provided, nations like the United States do not really allocate relief just because of their own egoistic interests and allocation of Scandinavian relief is also not purely humanitarian.

For future research, it would be interesting and important to determine whether the decision of new upcoming donors to provide disaster relief follows the same logic as that of the traditional OECD donors. In fact, this seems to be increasingly relevant as the make up of significant humanitarian aid donors is beginning to encompass nations such as Saudi Arabia, U.A.E., Turkey and India.[44] While debate rages over whether these donors will respond to disaster relief in similar ways as DAC donors,[45] recent press releases by these new donors' representatives seem to suggest a similar pattern in deciding who receives relief and how much relief. For example, India's foreign ministry has stated that the reason in handing over $1mn humanitarian aid to Libya is because "the Government of India has been supportive of the people of Libya and has interacted with the *National Transitional Council* (the same de-facto government, established by anti-Qaddafi forces)."[46] Politics have also been cited as a reason behind Turkey's provision of medical humanitarian aid to Gaza. In a press release, a Turkish governmental representative stated that relief was given "upon the request of the *relevant* Palestinian authorities…as a response to the emergent assistance call of the local health officials in the Gaza Strip, *suffering from the illegal blockade* (by Israel)."[47] As donors like Turkey and India increasingly play a role in disaster relief provision, it will be more and more

[44] According to a 2012 Reuters report, the United Nations has reported humanitarian aid between 2006 and 2010 to be $1.247 bn for Saudi Arabia; $589.9 mn for U.A.E.; $97.9 mn for Turkey; and $54.7 mn for India.
[45] This debate was featured in Alex Whiting's Thomson Reuter's article in January, 2012. It is reported that non-DAC donors play a limited role by allowing the affected state to take the lead in managing the aid response, while DAC donors have different national interests as well as concerns about corruption and human rights abuse." Furthermore, according to GPPi's Binder, "the United States may try to export certain cultural values such as the market economy, democracy, etc…by contrast, the Chinese just want to show they will help, but won't necessarily try to export the Chinese system."
[46] Times of India: 2012
[47] Alresalah: 2012

relevant to include these donors in research and examine the similarities and differences behind emergency relief motivations of the traditional DAC and these new non-DAC donors.

Although there have been a couple of previous systematic analyses on post-disaster relief, the data utilized either took place after the Cold War or the data itself was only voluntary. My thesis serves as a jumping point in the developing literature for disaster relief, as it is one of the first research papers that fully applies the current aid-motivation literature to natural disaster emergency relief. When one thinks about natural or man-made emergencies, the current Malaysian Assistant Finance Minister, Datuk Donald Mojuntin, sheds some light in recent comments: "Even though some countries are developed and peaceful, they can not run away from a natural disaster; while other countries frequently face war in the cities or villages, causing hardship among the people."[48] As natural disasters are projected to increasingly affect more individuals, the sheer amount of human loss and property damage can take a significant toll on a nation's progress.[49] Coupled with previous findings that long lasting effects from disasters can be seen through decreased schooling/health, decreased cognitive abilities, increased stunting, and reduced subsequent income,[50] the impact that a natural disaster can have on a nation for many years is devastating. Given the nature and impact that natural disasters as well as complex emergencies can and will have on a nation's people, it is imperative now more than ever to research why one country gets aid versus another and similarly why one gets more than another. This paper takes the first out of many needed steps to do such a task.

[48] Kinabalu 2012

[49] According to a recent Economist article, it is unclear as of now whether the economic toll of disasters is rising faster than global GDP since a wealthier world has naturally more wealth at risk. Nevertheless, "the incidence of spectacular, multi-billion-dollar catastrophes seem certain to rise. A 2007 study led by the OECD reckoned that by 2070, seven of the ten greatest urban concentrations of economic assets (buildings, infrastructure and the like) that are exposed to coastal flooding will be in the developing world; none was in 2005. In that time, assets exposed to such flooding will rise from 5% of world GDP to 9%.

[50] World Bank 2010: 23

APPENDIX Table 1
Bilateral Disaster Relief w/Oil Variable

	MODEL 13 Selection Equation: Is Relief Provided?	MODEL 14 Selection Equation: Is Relief Provided?	MODEL 15 Allocation Equation: Ln(Aid)	MODEL 16 Allocation Equation: Ln(Aid)
Ln(Affected)	0.011 (0.001)**	0.008 (0.001)**	0.003 (0.010)	-0.0002 (0.010)
Ln(Dead)	0.014 (0.002)**	0.012 (0.002)**	0.039 (0.022)	0.022 (0.023)
Banks' Conflict Index	0.973 (0.155)**	0.901(0.158)**	2.425 (1.830)	3.457 (1.842)
Civil War Cumulative Intensity	0.093 (0.008)**	0.096 (0.008)**	0.714 (0.099)**	0.650 (0.099)**
Total Disasters	-0.001 (0.0004)**	-0.003 (0.0005)	-0.003 (0.004)	-.005 (0.005)
Recipient Polity	-0.002 (0.0005)**	0.003 (0.0006)**	-0.022 (0.007)**	0.001 (0.008)
Alignment w/Donor	-0.038 (0.010)**	-0.055 (0.012)**	0.172 (0.206)	0.067 (0.205)
(Alignment w/Donor)^2	0.066 (0.015)**	0.058 (0.017)**	-0.133 (0.222)	-0.228 (0.218)
Colony (<1945)	0.083 (0.012)**	0.052 (0.013)**	0.545 (0.174)**	0.454 (0.179)*
Common Language	-0.019 (0.008)*	-0.028 (0.008)**	-0.049 (0.114)	-0.066 (0.115)
Ln(Distance)	0.033 (0.005)**	0.156 (0.005)**	0.112 (0.078)	0.192 (0.115)*
Recipient Oil	-0.0003 (0.0001)*	0.0005 (0.0002)*	-0.002 (0.003)	0.001 (0.003)
Ln(Donor GDP per capita)		-0.024 (0.024)		1.665 (0.490)**
Donor Growth		0.007 (0.002)**		-0.029 (0.026)
Ln(Recipient Population)		-0.011 (0.003)**		-0.021 (0.046)
Ln(Recipient GDP per capita)		-0.064 (0.003)**		-0.317 (0.047)**
Recipient FDI as % GDP		0.004 (0.0008)**		0.004 (0.014)
Cold War		-0.031 (0.010)**		0.226 (0.162)
Middle East		0.040 (0.011)**		0.811 (0.146)**
Constant	----------	----------	11.929 (0.687)**	-2.932 (5.091)
Observations	12,691	12,112	2,095	2,065

Note: z statistics in parentheses (robust standard errors) in Models 13 and 14; t statistics in parentheses (robust standard errors) in Models 15 and 16 ; GDP = gross domestic product; FDI = foreign direct investment; Oil variable refers to recipient oil exports-imports as % of GDP
Selection Models analyze marginal effects through a logit model, while Allocation Models follows a fixed effects panel regression.
*significant at 5 percent; **significant at 1 percent

APPENDIX Table 2
Heckman Analyses of Relief Recipients and Amount of Aid for Big Donors

	MODEL 17		MODEL 18	
	Selection Equation: Is Relief Provided?	Allocation Equation: Ln(Aid)	Selection Equation: Is Relief Provided?	Allocation Equation: Ln(Aid)
Ln(Affected)	0.043 (0.004)**		0.028 (0.005)**	
Ln(Dead)	0.058 (0.009)**		0.049 (0.010)**	
Banks' Conflict Index	3.366 (0.962)**		2.969 (1.074)**	
Civil War Cumulative Intensity	0.333 (0.050)**		0.378 (0.056)**	
Total Disasters	0.0002 (0.003)		0.004 (0.003)	
Recipient Polity	-0.0007 (0.002)	-0.017 (0.010)	0.019 (0.003)**	-0.025 (0.012)*
Alignment w/Donor	-0.355 (0.044)**	-0.466 (0.151)**	-0.177 (0.064)**	0.262 (0.202)
(Alignment w/Donor)^2	0.830 (0.085)**	-0.040 (0.298)	0.583 (0.099)**	-0.756 (0.314)*
Colony (<1945)	0.470 (0.038)**	-0.405 (0.181)*	0.491 (0.063)**	-0.102 (0.211)
Common Language	-0.021 (0.028)	0.170 (0.132)	-0.069 (0.043)	-0.009 (0.140)
Ln(Distance)	0.047 (0.281)	0.150 (0.123)	-0.152 (0.035)**	-0.118 (0.130)
Ln(Donor GDP per capita)			1.172 (0.146)**	2.230 (0.536)**
Donor Growth			0.064 (0.014)**	-0.125 (0.052)*
Ln(Recipient Population)			-0.027 (0.012)	-0.020 (0.050)
Ln(Recipient GDP per capita)			-0.336 (0.017)**	-0.080 (0.098)
Recipient FDI as % GDP			0.009 (0.003)**	0.0005 (0.009)
Cold War			0.034 (0.067)	0.407 (0.235)
Constant	-2.046 (0.246)**	16.432 (0.004)**	-9.406 (1.491)**	-5.391 (5.499)
Observations	8,613 (1,540)	8,613 (1,540)	7,355 (1,381)	7,355 (1,381)

Note: z statistics in parentheses (robust standard errors); uncensored observations in parentheses for observations
GDP = gross domestic product; FDI = foreign direct investment
*significant at 5 percent; **significant at 1 percent

APPENDIX Table 3
Heckman Analyses of Relief Recipients and Amount of Aid for Small/Middle Donors

	MODEL 19		MODEL 20	
	Selection Equation: Is Relief Provided?	Allocation Equation: Ln(Aid)	Selection Equation: Is Relief Provided?	Allocation Equation: Ln(Aid)
Ln(Affected)	0.040 (0.003)**	-0.066 (0.010)**	0.025 (0.004)**	-0.049 (0.009)**
Ln(Dead)	0.073 (0.007)**	-0.262 (0.021)	0.056 (0.009)**	-0.039 (0.022)
Banks' Conflict Index	10.924 (0.779)**	-2.096 (2.166)	8.416 (0.881)**	-0.416 (2.069)
Civil War Cumulative Intensity	0.564 (0.040)**	0.050 (0.121)	0.541 (0.046)**	0.062 (0.119)
Total Disasters	-0.011 (0.002)**	0.005 (0.006)	-0.014 (0.003)**	-0.007 (0.007)
Recipient Polity	-0.020 (0.002)**	-0.013 (0.006)*	0.001 (0.003)	-0.020 (0.007)**
Alignment w/Donor	-0.273 (0.207)		-0.539 (0.235)*	
(Alignment w/Donor)^2	0.281 (0.187)		0.343 (0.210)	
Colony (<1945)	0.265 (0.225)		0.258 (0.241)	
Common Language	-0.127 (0.039)**		-0.230 (0.043)**	
Ln(Distance)	0.181 (0.022**		0.140 (0.027)**	
Ln(Donor GDP per capita)			-0.017 (0.121)	1.597 (0.280)**
Donor Growth			0.022 (0.009)*	-0.032 (0.022)
Ln(Recipient Population)			0.070 (0.015)**	0.091 (0.042)*
Ln(Recipient GDP per capita)			-0.327 (0.014)**	0.017 (0.060)
Recipient FDI as % GDP			0.003 (0.002)	0.006 (0.006)
Cold War			-0.203 (0.047)**	0.296 (0.115)**
onstant	-2.986 (0.198)**	15.980 (0.357)**	-0.992 (1.287)	-1.966 (2.911)
Observations	12,921 (2,475)	12,921 (2,475)	11,034 (2,115)	11,034 (2,115)

Note: z statistics in parentheses (robust standard errors); uncensored observations in parentheses for observations
GDP = gross domestic product; FDI = foreign direct investment
*significant at 5 percent; **significant at 1 percent

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