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Keeping Friends Close, But Enemies Closer: Foreign Aid Responses to Natural Disasters

--Manuscript Draft--

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Abstract:	How can we square an existing literature which shows that bilateral donors primarily allocate aid to strategic allies with strong anecdotal evidence which suggests that following natural disasters, aid flows to strategic opponents quite generously? In this paper, we address this puzzle by building on the literature in three ways. First, we differentiate between three major types of aid: humanitarian, civil society, and development. Next, we show natural disasters act as an exogenous shock to the strategic calculus donor countries undertake when making foreign aid allocation decisions. Specifically, we argue that donor countries use natural disasters as opportunities to exert influence on strategic opponents through the allocation of humanitarian and civil society aid. However, donors still reserve development aid for strategic allies irrespective of the incidence of natural disasters. Lastly, we substantiate our findings using a new measure of strategic interest that accounts for the indirect ties states share and the multiple dimensions upon which they interact.
Response to Reviewers:	Please refer to our revision memo for our specific comments to the reviewers and editor. Thanks you!

MS. NO. BJPOLS-D-18-00438 ENTITLED "KEEPING FRIENDS CLOSE, BUT ENEMIES CLOSER: FOREIGN AID RESPONSES TO NATURAL DISASTERS"

Dear Professor Leeman,

Thank you for the opportunity to revise and resubmit our manuscript. We believe the manuscript has benefited from the Reviewers' helpful and thoughtful comments. We have revised the manuscript, taking seriously each individual point raised by the Reviewers. The revision memo is organized by first responding to your comments and then addressing the reviewers' points. Our comments and responses are shown in *BLUE* below each point.

We sincerely apologize for the time that it has taken us. Life events intervened, specifically, one of the authors on this project had a child, and that just pushed back our ability to complete and improve the manuscript based on the reviewer comments. However, we have responded to each of the reviewer comments, and very much hope that the work we have put in comes through in our revision letter. Thank you for your consideration of our manuscript.

We hope you agree that the manuscript has improved through this process and we are looking forward to your response.

Sincerely,

Cindy Cheng & Shahryar Minhas

Date: April 8, 2019 Version 0.01.

Reviewer 1

Major Comments.

(1) I think that this paper's primary findingthat donors increase aid to opponents but not to allies in the aftermath of natural disasteris an important one. Both the consideration of the (vast) extant literature on the strategic motivations for aid allocation and the novel theorizing by the authors are done carefully and well. I also appreciate that the finding is supported by a wealth of anecdotal examples.
   - *Thank you for this comment!*

(2) I really like the whole theory section of the paper, especially the careful reading of the strategic environment in aid and the naive vs. more strategic reading of why donors may distinguish between allies and opponents in humanitarian aid-giving. I think this moves the literature forward in a productive way.
   - *Thank you for this comment!*

(3) Theorizing civil society aid: I think that the authors have a choice to make with regards to the discussion of civil society aid. On the one hand, I think that they could group civil society aid with development aid and essentially test humanitarian vs. all other kinds of aid. This would still allow them to both theorize and test the main relationship of the paperthat between strategic alliances and humanitarian aid. On the other hand, if they want to maintain the three-part distinction in types of aid, then there is more theoretical and empirical work to be done in teasing out civil society aid. I note some of the empirical issues in 4b-c. On theorizing:
   - The authors state that civil society aid is "to empower grass-roots advocacy and improve governance and government accountability." This may be true, but there can also be a more strategic logic, especially in strategic opponents. For example, when the U.S. allocates civil society aid to Russia, much of it goes to pro-democracy groups or support for freedom of the press, which does support civil society but is also anti-regime. In this case, civil society aid may be about laying the groundwork for long-term change within strategic allies. It is worth looking into some specific civil society projects that happen after natural disasters to support the logic in the paper that natural disasters serve as an entrance into domestic politics within strategic opponents. In general, the authors need to be more clear about how civil society aid is defined and how it is strategically different from development aid.
     - *Thanks for pointing out where our theory needed further clarification. We absolutely agree with the reviewer that civil society aid can in fact be pursued for more strategic purposes; this was in fact the point that we were trying to make in our paper. We have hopefully since clarified our language to better reflect this. We have also tried to make a clearer distinction between civil society and development aid. Following the reviewer's suggestion, we have also identified some suggestive anecdotal evidence that this may in fact be occurring. We hope that the distinction that we make between civil society and development aid (in brief, supporting civil society has a much higher ability to affect domestic politics, which makes its strategic value much higher than development aid) makes it clearer why testing these two aid categories separately might be fruitful.*

(4) Types of aid: The empirical tests rely on distinguishing between humanitarian, civil society, and development aid. I have several outstanding questions about these distinctions.

- Strategic labeling of humanitarian aid: I would like the authors to consider the possibility that there is a strategic logic to how donors label aid, which may vary between strategic allies and opponents. For example, as illustrated nicely in the authors' Iran example, in order for the U.S. to allocate any aid to Iran, it was necessary to create new aid levers outside of the normal aid bureaucracies and allocation processes. This was true in this specific case because of economic sanctions, but it may also be true in order to generate public appetite for aid going to strategic opponents. With a strategic ally, there are already preexisting development aid channels and it may be more possible bureaucratically to send resources through those channels (without needing a distinct aid category of humanitarian aid) to provide post-disaster support or to enable allied recipients to reallocate, say, budget support in the health sector to disaster relief (and allies tend to receive more fungible forms of aid in the first place). The humanitarian aid classification may thus be more necessary with strategic opponents compared to strategic allies. One way to check this would be to see whether some of the types of aid within development aid increase for strategic allies in the aftermath of natural disasterfor example, do donors allocate more to food aid (but maybe less to other sectors, so the net effect is zero?). This would still indicate humanitarian support for allies, just through different bureaucratic channels.
  - *We have taken up your suggestion and explored the possibility of strategic labelling as illustrated through Figure 9. Here we break down how much development aid was given to countries experiencing that experienced either 0 disasters or 1-3 disasters across different types of development aid. The comparison between 0 or 1-3 disasters was used to maximized comparability, as around 40 percent of the country-years in the dataset had 0 disasters, while 43 percent experienced 1-3 disasters. This figure suggests that i) countries that are strategic allies (located at low levels of strategic distance) are more likely to get more aid related to economic infrastructure and services while ii) countries that experience disasters are much more likely to get debt relief when the they are strategic opponents (that is at high levels of strategic distance), compared to countries that experience 0 natural disasters. However, while Figure 9 does seem to be consistent the reviewer's hunch that it may be easier to distribute different types of aid depending on whether one is a strategic opponent or strategic ally, there does not seem to be much in the way of strategic labelling going on. That is, the additional aid for economic infrastructure services to strategic allies and the additional aid for debt relief appear to be given in on top of existing levels of aid; neither appear to be offsetting other types of development aid.*

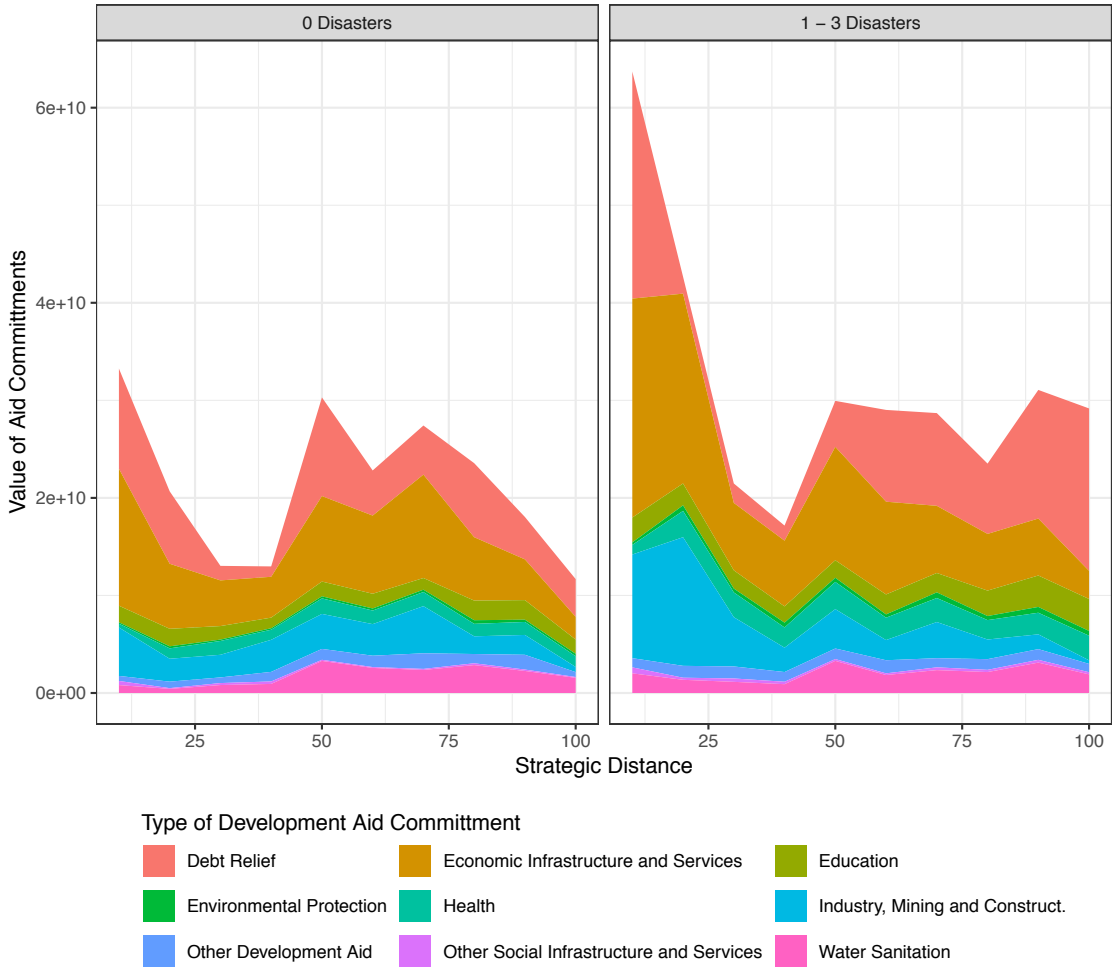

FIGURE 1. Value of Aid Commitments categorized by type of development aid and by the number of disasters

- Why is "women" categorized as civil society aid? Aid aimed at women's empowerment could as easily be categorized as development aid. It would be useful to understand at a project level what types of projects fall into this category to understand whether "women" is capturing, say, women's political organizations or women's economic empowerment. If it is simply a heterogenous category that doesn't fall neatly into any of the authors' categories, then they could re-run the models classifying "women" as civil society vs. development and see if it makes a difference. It is also worth noting that women are disproportionately affected by natural disasters, and there could be a humanitarian logic behind increasing women's programs in the years after a natural disaster.
  - *Reviewer 1's comments cuts to the tension between donor motivations and aid outcomes that we seek to distinguish between in this paper. Indeed, civil society aid as a whole has often been understood as not only promoting civil society for it's intrinsic sake but as an instrumental mechanism to bring about development (Van Staveren and Webbink, 2012; Howell and Pearce, 2002). For that matter, humanitarian aid can also be understood*

as responses to acute crises that are necessary for laying the foundation for longer term developmental outcomes. Given the messy link between motivations for aid and aid outcomes that plague the literature more generally however, we choose in this paper to focus only on donor motivations. To that end, we code aid given to support women as civil society aid however because they are targeted toward promoting women's rights and gender equality, which are commonly accepted to form an important facet of civil society (Esplen, 2016). Nevertheless, we do acknowledge Reviewer 1's argument that it is possible that aid given to support women could have more direct developmental outcomes than what we had originally imagined when we coded this category under civil society aid. However, the overall substantive impact of this decision should be negligible as aid coded as being given to women takes up 0.1% of the total amount of aid considered in this dataset and 3.6% of the aid coded as 'civil society aid' in this dataset. As such, recoding this variable is unlikely to affect our findings.

- There seem to be some missing aid categories. Where do things like governance aid, budget aid, and technical assistance fall? I am particularly wondering whether these categories (especially budget aid) are falling into civil society aid through the "Government and Civil Society" tag, as these are decisively not support for civil society. How does civil society aid relate to Dietrich's notion of bypass aid? Is it always non-governmental?
  - *These aid categories were deliberately excluded from our analysis precisely because it would be difficult to categorize them along the distinctions that we make when we define humanitarian, civil society and development aid. These excluded aid categories take up around 30% of the sum of total aid over the time period under consideration in this paper.*

(5) Empirics: The models rely on testing the interaction term between strategic proximity and the number of natural disasters.

- It would be good to see in an Appendix the factor analysis used to calculate the strategic proximity variable as well as the summary statistics on this variable.
  - *Sure! Please see the Appendix in the revised paper.*
- I would like to see the models re-run using a dummy variable for whether a natural disaster occurred at all rather than the number of natural disasters. I don't see how the number of natural disasters affects the strategic calculus of whether to respond with humanitarian aid, especially since the number of disasters has little to do with their scale. Using a dummy variable would ease interpretation of the interaction terms and their constituent terms. It also seems more consistent with the authors' argument: they argue that natural disasters are a "shock" which prompts donors to respond based on varying levels of strategic alliance.
  - *We have rerun the analysis using a dummy variable for whether a natural disaster occurred instead of a count of natural disasters. We show the substantive results of this analysis below in Figure 2. The findings from this analysis reflect those that we observe when we use the count variable. We have included these revised results in the appendix of our paper.*
  - *We choose to include these results in the appendix rather than as part of the main analysis in our paper because the relative lack of variation in the*

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binary variable makes it impossible to present how aid is distributed differently to strategic allies vs. strategic opponents over increasing intensities of natural disasters.

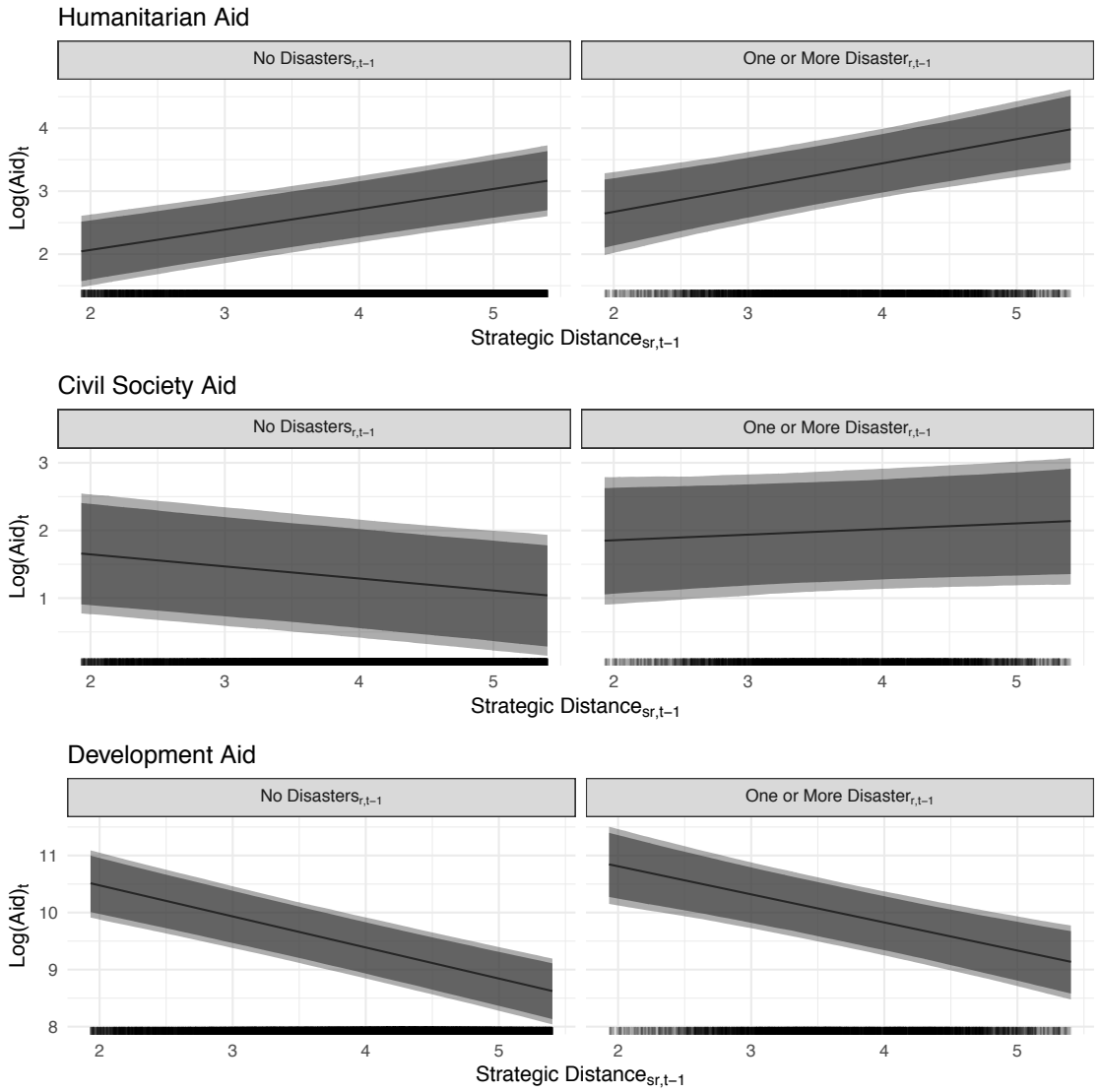

FIGURE 2. Simulated substantive effect plots for development aid for varying lags of variables of interest and whether or not a recipient country experienced a natural disaster across the range of the strategic distance measure.

- If the authors do think that the scale of the natural disaster matters for the response, then using the number of deaths seems more appropriate that the number of disasters, since one large disaster could be far more damaging than five small ones.
  - *We have rerun the analysis using the number killed from a natural disaster instead of a count of the number of natural disasters. We show the substantive results of this analysis below.*

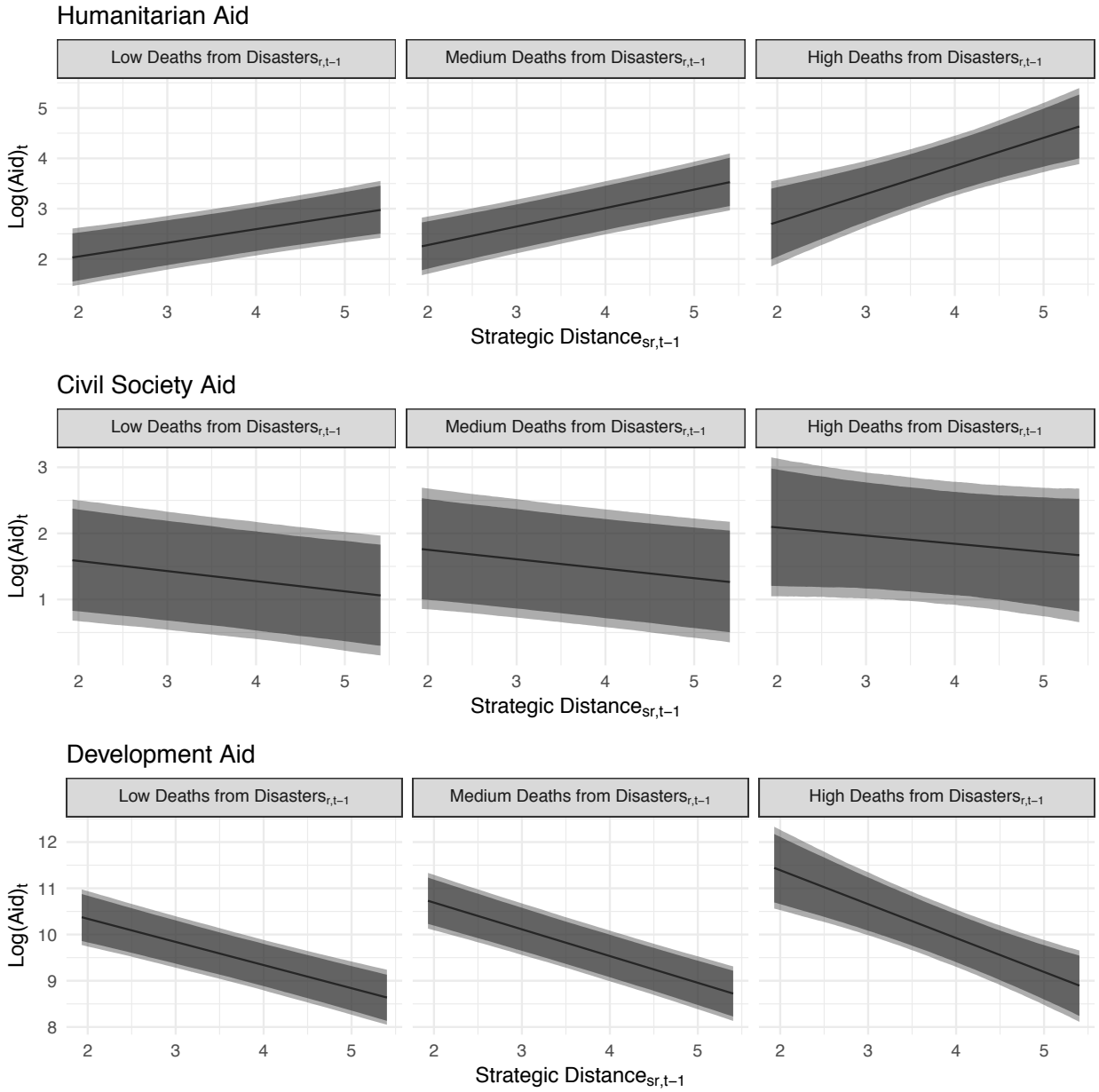

FIGURE 3. Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity (specifically, the log of the number killed) across the range of the strategic distance measure.

– *The substantive trends with respect to humanitarian aid and development aid are notably similar to results that rely on a count of the number of natural disasters. There is a difference, however, with respect to the finding for the civil society aid dependent variable. In our analysis with the count of the number of natural disasters we saw that at higher counts of natural disasters the slope between the amount of civil society aid given and strategic distance became positive. Here we see a less pronounced change in the*

slope between strategic distance when there are a higher number of deaths. This is perhaps explained by the fact that this measure has a missingness rate of 10.8%.

- *With regards to other potential measures, the EM-DAT database provides the data on number people injured, homeless, or affected and the dollar amount of the disaster. However such data has a high degree of missingness and, by their own admission, frequently imprecise or under-reported. For instance there is 79% missingness for the number of injured, 36% missingness for the total number of homeless and 33% for the total damages. The number of affected has comparatively less missingness, with 9.6%, however the EM-DAT Gudelines note that, "The indicator affected is often reported and is widely used by different actors to convey the extent, impact, or severity of a disaster in non-spatial terms. The ambiguity in the definitions and the different criteria and methods of estimation produce vastly different numbers, which are rarely comparable." Generally all the indicators have varying degrees of imprecision. For instance, the guidelines further state, "Any related word like 'hospitalized' is considered as injured. If there is no precise number is given, such as 'hundreds of injured', 200 injured will be entered (although it is probably underestimated)." Given these problems with these other potential measures, we decided to focus on the number of disasters as our measure of disaster intensity.*

Minor Comments.

(1) The legend on Figure 1 did not come out clearly, and the different categories of aid cannot be easily distinguished.
   - *Thanks for pointing this out! We have fixed the legend so that it is more legible.*

(2) I think H3 is phrased the opposite of what the authors intended.
   - *H3 was indeed phrased the opposite of what we intended and we have since fixed this unfortunate oversight.*

Reviewer 2

Major Comments.

(1) The manuscript asks whether donors respond differently to natural disasters in strategic allies and adversaries. In particular, the authors put forth hypotheses across three different types of aid - humanitarian, civil society and development - and posit that an interaction will exist between "strategic distance" and disasters. The idea is sound and worth testing, particularly with regard to civil society aid, but the execution is not as good as it could be and the paper feels dated in both literature review and time covered. I would strongly suggest reframing the paper to focus more on the civil society findings (as well as the humanitarian findings), updating the analysis and literature review, and paying additional attention to some empirical difficulties. I'll say some more on each of these.

- *We thank the reviewer for taking the time to provide her/his comments!*

(2) I thought the most interesting finding is that donors may be using a humanitarian disaster to "sneak" civil society aid to groups in countries not aligned with themselves - if this holds up it is a really neat finding. It also suggests that recipients are right to be worried about donors having multiple purposes when responding to humanitarian crises. I would highlight the importance of this more, as it would be the newest finding in the paper. The North Korean example regarding "changing hearts and minds" could play into this - it is a clear example of influencing the opinion of the people, rather than the government, toward the donor.

- *We largely agree with the reviewer but we also think that the findings in terms of the development and humanitarian aid findings are also quite interesting. Though the development aid findings largely mirror expectations from the literature we still see it as an important validation of our strategic interest measure. Just as important the fact that the humanitarian aid finding has essentially the opposite effect of development aid is also quite interesting and makes an important contribution to the literature. To make our perspective on these findings more clear we have revised the paper to reflect what we see as our contribution here.*

(3) Breaking H1 into three parts (the middle one clearly a straw man) is not helpful. Also on framing I recommend removing the multiple anecdotes of disasters in wealthy states in the front of the paper - these have nothing to do with interactions between aid donors and recipients, they are confusing in the context of the questions asked in the paper, and removing them would streamline the argument.

- *We would respectfully push back on this comment: We think that making the distinction between H1A and H1C is especially helpful for reasoning through why a finding that shows that donors give even more to strategic opponents is an indication strategic, rather than a humanitarian motivation. We also think that the middle hypothesis (H1B) is quite valuable given that this is precisely the finding that the previous literature would expect for us to find. Overall, we think that having all three hypotheses explicitly laid out also helps the reader think through our theoretical reasoning as well as gives a better foundation for how to interpret the subsequent empirical findings that we find. That being said, the point on the type of anecdotal evidence that we use is well-taken and we have*

adapted the anecdotes that we use in our paper to better align with the rest of the paper.

(4) I believe H3 is stated exactly the opposite of what the authors intended to say. Also, it does not necessarily seem consistent with H1A/C- if states experience a lot of infrastructure destruction then much of the disaster aid may be designated to rebuild infrastructure. In this way it seems like a longer-term disaster response, and then the same logic that plays out in H1 might play out here too.

- *H3 was indeed phrased the opposite of what we intended and we have since fixed this unfortunate oversight.*

(5) The literature review is dated. In particular, it misses some key contributions from recent years regarding donor intent and foreign aid. Most notable are Bueno de Mesquita and Smith (2009, 2015); Fleck and Kilby (2010); Clist (2011); Bermeo (2017, 2018). Multiple of these studies note the importance of considering changes in donor intent and behavior across three periods (Cold War, 1990s, post-2001), which the authors should certainly test in their empirics. Carter and Stone (2015) have written the definitive piece on UN voting and aid, which should certainly be referenced.

- *The development of this paper was quite long and we appreciate Reviewer 2 pointing out these later works that we overlooked and have incorporated them into the manuscript. Inspired by this comment, we have also incorporated additional relevant readings from: Andrabi and Das (2017), Bryant et al. (2018), (Carnegie and Marinov, 2017), Dreher et al. (2011), (Dreher and Fuchs, 2015), Dreher et al. (2018), Eisensee and Strömberg (2007), Fuchs and Vadlamannati (2013), Harmer et al. (2005), Milner and Tingley (2013), Neumayer (2003), Olsen et al. (2003), Qian (2015), Strömberg (2007) which hopefully has made the literature review even more relevent and timely.*

(6) A key contribution the authors could be making is on the measure of strategic difference, using network analysis and combining information from three variables - UN voting, alliances, and membership in IGOs. It is difficult to assess the suitability of this with the information given. We don't know which IGOs were included in developing this measure. There is updated data for UN voting (Bailey et al., 2017).

- *Thank you for this suggestion! We have added a bit more descriptive information on the IGOs included in the COW dataset to help give readers a better idea of the underlying data our analysis is based on. Given the number of IGOs in the data-set, we would run into space constraints if we tried to document each and every one of them. However, we have added a note in the text inviting readers to go to the COW website if they are interested in learning more. With regards to the UN data, note that the constraint that we face is that IGO data only goes up until 2005.*
- *As the underlying data is updated, however, our approach can be easily used to generate updated measures of strategic interest. If we find that there is significant interest among scholars for our measure, we will then also be happy to regularly update the strategic interest variable and make it available through a website and/or the Harvard dataverse.*

(7) On the empirical setup, it would be nice to see results on total aid in addition to the results by category. Do disasters shift total levels of aid and does this interact with strategic distance?

- *Here we present results for a model on total aid as well. Here we find strong evidence that countries are more likely to give aid to those that are strategically proximate to them and we also find robust support for an interactive relationship between strategic distance and the number of disasters. We certainly find the results for total aid interesting, but our hypotheses are dependent on differentiating between different types of aid and as such we choose to focus on that in the paper.*

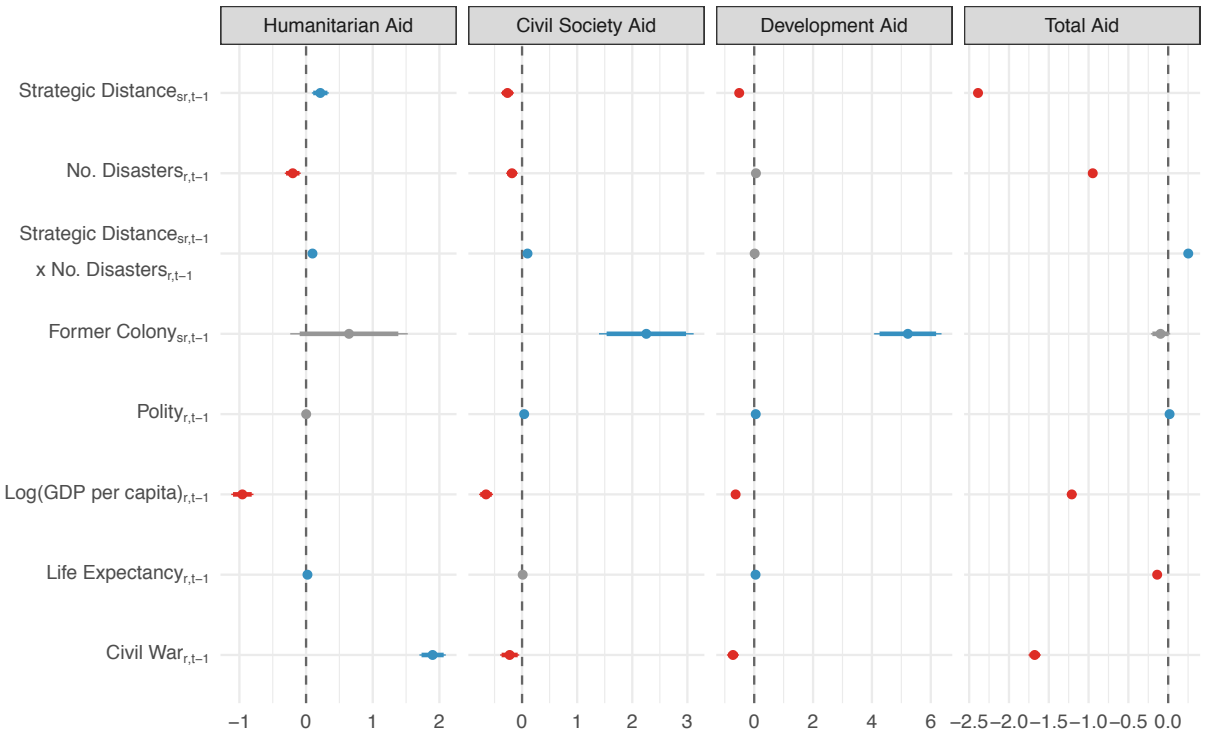

FIGURE 4. Parameter estimates for models using our three original aid dependent variable and total aid.

(8) Have the authors considered threshold effects? It is possible that there are discontinuities - perhaps for recipients that are either really close or really far from the donor in terms of strategic distance are treated differently but the many countries in the middle see no impact for small changes in strategic distance, regardless of disasters.

- *We thank the reviewer for this comment but we have not found evidence for non-linear effects between strategic distance and aid. We tested this by incorporating a squared version of the strategic distance into our specification along with the original term, and found no support for a non-linear relationship. We are happy to provide additional details if requested.*

(9) The period of analysis is cause for concern. First, it is not really a good idea to start in 1975 using disaggregated aid data. Countries were not required to report

the purposes of aid for earlier years and before 1995 there was significant lack of reporting by category and it was not uniform across donors. Some donors almost never marked the sector of aid (just reported the total amount by recipient) and others did report. This is particularly problematic in AidData (which the authors use), since this source only includes aid that is reported at the project level. So large sums of aid are excluded from AidData in earlier years because donors did not code its purpose. This makes it impossible to create meaningful categories for humanitarian, civil society, and development aid, since donors did not distinguish across types.

- *Note that for the Aid Data version 3.0, which is what we use in the paper, the AidData team themselves code aid projects according to different sectors. We have confirmed this both in terms of the documentation given for the version 3.0 data as well as in terms of the actual data. We double checked this by seeing if the sum of the disaggregated aid categories by purpose code equals the aggregated aid cateogries across purpose codes and found this to be so. As such, there should be no concerns about missing data in this regard.*

(10) It is also problematic to end the analysis in 2006. Why exclude ten years of more recent data? It can be particularly problematic to do so since multiple studies have shown that patterns in aid giving vary across the Cold War, 1990s, and post-2001 period. This analysis is swamped by Cold War years and may not hold for the more recent periods.

- *We agree with Reviewer 2 and ideally we would also have liked to extend the analysis past 2005. However, we face the constraint that the IGO data is simply not available past 2005 which restricts our ability to construct our strategic interest variable and consequently, also restricts our ability to model the relationship between strategic interest and aid.*
- *To show the potential relevance of our findings for more recent periods we have run our models using only data from the post Cold War period. The results are presented below and mirror the findings presented in the paper. We have included these results in the appendix.*

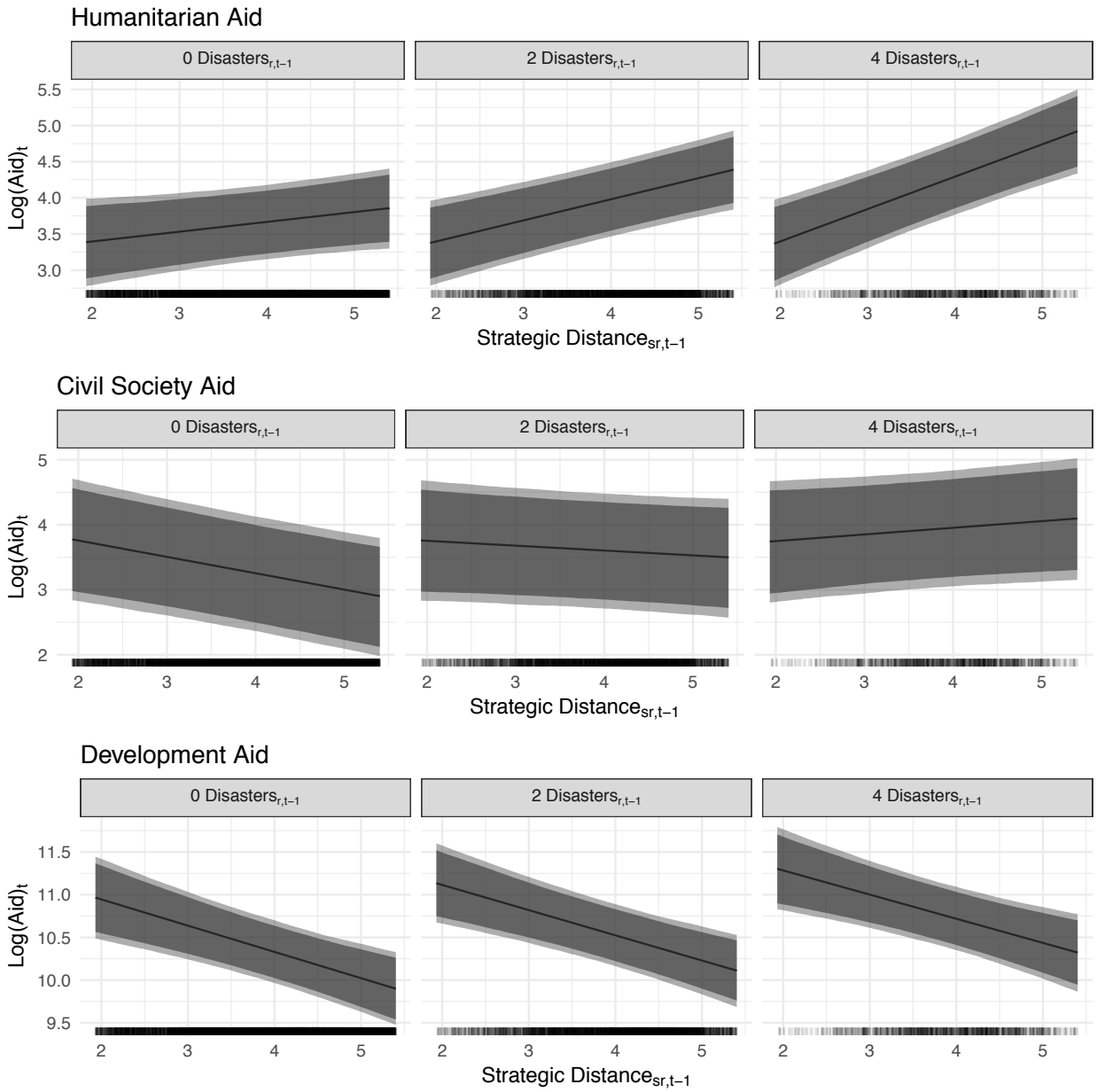

FIGURE 5. Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure for the post Cold War period.

- *Additionally, we also run our models using only data from 2002-2005 (post-2001 period in our sample). The results are presented below and mirror the findings presented in the paper. We have included these results in the appendix as well.*

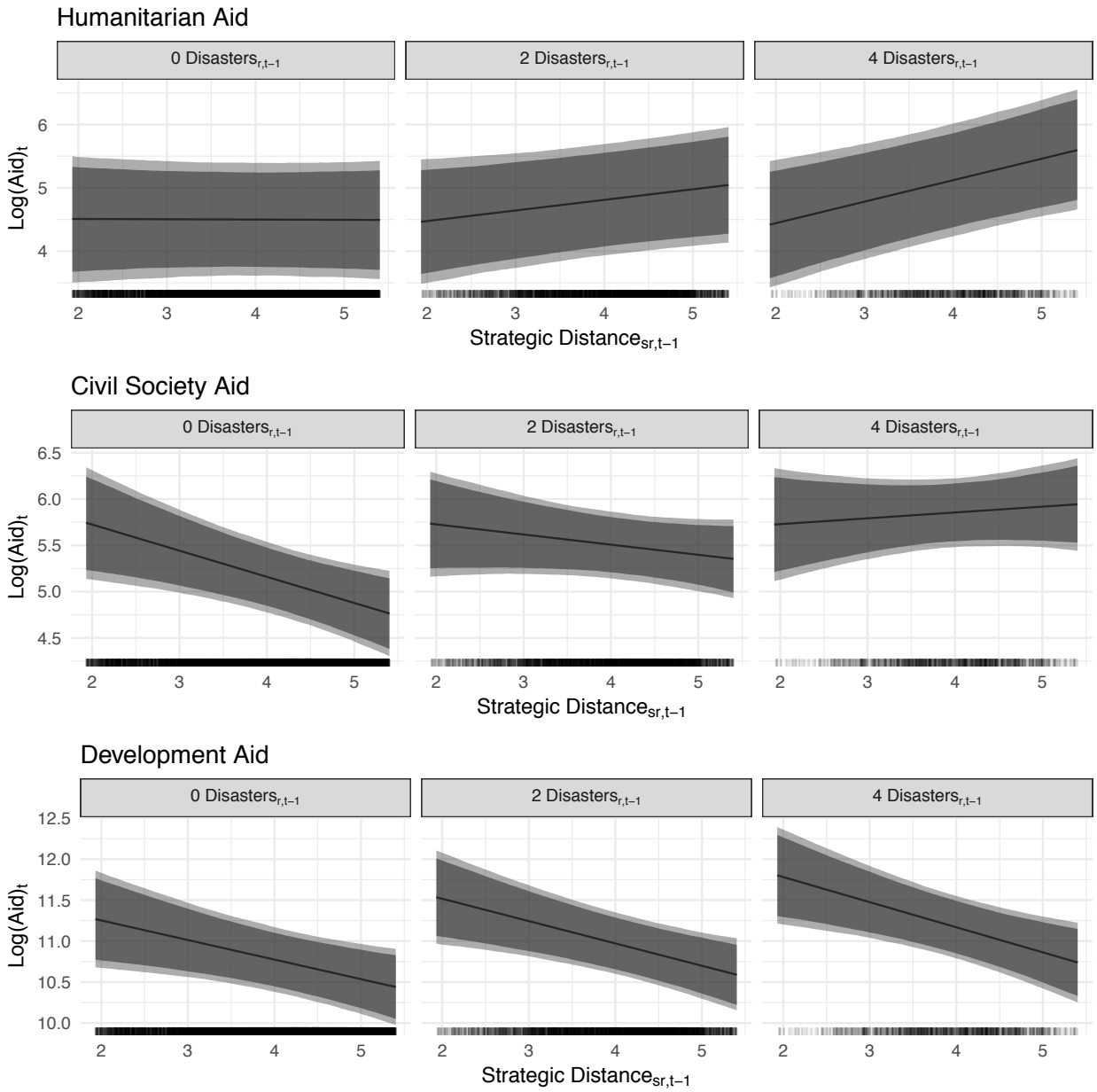

FIGURE 6. Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure for 2001-2005.

(11) The count of natural disasters seems like the wrong measure of disaster intensity. A measure of number of people affected or dollar value of damages would better measure need in the wake of a disaster.

- *We have rerun the analysis using the number killed from a natural disaster instead of a count of the number of natural disasters. We show the substantive results of this analysis below.*

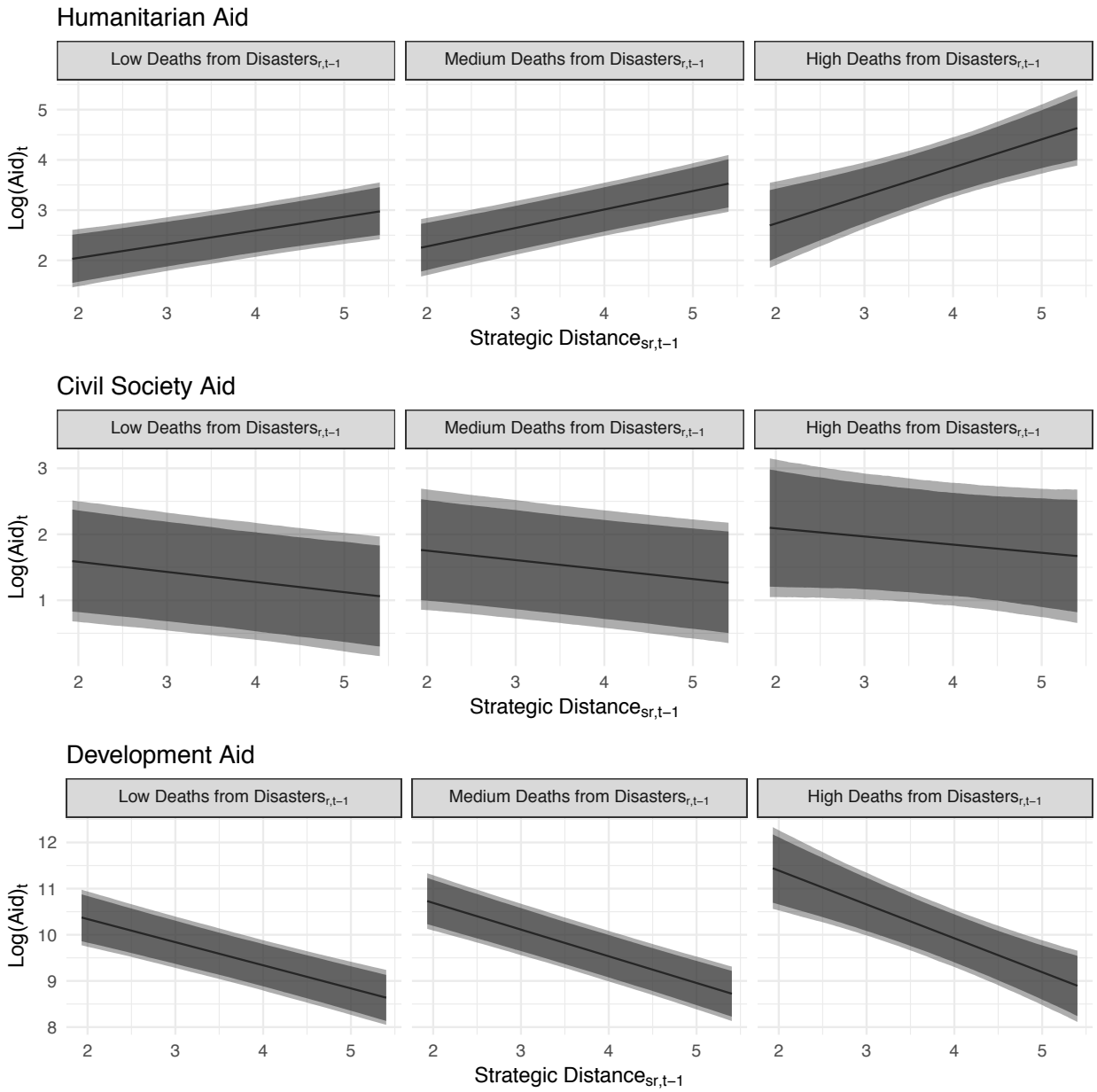

FIGURE 7. Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity (specifically, the log of the number killed) across the range of the strategic distance measure.

- *The substantive trends with respect to humanitarian aid and development aid are notably similar to results that rely on a count of the number of natural disasters. There is a difference, however, with respect to the finding for the civil society aid dependent variable. In our analysis with the count of the number of natural disasters we saw that at higher counts of natural disasters the slope between the amount of civil society aid given and strategic distance became positive. Here we see a less pronounced change in the slope between strategic distance when there*

are a higher number of deaths. This is perhaps explained by the fact that this measure has a missingness rate of 10.8%.

- *With regards to other potential measures, the EM-DAT database provides the data on number people injured, homless, or affected and the dollar amount of the disaster. However such data has a high degree of missingness and, by their own admission, frequently imprecise or under-reported. For instance, there is 79% missingness for the number of injured, 36% missingness for the total number of homeless and 33% for the total damages. The number of affected has comparatively less missingness, with 9.6%, however the EM-DAT Gudelines note that, "The indicator affected is often reported and is widely used by different actors to convey the extent, impact, or severity of a disaster in non-spatial terms. The ambiguity in the definitions and the different criteria and methods of estimation produce vastly different numbers, which are rarely comparable." Generally all the indicators have varying degrees of imprecision. For instance, the guidelines further state, "Any related word like 'hospitalized' is considered as injured. If there is no precise number is given, such as 'hundreds of injured', 200 injured will be entered (although it is probably underestimated)." Given these problems with these other potential measures, we decided to focus on the number of disasters as our measure of disaster intensity.*

(12) Donor and year fixed effects would be more in-line with the theory and existing literature, rather than donor and recipient random effects. The theory would imply that within a donor in a given year, the donor awards aid differently across recipients. Although there could be within-recipient differences over time for individual donors as well, the need to account for time invariant donor characteristics (while still allowing dyad characteristics to vary over time) suggests that donor fixed effects are worth considering.

- *We have rerun the analysis using a fixed effects specification and show the results below. The results remain broadly the same.*
- *Additionally, when running a Hausman specification test for our models we fail to reject the null hypothesis at both the 90 and 95% confidence intervals, providing at least some initial evidence that we are justified in our choice (Greene, 2008).*

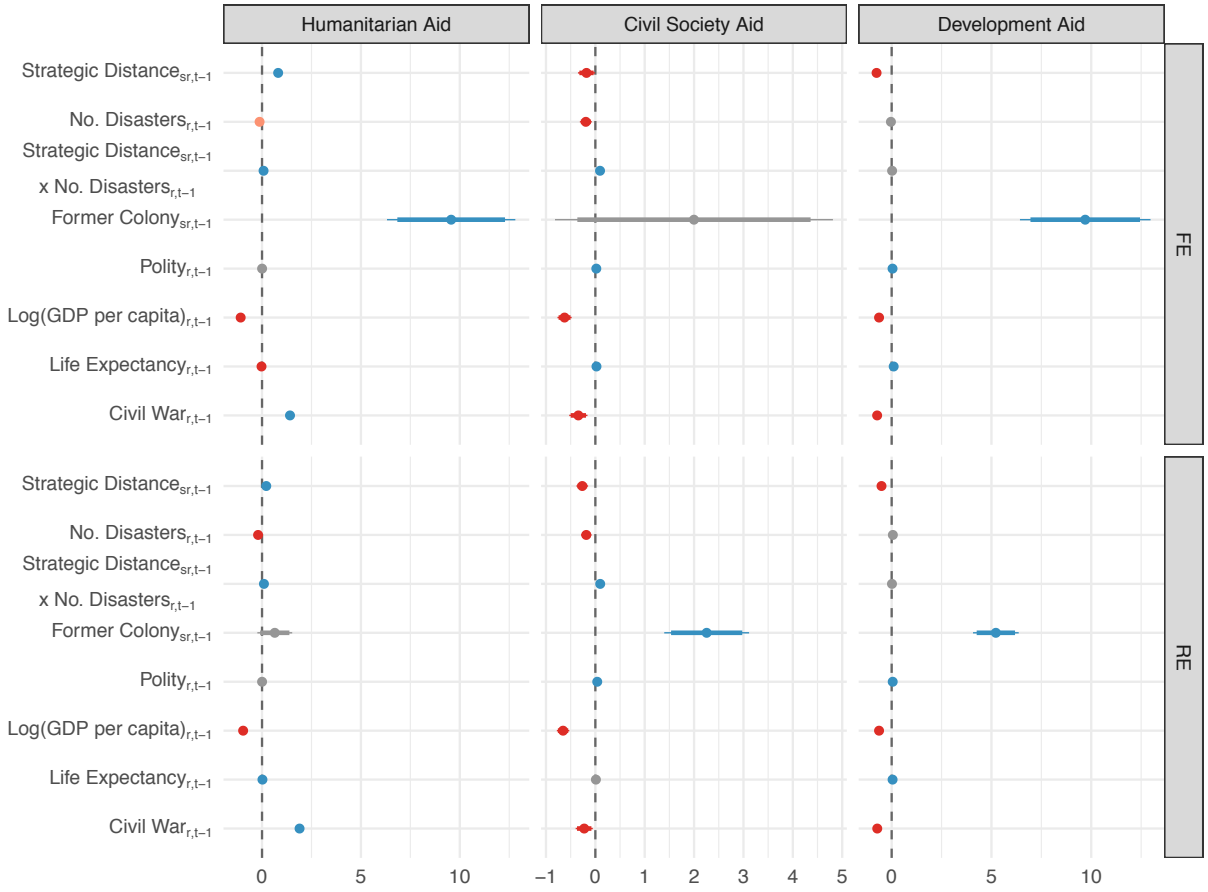

FIGURE 8. Comparison between parameter estimates using fixed and random effects.

(13) Multiple studies have shown that donors vary the composition of aid based on recipient characteristics. The positive relationship between humanitarian aid and strategic difference even in the absence of a disaster, coupled with the negative relationship between development aid and strategic difference, suggests that donor may simply be giving different types of aid to allies and adversaries. Perhaps they are more worried about going through the government in adversaries and so use aid that is more easily channeled through NGOs (similar to the Dietrich logic on corruption/governance and aid channels). This would suggest that, even absent disasters, donors are giving to both allies and adversaries but doing so differently. The same applies when a disaster strikes: allies and allies may both get more aid (hard to tell from the way it is presented), but for allies it is development aid and for adversaries it is humanitarian aid. The authors should address these patterns and possible implications for their theory.

- *This is indeed a legitimate concern. Following a suggestion made by Reviewer 1, we seek to explore the extent to which this is an issue by looking at whether donors strategically shift the type, that is the label, of aid they dispense within the overall category of development aid* ***while keeping the overall level of***

***aid the same**, which would be a cause for concern. This is illustrated in Figure 9. Here we break down how much development aid was given to countries experiencing that experienced either 0 disasters or 1-3 disasters across different types of development aid. The comparison between 0 or 1-3 disasters was used to maximized comparability, as around 40 percent of the country-years in the dataset had 0 disasters, while 43 percent experienced 1-3 disasters. This figure suggests that i) countries that are strategic allies (located at low levels of strategic distance) are more likely to get more aid related to economic infrastructure and services while ii) countries that experience disasters are much more likely to get debt relief when the they are strategic opponents (that is at high levels of strategic distance), compared to countries that experience 0 natural disasters. However, while Figure 9 does seem to be consistent the reviewer's hunch that it may be easier to distribute different types of aid depending on whether one is a strategic opponent or strategic ally, there does not seem to be much in the way of strategic labelling going on. That is, the additional aid for economic infrastructure services to strategic allies and the additional aid for debt relief appear to be given in on top of existing levels of aid; neither appear to be offsetting other types of development aid.*

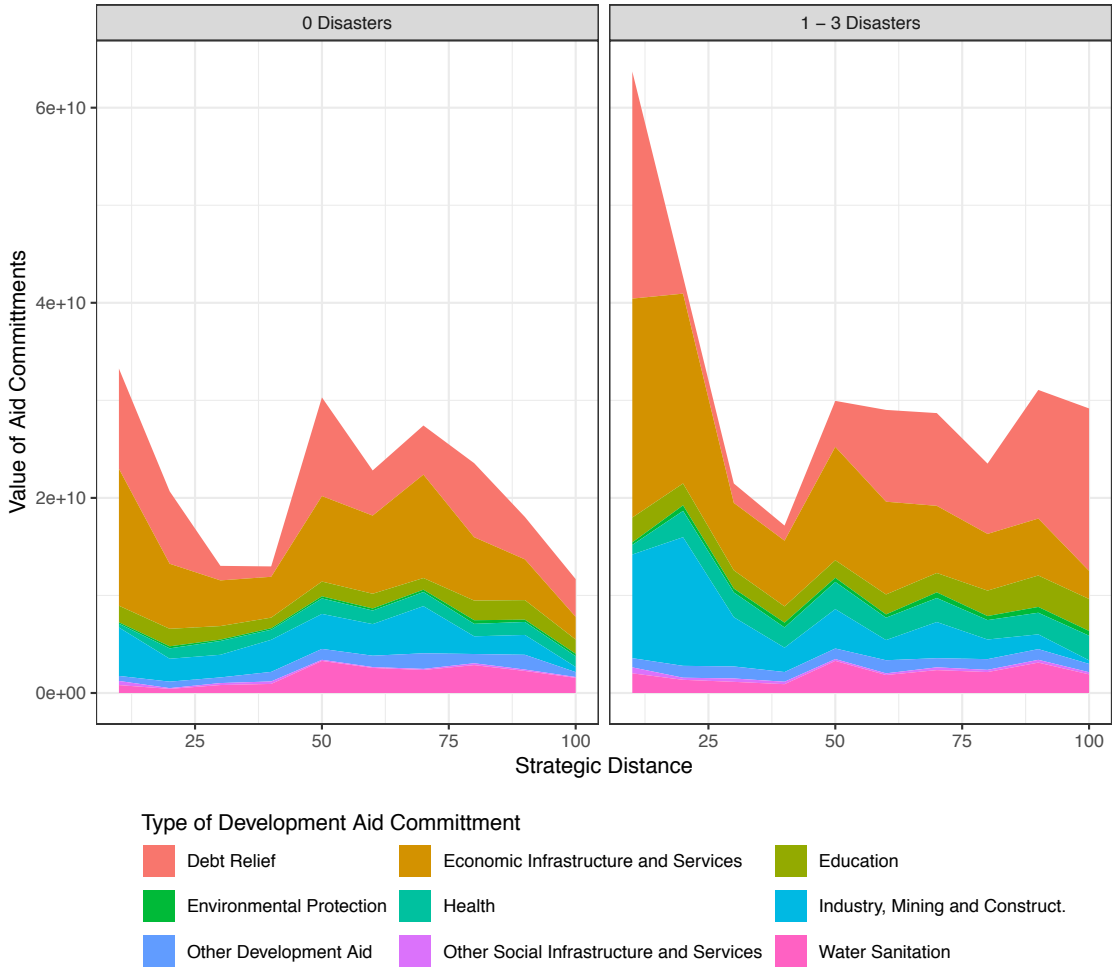

FIGURE 9. Value of Aid Commitments categorized by type of development aid and by the number of disasters

Reviewer 3

Major Comments.

(1) This paper argues that the extent to which natural disasters lead to an increase in bilateral aid allocation is a dependent upon the strategic relations between countries. They examine this relationship using dyadic data, and a novel measure of strategic interest. I find the discussion of potential theoretical mechanisms surrounding the impact of natural disasters upon aid allocation to be well executed and rather common sense. Therefore I think the main contribution of the paper is its empirical analysis, particularly with respect to the effect of strategic interest. Thus I would suggest a revise and resubmit.

- *Thank you for your comments!*

(2) One key empirical part of the paper is the introduction of the new measure of strategic interest. I think this measure is a good addition to the literature. However there is one methodological concern that it raises, which is that this measure of strategic interest is an estimate with uncertainty. This introduces a statistical bias akin to measurement error. Therefore the statistical models need to take this into account.

- *Below we show results when taking into account uncertainty in the latent variable compared with our original estimates. We do this by simulating 1000 values of each latent variable estimate from the underlying distribution. From this we create 1000 versions of our dataset in which for each dataset we have a different sampled value of the strategic interest variable. We then run each of our models on those 1000 datasets and combine the parameter estimates using Rubin's rules (Rubin, 1987). We present the results of this analysis juxtaposed against our original model in the figure below.*

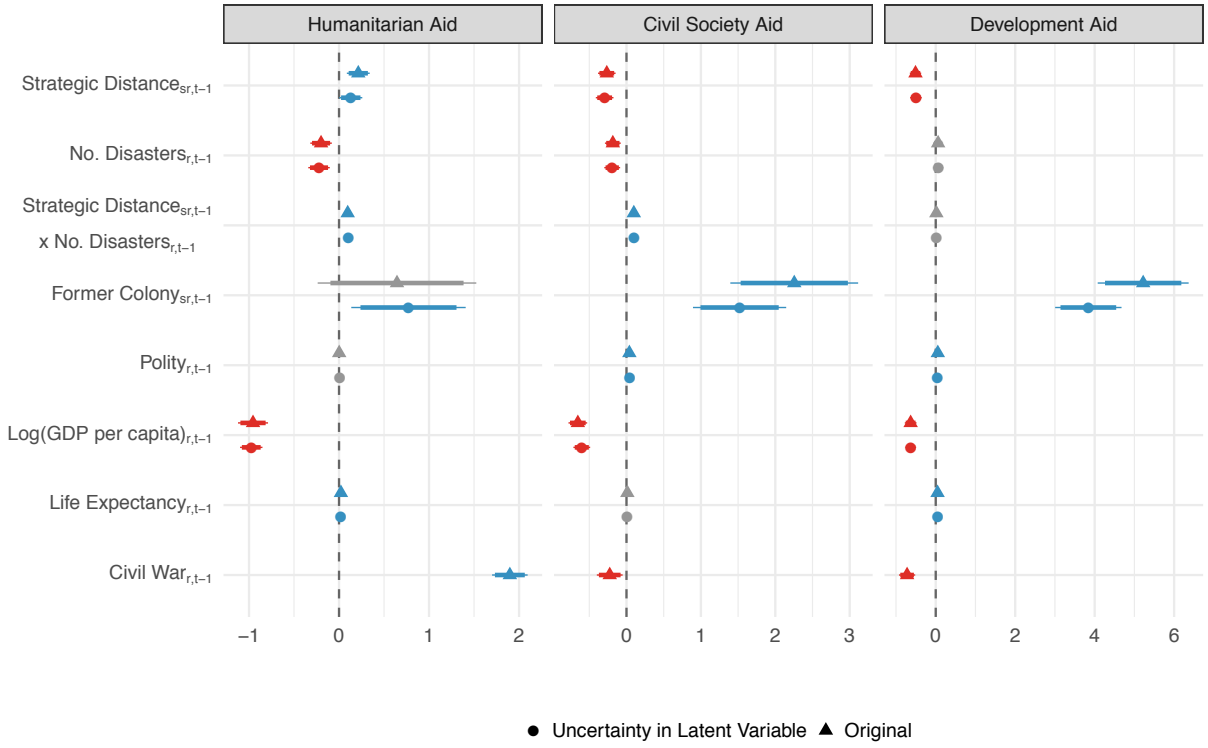

FIGURE 10. Effect of accounting for uncertainty in latent variable.

(3) Another concern is that strategic interest as operationalised is correlated with factors such as trade and FDI, i.e. economic interests. In the case of the impact of natural disasters on aid, and development assistance in particular, I would think it's exactly such economic linkages that would be relevant for donors. For example to help rebuild infrastructure that facilitates trade between them. Therefore this economic interdependence needs to be incorporated in the empirical specification.

- *With regards to FDI data, dyadic data does exist from OECD and UNCTAD but there is a significant amount of missing data in these datasets and they start, at the very earliest, around 2001. As such, we do not see it as feasible to use dyadic FDI data for our analysis. However, we can control for the trading relationships between countries in our analysis. Below we show the results of our model when including trade as a control. The results are largely robust to the simpler specification that we present in the paper. We have not yet included this analysis in the appendix but are happy to do so upon request.*

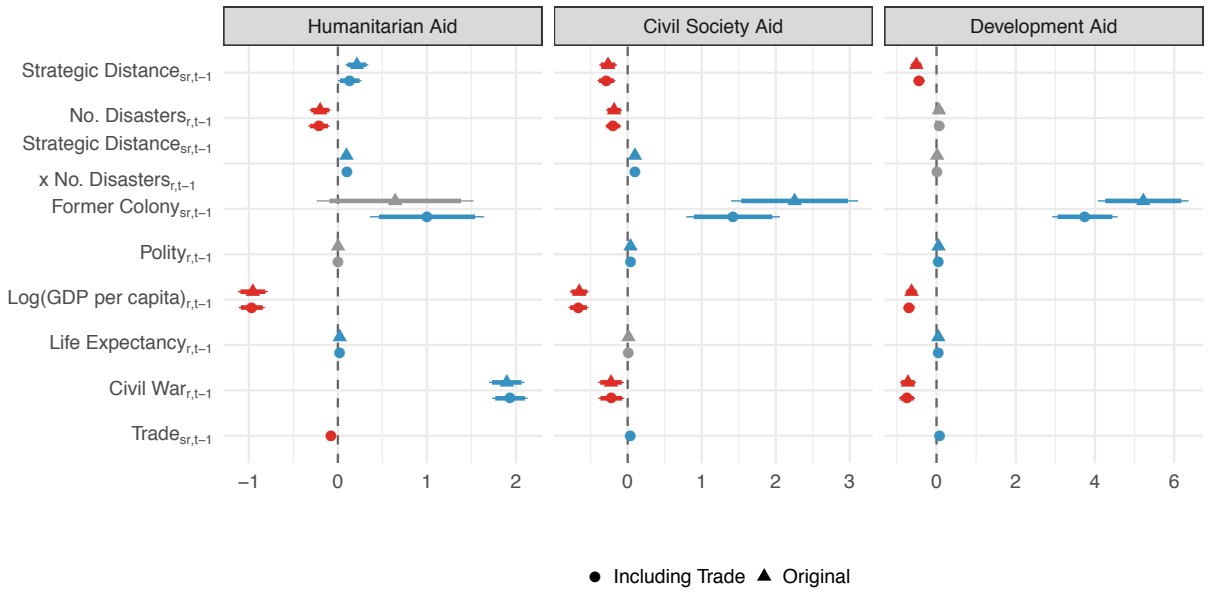

FIGURE 11. Effect of Including trade in model specification.

(4) I also have other comments/suggestions related to the use of this measure of strategic interest:
- It would be interesting to see how much better this measure is at explaining variation in aid commitments compared to existing bilateral approaches. e.g. compare the latent space measure of alliances to the simple measure of whether the countries share an alliance or not.
  - *To answer this question we set up two different versions of our general specification, one in which we use our strategic interest measure and another in which we use a raw measure of alliance. We then perform a 30-fold cross validation procedure. This works by randomly assigning each unit in our dataset to one of thirty folds, running the model excluding a fold, and then generating predictions for the fold that was left out. Once we have generated out-of-sample predictions in this manner for every fold, we then calculate the root mean squared error (RMSE) for models using the raw alliance measure and models using the strategic interest measure. The results are presented in the table below. In general we see a very small decrease in RMSE when incorporating our measure versus a raw measure of alliance. Thus the improvement in predictive fit for the various aid dependent variables from incorporating our measure is minimal.*

	Latent Space Measure	Raw Alliance Measure
Humanitarian Aid	5.037	5.042
Development Aid	5.030	5.035
Civil Society Aid	4.368	4.371

TABLE 1. Out-of-sample RMSE statistics based on a 30-fold cross validation.

- I'd be interested to see which aspects of strategic interest drive the results. Therefore it would be nice to see the results from simply including each of the latent space measures in the model, to potentially see their relative importance.
  - *In the figure below, we present results when using the individual latent distance measures from our analysis instead of the aggregated version we present in our paper. However, we believe that there is value from generating a single measure of strategic interest for conceptual reasons, thus we focus on that for the paper. In future research, exploring the different roles that these measures can play is definitely of interest to us. Currently, we do not have a specific theory about the varying effects that these measures may have on aid or more broadly.*

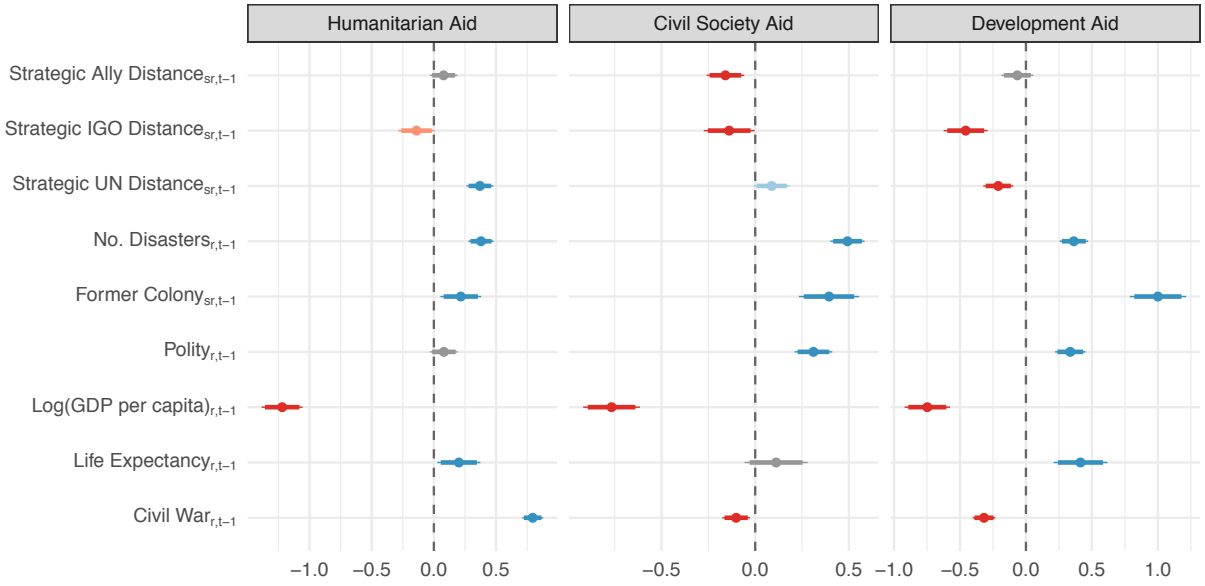

FIGURE 12. Effect of individual latent variables. Standardized regression estimates provided.

(5) I have further concerns about the empirical specification used in the paper:
- Aid tends to have pretty strong temporal dependence, particularly within dyads. However no efforts are taken to model this dependence. Therefore it's important to ensure the results are robust to models that take this into account, such as including a lagged dependent variable or more elaborate specifications such as an Error Correction Model.
  - *Below we show that our results are robust to the inclusion of lagged versions of the dependent variables. Given that our results are robust to the inclusion of a lagged DV, we opt for the more parsimonious specification in the model that we present in our paper. We have not yet included this analysis in the appendix but are happy to do so upon request.*

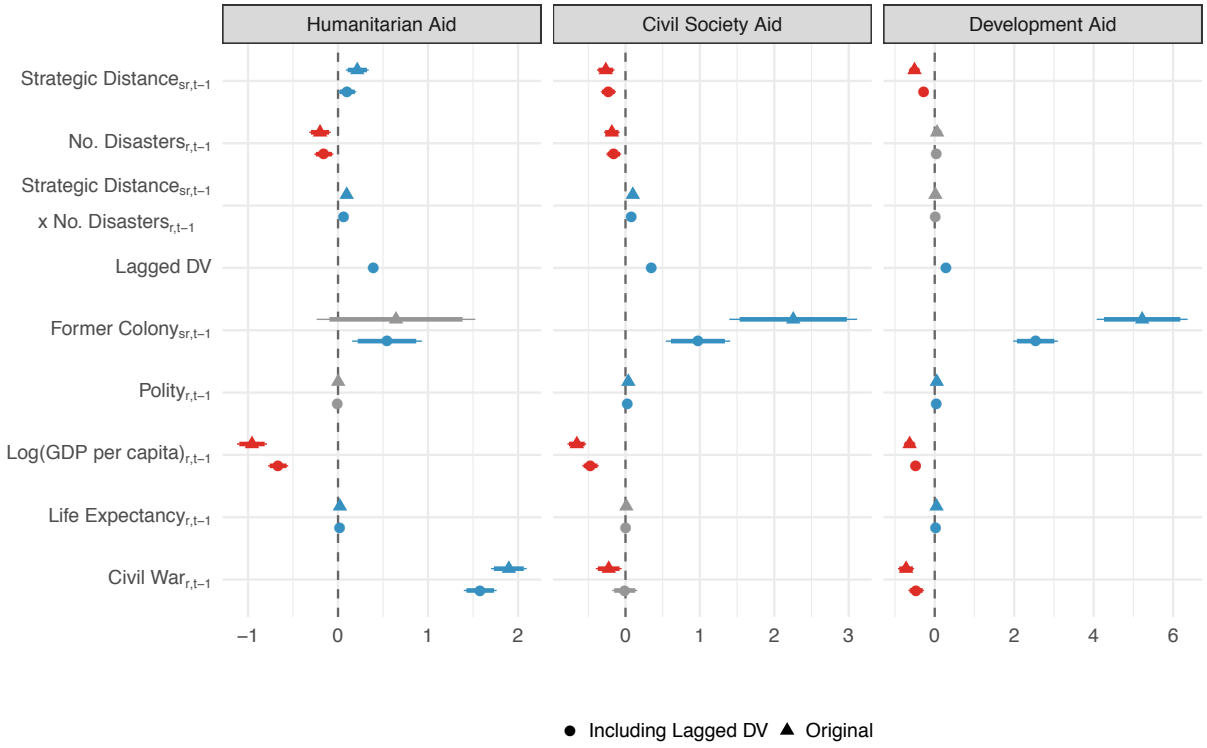

FIGURE 13. Effect of accounting for uncertainty in latent variable.

- There should be discussion of why fixed effects models aren't estimated, given their common use in the aid literature and given that unobserved unit heterogeneity is likely correlated with the right hand side variables. At least FE models should be estimated as a robustness test.
  - *We have rerun the analysis using a fixed effects specification and show the results below. The results remain broadly the same and a Hausman test indicates that a random effects specification is preferred.*

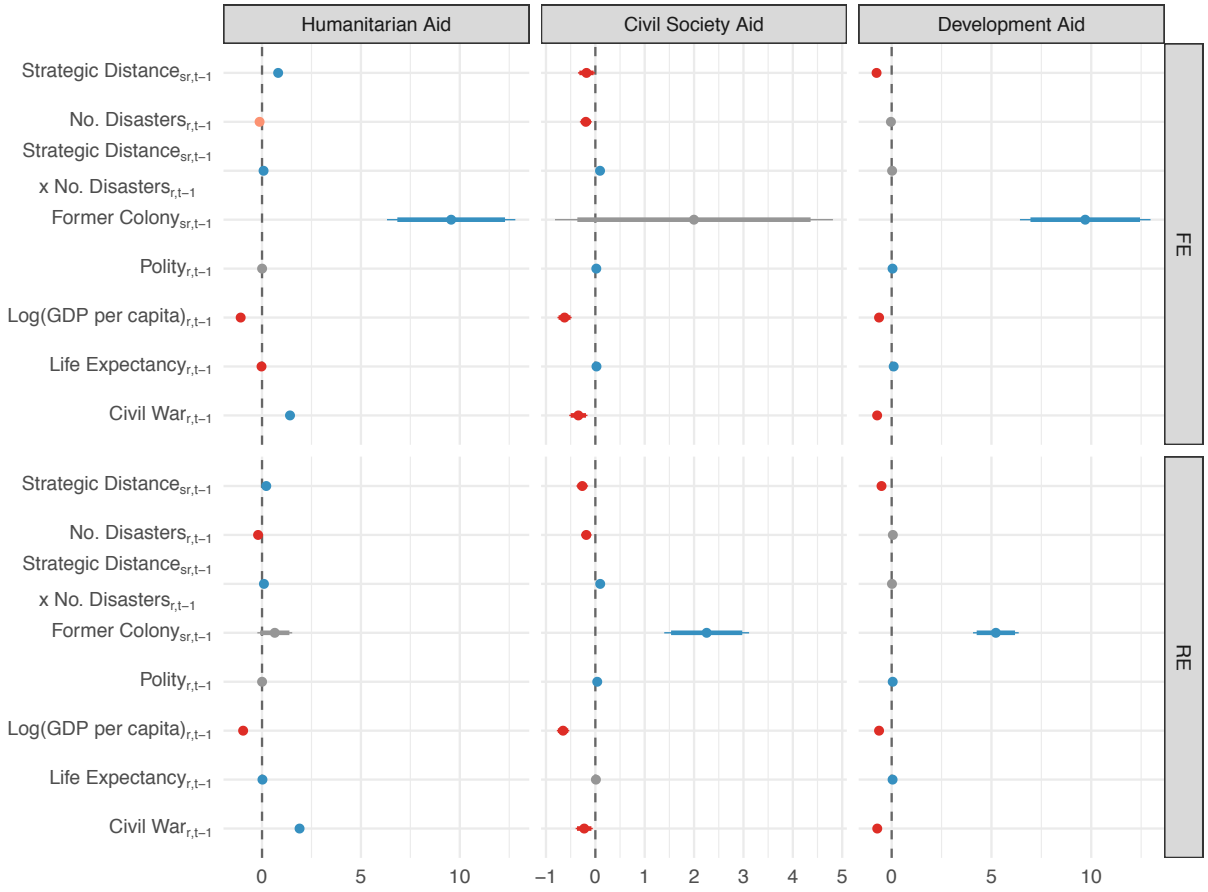

FIGURE 14. Comparison between parameter estimates using fixed and random effects.

- Any justification for why the independent variables are lagged by one year?
  - *We use one year lags because while our natural disaster data is pinpointed to the day, we do not have correspondingly fine-grained data on foreign aid distributions. Thus we take a conservative approach and lag by one year to guarantee that the aid is committed after the incidence of a natural disaster. In general we are following standard practices here with regards to why we lag our control variables by one year. However, we do agree that exploring differing lag structures is often of interest, and this is why we examine the persistence of foreign aid allocation over time with regards to our primary parameters of interest (strategic distance and number of disasters) in the manuscript.*

(6) Regarding the dependent variable could there be an issue of countries committing more to non-strategically aligned countries, with the expectation that they will not accept all of this money? Some information on how the relationship between commitments and disbursements varies according to strategic interest would be useful.

- *Thanks for this comment. We initially decided to use aid commitments as our preferred for a number of reasons i) coverage of data for aid commitments is*

better than for aid disbursements ii) this is the measure most commonly used in the literature and thus using it will allow our findings to better speak to existing findings. Meanwhile, other work has found that donors generally do disburse the aid they have committed to a high degree, including with regards to humanitarian aid in particular (Hudson, 2013).

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Keeping Friends Close, But Enemies Closer: Foreign Aid Responses to Natural Disasters

How can we square an existing literature which shows that bilateral donors primarily allocate aid to strategic allies with strong anecdotal evidence which suggests that following natural disasters, aid flows to strategic opponents quite generously? In this paper, we address this puzzle by building on the literature in three ways. First, we differentiate between three major types of aid: humanitarian, civil society, and development. Next, we show natural disasters act as an exogenous shock to the strategic calculus donor countries undertake when making foreign aid allocation decisions. Specifically, we argue that donor countries use natural disasters as opportunities to exert influence on strategic opponents through the allocation of humanitarian and civil society aid. However, donors still reserve development aid for strategic allies irrespective of the incidence of natural disasters. Lastly, we substantiate our findings using a new measure of strategic interest that accounts for the indirect ties states share and the multiple dimensions upon which they interact.

Introduction

In the early morning hours of December 26, 2003, a massive earthquake measuring 6.3 on the Richter scale struck the city of Bam, Iran. Its effects were devastating. Out of Bam's 100,000 residents, approximately 26,000 to 40,000 were killed~~while those~~. Those who survived were left to grapple with the destruction of 70 to 90 percent of the city's housing infrastructure (Montazeri et al., 2005).[1] As part of the international response that followed, more than 44 countries sent aid, including the United States, which contributed eight plane loads of medical and humanitarian supplies as well as several dozen teams of experts to the relief effort.

~~However, while~~ While the US response to the 2003 Bam earthquake was seemingly analogous to that of any foreign actor offering aid and support, *a priori*, it was not obvious whether the US

[1]Fathi, Nazila. "Deadly Earthquake Jolts City in Southeast Iran." *The New York Times.* 26 December 2003. Accessed October 2017: https://web.archive.org/web/20090620230700/http://www.nytimes.com/2003/12/26/international/26CND-QUAKE.html?ex=1225166400&en=c550b50a2ad59dd6&ei=5070

would send any humanitarian aid at all, to say nothing of whether Iran would accept it. Just the year prior, then-President George W. Bush had famously ~~anointed~~ assigned Iran membership in the "Axis of Evil" (Heradstveit and Bonham, 2007). Meanwhile, at the time of the earthquake ~~US-Iran~~ US-Iranian relations were particularly delicate as the countries navigated the issue of nuclear weapons in Iran.[2] Indeed, given the broader context of contentious bilateral relations, the process of transferring aid from the US to Iran entailed greater intentionality than normal. To initiate the flow of any aid, President Bush was obliged to institute a special 90-day measure to ease US sanctions on Iran[3] – ~~these~~ which had been in place since 1979 and continue to be enforced to this day ~~.~~[4] (Katzman, 2014). For Iran's part, accepting US aid meant allowing US military planes to land ~~in Iran, which had not happened in over~~ on its soil, which they had spent the previous 20 years ~~prohibiting.~~[4] For a country that had undergone a revolution in part because the US military was perceived to have had too strong a domestic influence, it was far from obvious that such an act would be perceived as benign.[5]

Yet, the Bam earthquake led not only to an increase ~~, albeit temporarily,~~ in US humanitarian aid to Iran, ~~but~~ albeit temporarily, it was followed by other types of aid as well. Figure 1 shows that after 2004, aid commitments to "strengthen civil society" increased markedly and consistently, reaching its apex with the creation of the 2006 "Iran Democracy Fund" to promote democracy in Iran.[6] Meanwhile, US aid for a variety of developmental purposes, (i.e. economic and development policy and planning, infectious disease control, social/welfare services) also

[2] "Timeline: US-Iran ties." *BBC News*. 16 January 2009. Accessed October 2017: http://news.bbc.co.uk/2/hi/middle_east/3362443.stm

[3] "US eases Iran sanctions to speed earthquake relief." *China Daily*. 1 January 2004. Accessed October 2017: http://www.chinadaily.com.cn/en/doc/2004-01/01/content_295063.htm

[4] ~~The US first imposed sanctions against Iran in 1979 during the US-Iran hostage crisis. While many assets have since been unfrozen, sanctions on a number of items, including military sales, financial assets, and real estate holdings remain in place (Katzman, 2014)~~

[4] "Iran Quake Toll May Hit 50,000." ~~*China Daily*~~ *China Daily*. 31 December, 2003. Accessed October 2017: http://www.chinadaily.com.cn/en/doc/2003-12/31/content_294833.htm

[5] "Geopolitical Diary: Tuesday Dec. 30, 2003." ~~"Stratfor"~~ *Stratfor*. 31 December 2003. Accessed June 2018: https://www.stratfor.com/geopolitical-diary/geopolitical-diary-tuesday-dec-30-2003

[6] Carpenter, J. Scott. "After the Crackdown: The Iran Democracy Fund." ~~*The Washington Institute for Near East Policy, PolicyWatch 1576*~~ *The Washington Institute for Near East Policy, PolicyWatch 1576.*

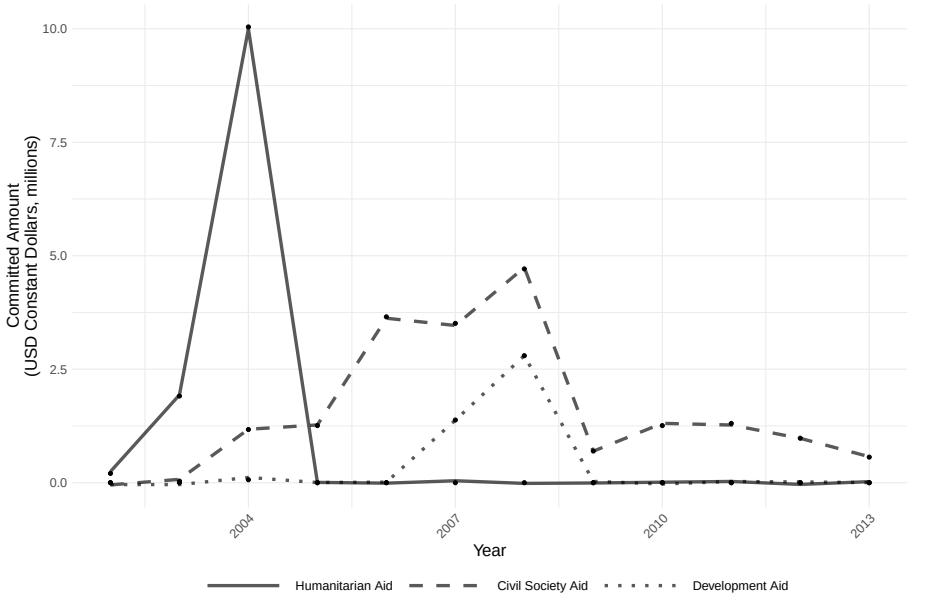

Figure 1: US aid commitments to Iran, 2002 - 2013

increased sporadically following 2003. This is particularly noteworthy given that Iran has generally been barred from receiving US foreign aid since the US State Department designated it a "state sponsor of terrorism" in 1984 (Samore, 2015).[7] Why did the US send humanitarian aid to Iran despite objectively hostile extant relations? Was this event *sui generis* or is it possible to observe other dyadic pairs acting in a similar fashion? If so, does the occurrence of a natural disaster also lead donors to distribute other types of aid to strategic opponents?

Answering these questions has important implications for our understanding of how donors ~~seek to~~ use foreign aid. Furthering such an understanding is ~~important as~~ especially pressing given that the occurrences of natural disasters are likely to increase with changing climate conditions. Meanwhile, ~~given~~ in light of an existing literature that ~~emphasizes~~ finds that donors are more likely to ~~give~~ allocate aid to strategic allies, a more nuanced understanding of what ~~motivates donor~~ drives foreign aid allocations is necessary to answer these questions. To do this, we begin by first disaggregating foreign aid into three types: humanitarian, civil society, and

September 2009. Accessed May 2018: http://www.washingtoninstitute.org/policy-analysis/view/after-the-crackdown-the-iran-democracy-fund

[7]Available data from AidData and the OECD suggest that the US did not commit any aid to Iran from 1974 to 2001.

development aid. Humanitarian aid is meant as a stop-gap measure to help recipient countries return to their status quo, while the latter two types of aid are targeted towards catalyzing long term change. Specifically, civil society aid is often used to improve governance outcomes, [8] which provides donors an avenue through which to wade into the domestic politics of recipient states (?Henderson, 2002; Resnick, 2012; Spina and Raymond, 2014)(Ottaway and Carothers, 2000; Henderson, 20 Meanwhile, development aid is primarily focused on promoting economic development.

We show that following a natural disaster donor countries actually give more humanitarian aid to strategic *opponents*opponents. We argue that this is because donors use natural disasters as an opportunity to ingratiate themselves with countries that they have historically shared hostile relations with. Additionally, we find that donors tend while natural disasters prompt donors to increase civil society aid if strategic opponents experience natural disaster to strategic opponents for similar reasons. However, natural disasters prompt , they conversely push donors to give more development aid to strategic *allies.* allies. In all, we argue that while donors do use aid to promote their strategic interest, the tactics they employ to do so can depend highly on context. We evaluate these claims using a new measure of strategic interest that: 1) captures accounts for the indirect ties states share 2) and incorporates a variety of dimensions of strategic interest.

In what follows, we first give a brief overview of the existing literature on natural disasters and foreign aid allocations before outlining our hypotheses. We then introduce our new measure of strategic interest, and present our empirical analysis of how natural disasters condition foreign aid allocation decisions.

EXTANT MOTIVATIONS FOR FOREIGN AID

Natural disasters can lead to the destruction or impairment of physical and social infrastructure and even more significantly, the devastating loss of human lives. For example, the 1985 Mexico City Earthquake, one of the most catastrophic natural disasters in modern times, killed at least 10,000

[8] More specifically, some argue that the lack of good governance and state capacity in developing countries have stymied the ability for foreign aid to promote development. As such, the promotion of civil society is seen as important to the successful implementation of foreign aid projects.

people[8] and cost around 9 billion dollars.[9] While the resulting destruction prompted the Mexican government to institute a number of regulatory measures to limit future damage, 32 years later, Mexico City's 2017 earthquake still resulted in ~~a death toll~~ the deaths of at least 360[10] and the recovery effort could cost more than 2 billion dollars.[11] ~~The 2011 Fukushima incident meanwhile, stands out for both its death toll and high cost, leaving nearly 1~~Even more devastating was the 2004 Indian Ocean earthquake (the fourth largest since the 1900s) and tsunami which led to the deaths of more than 200,~~600 dead and more than 174,~~000 ~~displaced.~~[12] ~~Recent 2017 projections estimate that it will cost around 187 billion dollars — double the 2013 estimate.~~people across 13 countries, causing around USD 7.5 billion in damage.[12] ~~Similarly, estimates put the cost of responding to Hurricane Harvey, which left 82 dead,~~[13] ~~at around 180 billiondollars, likely to be the most expensive natural disaster in US history.~~Meanwhile, the most expensive natural disasters have been in the tens of billions. These range from the 2008 Sichuan earthquake (191 billion)[13] to the Thai floods in 2011 (45 billion).[14]

[8]The Editors of Encyclopaedia Brittanica. "Mexico City earthquake of 1985." *Encyclopaedia Britannica*. 20 September 2017. Accessed September 2017: https://www.britannica.com/event/Mexico-City-earthquake-of-1985

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[11]'The Associated Press.' "Economic Costs of ~~Mexicoâ~~Mexico's Earthquake Could Surpass $2B." *Insurance Journal* 29 September 2017.

[12]~~Hamilton, Bevan. "Fukushima 5 years later: 2011 disaster by the numbers." *CBC News.* 10 March 2016. Accessed September 2017:~~

[12]~~McCurry~~Pickrell, ~~Justin~~John. ~~"Possible nuclear fuel find raises hopes of Fukushima plant breakthrough~~Facts and Figures: Asian Tsunami Disaster." ~~*The Guardian.* 30~~ *New Scientist.* 20 January ~~2017.~~ 2005. Accessed ~~September 2017~~January 2019: https://www.newscientist.com/article/dn9931-facts-and-figures-asian-tsunami-disaster/

[13]~~Moravec, Eva Ruth. "Texas officials: Hurricane Harvey death toll at 82 in 2017, 'mass casualties have absolutely not happened." *The Washington Post.* 14 September 2017. Accessed September 2017: '~~

[13]"Sichuan 2008: A disaster on an immense scale." *BBC News.* 9 May 2013. Accessed January 2019: https://www.bbc.com/news/science-environment-22398684

[14]Tang, Alisa. "~~Hurricane Harvey Damages Could Cost up to $180 Billion~~Thailand Cleans Up; Area Remain Flooded. ~~" *Fortune.* 3 September 2017.~~ *Time.* 2 December 2011. Accessed ~~September 2017:~~

Few countries are spared the devastation that natural disasters can wreak. Between 1980 and 2004, approximately 7,000 natural disasters led to the deaths of around two million people and further negatively affected the lives of five billion more (Guha-Sapir et al., 2009). The economic costs are also considerable and rising, with the direct economic damage from natural disasters between 1980-2012 estimated to be ~~around~~ $3.8 trillion (Gitay et al., 2013).

While dealing with both the immediate and long-term damage wrought by natural disasters can seriously drain existing resources for any country, developing countries ~~generally~~ find it especially difficult to cope. Often, their existing physical infrastructure is grossly unequal to the task of withstanding natural disasters. Meanwhile, their institutional infrastructure often lacks the resilience or capacity necessary to deal with the often long and complex process of rebuilding. In general, when natural disaster strikes, developing countries are likely to experience more serious physical damage and have less state capacity to recover from it. For example, prior to its 2010 earthquake, Haiti had no building codes and many of its buildings were not designed to withstand even a mild earthquake.[15] Meanwhile, the lack of governmental leadership and low state capacity, along with other factors, has meant that even 7 years after the disaster, Haiti has yet to fully recover (Hartberg et al., 2011).[16]

From a purely tactical perspective then, natural disasters represent an opportune time to inflict harm on a strategic adversary, particularly if it is a developing country, as both government officials and public resources are fully engaged with responding to the emergency. Yet, anecdotal evidence suggests that strategic adversaries rarely take advantage of this opportunity ~~by overtly initiating~~ to overtly initiate hostile actions, at least as far as can be openly observed.[17] Many of the deadliest natural disasters (which should present foreign opponents the best opportunity to

April 2019, https://web.archive.org/web/20120108085747/http://www.time.com/time/world/article/0,8599,2101273,00.html

[15] Watkins, Tom. "Problems with Haiti building standards outlined." *CNN*. 2010 January 14. Accessed September 2017: http://edition.cnn.com/2010/WORLD/americas/01/13/haiti.construction/index.html

[16] Cook, Jesselyn. "7 years after Haiti's Earthquake, millions still need aid." *Huffington Post*. 13 January 2017. Accessed May 2018: https://www.huffingtonpost.com/entry/haiti-earthquake-anniversary_us_5875108de4b02b5f858b3f9c?guccounter=1

[17] Note, whether countries take advantage of their strategic opponents using more covert methods during times of natural disaster is a more open question.

inflict harm) do not seem to have been followed up by hostile overtures. For instance, Taiwan did not use the 1976 Tangshan earthquake, believed to be the largest earthquake in the 20th century by death toll, as an opportunity to ~~improve its strategic position vis-a-vis~~ inflict further harm on China. Similarly the ~~2011 Fukushima disaster was not followed by hostile gestures from China nor did Russia react to Hurricane Harvey with belligerence toward the US.~~[18] India did not use the occasion of either the 1970 Bhola cyclone in then East Pakistan (the deadliest tropical cylone ever recorded)[18] or the 1991 Bangladesh cyclone, to initiate hostile gestures

Context of course matters. There are different rules of engagement depending on whether one has a contentious versus an actively hostile relationship with another country. In the former context, though taking preemptive action against a strategic opponent may lead to short term gains, it could very well lead to long term losses, especially since such an action would be well out of the realm of socially acceptable behavior in response to a natural disaster. But even by this hard-nosed logic, we might expect countries to simply do nothing when tragedy befalls their strategic opponents. Such behavior would fit well with the larger literature that investigates donor motivations for allocating foreign aid. Indeed, scholars have produced a large body of evidence suggesting that donors overwhelmingly prioritize their own self-interest over recipient need when dispensing aid.[19] [19] and under certain conditions, have seen such efforts pay off (De Mesquita and Smith, 2009; Carter and Stone, 2015; Bueno de Mesquita and Smith, 2016).

Yet, much anecdotal evidence suggests that rather than jockeying for a more favorable strategic perch or doing nothing, natural disasters encourages the flow of *aid* from strategic opponents. For example, during the famine that ravaged North Korea from 1994 to 1998, the United States, South Korea, Japan and the European Union stepped up as the primary donors of food aid (Noland, 2004). Meanwhile, Taiwan was one of the biggest donors to China in the aftermath of the 2008

[18] ~~Note, whether countries take advantage of their strategic opponents using more covert methods during times of natural disaster is a more open question.~~

[18] Halloran, Richard. "Pakistan Storm Relief a Vast Problem." *New York Times*. 30 Nov 1970. Accessed January 2019: https://www.nytimes.com/1970/11/30/archives/pakistan-storm-relief-a-vast-problem-disaster-in-pakistan-created.html

[19] ~~For example, see~~ McKinlay and Little ~~(~~1977, 1978, 1979~~);~~ Maizels and Nissanke ~~(~~1984~~);~~ Schraeder et al. ~~(~~1998~~);~~ Alesina and Dollar ~~(~~

[19] For example, see McKinlay and Little (1977, 1978, 1979); Maizels and Nissanke (1984); Schraeder et al. (1998); Alesina and Dollar (

Sichuan earthquake.[20] Taiwan also actively contributed to the rescue effort,[21] and further offered to share the technical expertise it developed from its own devastating earthquake experience in 1999.[22]

Are these anecdotes of non-strategic behavior indicative of a systemic pattern or one-off exceptions to the rule of strategic self-interest? If the former, what could explain this seemingly humanitarian turn of behavior? Finding an answer to these questions in the current literature is difficult. For one, in evaluating the relative roles that donor interest and recipient need play in foreign aid allocation, what researchers refer to as recipient need may be more precisely understood as "developmental need" and as such, targeted towards addressing chronic poverty. To that end, development need is frequently measured using gross domestic product (GDP) or gross national product (GNP) per capita;[23] or occasionally with more holistic measures of social outcomes such as the Physical Quality of Life Index,[24] the average life expectancy,[25] or the daily caloric intake.[26]

Meanwhile, only a small body of research investigates the degree to which aid is given in response to acute crises, such as natural disasters, which will be referred to here as humanitarian need. Considering that around 11% of official development assistance (ODA) was officially categorized as being given for humanitarian reasons in 2015, the systematic failure to include natural disasters as a potential driver of foreign aid is puzzling.[27] What evidence that does

[20] "FACTBOX-Earthquake aid for China." *Reuters*. 14 May 2008. Accessed April 2019: http://uk.reuters.com/article/idUKPEK29448220080514

[21] French, Howard and Edward Wong. "In Departure, China Invites Outside Help." *The New York Times*. 16 May 2008. Accessed September 2017: http://www.nytimes.com/2008/05/16/world/asia/16china.html

[22] Hille, Kathrin. "Taiwan shares quake lessons with Sichuan.' *Financial Times*. 9 June 2008. Accessed September 2017: https://www.ft.com/content/b0204002-3641-11dd-8bb8-0000779fd2ac

[23] For example, see McKinlay and Little (1977, 1978, 1979); Maizels and Nissanke (1984); Alesina and Dollar (2000); Berthélemy (2006); Stone (2006); De Mesquita and Smith (2007); Bermeo (2008).

[24] See Maizels and Nissanke (1984).

[25] See Schraeder et al. (1998).

[26] See McKinlay and Little (1979); Schraeder et al. (1998).

[27] Total ODA for DAC countries was 131.6 billion in 2015, 15.6 billion of which was designated as humanitarian assistance http://www.oecd.org/dac/development-aid-rises-again-in-2015-spending-on-refugees-doubles.htm http://www.oecd.org/dac/stats/humanitarian-assistance.htm

exist suggests a null or small effect of humanitarian aid on foreign aid allocations. For instance, Bermeo (2008) finds no relationship between the number of people affected by disasters and the allocation of bilateral aid for France, Japan, the UK and the US.[28] Similarly, David (2011) finds no statistically significant relationship between development aid flows and climatic or human disasters. David does find evidence for increased development aid following geological disasters, but the effect is only found with a 2 year lag and substantively small.[29] Yang (2008) also finds that ODA increases after a hurricane, but only with a lag of 2 years.[30] In this paper, we not only seek to investigate donors give more aid in response to natural disasters, but to explain why they might do so

How Natural Disasters Affect Foreign Aid Allocations

Only in the twentieth century has expending public resources to relieve the human suffering of foreigners shifted from being virtually inconceivable to relatively commonplace. The devastation wrought by the two world wars was particularly instrumental in bringing about this change. However, such aid was strictly intended to serve as temporary transfers that would facilitate a return to the previous status quo, rather than a long-term commitment to "development" as such. The turn toward promoting development was instead fostered by ongoing Cold War hostilities, which simultaneously promoted the use of aid to further donor's strategic goals while also building a new norm of rich countries aiding poor countries (Lancaster, 2008).

The role of mitigating disaster and suffering on the one hand and furthering strategic interest on the other are thus baked into the modern conception of foreign aid. This history also suggests that ~~initial~~ humanitarian aid, ~~though~~ even if only initially meant to serve as a temporary expedient,

[28]Note, Bermeo (2008) also conceptualizes humanitarian aid using measures of the number of refugees and civil war, with mixed effects across countries for both

[29]David (2011) defines climatic events as: floods, droughts, extreme temperatures and hurricanes; human disasters as: famines and epidemics; geological events as: earthquakes, landslides, volcano eruptions and tidal waves.

[30]Strömberg (2007) does find a positive and significant relationship between aid and natural disasters, but his paper is concerned with emergency aid in particular, not foreign aid. Similarly, Olsen et al. (2003) find that donors are more likely to give aid for strategic reasons, though their analysis is confined to emergency aid.

may lead to the establishment of aid with longer-term strategic goals. Whether this pattern exists more generally and if so, whether it is driven primarily by strategic or humanitarian concerns is unclear however. The role of the Cold War in foreign aid's origin story dictated that recipients of humanitarian aid were generally within a particular strategic bloc, making it difficult to untangle strategic from humanitarian drivers.

As such, looking at how natural disasters affect foreign aid allocation is not only interesting in its own right but also provides an exogenous factor with which to identify the role of donor interest and recipient need in explaining patterns of aid commitments. To that end, we develop a set of hypotheses as to how natural disasters affect foreign aid allocations. Further, to better ~~entangle the varying strategic motivations~~untangle the varying potential drivers, we disaggregate foreign aid into three types: humanitarian, civil society, and development aid. In doing so, we seek to offer a more nuanced understanding of the principle drivers of foreign aid allocations.

Short-term Humanitarian Response to Natural Disasters

Responding to natural disasters quickly and efficiently is often crucial to saving lives and alleviating human suffering ~~. The immediate period after a natural disaster is often critical~~ as services like electricity, gas, water, and telecommunications may all be disrupted in the immediate period following a natural disaster. The timely deployment of humanitarian aid is the first response that donors can extend to countries struck by natural disaster. In what follows, we develop three hypotheses as to how the interaction between strategic interests and natural disaster severity can affect humanitarian aid allocation.

We draw first from recent research in behavioral economics, which underscores the idea that different social contexts lead to varying behavior in identical situations (Kahneman, 2003; Do, 2011).[31] Natural disasters may reorient the social context of a dyadic relationship to encourage donors to increase aid to their strategic opponents. That is, the loss of human life and destruction of infrastructure, which natural disasters provoke, can temporarily serve to emphasize the human

[31]While there is evidence that non-governmental organizations are driven by the norms of humanitarian discourse when allocating aid (Büthe et al., 2012), evidence for similar behavior in governments has been mixed at best.

aspect of the bilateral relationship as opposed to the political, economic, and military aspects that generally define foreign relations between two countries.

Moreover, if natural disasters do have a humanizing effect, ~~than~~ then we might expect strategic opponents to be particularly sensitive to it. ~~This is~~ That is is, given that strategic opponents are more likely to "otherize" each other, then dyadic opponents must traverse a greater gap to humanize ~~each another~~ the other compared to dyadic allies (de Buitrago, 2012). On balance then, we would expect that donors ~~not to~~ do not discriminate between strategic opponents or strategic allies when dispensing aid. For example, historically hostile relations between the US and Cuba may mean that the baseline extent to which they "otherize" each other is much greater than in the US-Japan relationship, increasing the potential for Cubans to be humanized in American eyes. As such, we might expect American aid to Cuba rise to the level they would provide to the Japan in the event of similar natural disasters.

That is not to say that natural disasters can always bridge the divide among strategic opponents. For example, India and Pakistan have had an uneasy history ~~in~~ of accepting aid from each other following natural disasters.[32] In general, we contend only that natural disasters may make it more *likely* that a strategic adversary will contribute aid because the humanitarian disaster temporarily reframes the context of bilateral relations. An understanding of the interaction between natural disasters and strategic interests affects humanitarian aid allocations based on social context thus leads us to the following hypothesis:

> HYPOTHESIS 1A: Donors who are strategic opponents of the recipient are more likely than strategic allies to be sensitive to the humanizing effect of natural disasters. As such, following natural disasters, donors are likely to send **similar amounts of humanitarian aid to strategic allies and strategic opponents.**

Realist scholars offer an alternative perspective ~~that~~ which proclaims that, "foreign aid is today and will remain for some time an instrument of political power" (Liska, 1960). Under this

[32]Ravishankar, Siddharth. "Cooperation between India and Pakistan after Natural Disasters." *Stimson Center*. 9 January 2015. Accessed September 2017: https://www.stimson.org/content/cooperation-between-india-and-pakistan-after-natural-disasters

logic, donors commit aid primarily to recipient countries ~~primarily~~ to further their own strategic interests. Extant literature on the drivers of foreign aid have put forward strong substantive evidence to support this viewpoint (McKinlay and Little, 1979; Maizels and Nissanke, 1984; Schraeder et al., 1998; Alesina and Dollar, 2000; Berthélemy, 2006; Stone, 2006; De Mesquita and Smith, 2007; Bermeo, 2008; Dreher et al., 2015). With regards to the interaction between natural disasters and strategic interests, it is in donor's self-interest to commit greater amounts of humanitarian aid to their strategic allies rather than opponents in the event of a natural disaster. A naive reading of the logic of realism would lead to the following hypothesis as to how the interaction between natural disasters and strategic aid affects humanitarian aid allocations:

HYPOTHESIS 1B: Donors are driven by self-interest and in the event of ~~a natural disaster~~natural disasters, donors are **likely to send less humanitarian aid to their strategic ~~allies~~ opponents vs their strategic allies~~.~~**

A more sophisticated realist perspective, however, suggests that natural disasters may present donors with a strategic opportunity to improve relations with strategic opponents. As suggested in H1A, social context does matter, but only to the extent ~~of limiting~~ that it limits the acceptable set of responses to natural disasters to the allocation of humanitarian aid (as opposed to, for example, the use of hostile overtures). However, donors may still seek to work within this framework of humanitarian altruism to forward their own interests.

Indeed, disaster-afflicted countries appear to be sensitive to the possibility that accepting humanitarian aid from strategic opponents may come with ulterior motives. In 1999 for example, Venezuela experienced catastrophic flash floods and debris flows in Vargas State, which left as much as 10% of the Vargas population dead (Wieczorek et al., 2001). US troops helped in the relief efforts by running helicopter rescue missions and working to provide clean water. However, consistent with his antagonism toward US hegemony in the region, President Hugo Chavez declined US assistance in rebuilding a critical highway, saying that while, "he would accept American equipment if Venezuelan soldiers operated it...he did not want US troops in

his country."[33] Meanwhile, Iran categorically refused any aid from Israel following the 2003 Bam earthquake, though the Israeli government still encouraged its citizens to donate privately.[34] Indeed, even the US first turned down Russian aid for Hurricane Katrina before ultimately accepting it.[35] Most recently, Venezuelan leader Nicolas Maduro's refused humanitarian aid to alleviate its food crisis under the reasoning that such aid is "merely a pretext for regime change," demonstrating that i) some political actors also suspect that humanitarian aid may be strategically driven and that ii) the use of humanitarian aid for strategic purposes may extend beyond natural disasters (as this particular crisis was largely a function of political missteps). [36]

There is also anecdotal evidence to suggest that aid given under such circumstances can ~~also~~ serve to humanize and improve public perceptions of donors as well. For example, in the wake of US and South Korean aid for the North Korean famine, one refugee summarized his reaction to the US Institute for Peace this way: "We were taught all these years that the South Koreans and Americans were our enemies. Now we see they are trying to feed us. We are wondering who our real enemies are" ~~(~~Natsios~~, 1999). This~~ (Natsios, 1999, 9). Andrabi and Das (2017) moreover, find that following the inflow of international aid sent to alleviate the damage done during an earthquake in Pakistan 2005, trust in Euoropeans and Americans was much higher in the affected population. This evidence suggests that, at least ~~anecdotally, that~~ in certain contexts, humanitarian aid can serve to improve relations with strategic opponents. Here, however, we are primarily interested in investigating whether donors are driven by this possibility when allocating aid, leading to our third hypotheses:

[33]Brand, Richard. "Chavez assailed on handling of Venezuelan flood disaster." *The Miami Herald*. 5 August 2001. Accessed September 2017: http://www.latinamericanstudies.org/venezuela/venezuela-disaster.htm.

[34]Popper, Nathaniel. "Israelis Help Iran Victims Despite Rebuff." *The Forward*. 2 January 2004. Accessed September 2017: http://forward.com/news/6059/israelis-help-iran-victims-despite-rebuff/

[35]"U.S. accepts Russian Katrina aid." *UPI*. 2 September 2005. Accessed September 2017. https://www.upi.com/US-accepts-Russian-Katrina-aid/39221125680989/.

[36]Taladrid, Stephania. "Venezuela's Food Crisis Reaches A Breaking Point." *The New Yorker*. 22 February 2019. Accessed March 2019: https://www.newyorker.com/news/news-desk/venezuelas-food-crisis-reaches-a-breaking-point

HYPOTHESIS 1C: Donors see natural disasters as a strategic opportunity to improve their relations with strategic opponents and are thus are likely to send **more humanitarian aid to strategic opponents versus allies.**

Long-term Responses to Natural Disasters

Donor countries may dispense aid that not only serves to immediately address the natural disaster at hand, but also ~~through other channels that have~~ to further longer-term objectives. Here, we make a distinction between civil society aid and development aid. Civil society aid is aimed at supporting non-governmental organizations (NGOs) and their programs. The ~~goal~~ stated purpose of such aid is to empower grass-roots advocacy and improve governance and government accountability. Meanwhile, development aid is targeted toward promoting long-term economic development in a recipient country often through the building of infrastructure like roads and hospitals as well as the growth of human resources via technical training and education. In what follows, we develop hypotheses as to how the interaction between strategic interest and natural disasters can affect the allocation of these two different types of aid.

Natural Disasters as Strategic Opportunities. ~~If, as following the realist logic, foreign aid is used to promote donor interests, then donor governments should be especially inclined to increase the allocation of civil society aid. This is because aiding the developmentof civil society~~ Donors generally distribute aid to civil society not only for its intrinsic value but also, and arguably primarily, for its perceived instrumental value in either promoting democratization (Robinson, 1995; Ottaway and Carothers, 2000) or economic development (Kral et al., 2013). However, we make the distinction between civil society and development aid because while any given donor may commit civil society aid to promote economic development, lending support to civil society at all is an inherently political act.[37] From supporting the growth of government watch dogs to increasing the domestic capacity for grass roots advocacy, whether it is their intention or not,

[37]Carothers, Thomas and Diane de Gramont. "The Prickly Politics of Aid." *Foreign Policy*. 12 May 2013. Accessed June 2018: http://foreignpolicy.com/2013/05/21/the-prickly-politics-of-aid/

donors are able to exert influence over a recipients domestic politics by directing funds to civil society.

Thus if, as following the realist logic, foreign aid is used to promote donor interests, then donor governments should be especially inclined to increase the allocation of civil society aid. With respect to natural disasters, countries may be motivated to give more civil society aid to their strategic opponents because the temporary suspension in the normal dynamics of the relationship represents a unique opportunity to increase civil society aid and initiate a shift in the nature of the bilateral relationship ~~. That is, donor countries may either already recognize all to well or come to recognize that the natural disasters offers an opportunity to improve the terms of their relationship with the affected country~~ (as in H1C). ~~Either way, donors~~ Donors can seize on a country's inherent vulnerability following a natural disaster to decide to *strategically* increase their civil society aid so as to increase their chances of exerting domestic influence over the recipient countries. ~~As such , we derive the following hypothesis~~

To draw a concrete example, following the 2004 Indian Ocean Earthquake and Tsunami, the US began committing aid to civil society groups in Somalia. Though the initial nominal amount was a drop in the bucket in absolute terms, considering that no aid was given to civil society in Somalia prior to the natural disaster and such aid has been steadily growing over the past decade, this represented a substantial change in US aid commitments to Somalia.[38] Given that the U.S. had closed its embassy in Somalia in 1991 and only re-established diplomatic presence in 2018.[39], it seems plausible to interpret this as strategic gambit on the US' part to gain a foothold in Somalia, and if so, a successful one. Before jumping to conclusions however, note that the US also increased civil society aid to Indonesia at the same time.[40] Given that Indonesia

[38] Data collected from USAID from: "USAID Foreign Aid Explorer". Accessed January 2019: https://explorer.usaid.gov/

[39] Watkins, Eli and Jennifer Hansler. "State Department announces re-establishment of 'permanent diplomatic presence' in Somalia." *CNN*. 4 December 2018. Accessed January 2019: https://edition.cnn.com/2018/12/04/politics/us-somalia-state-department/index.html

[40] Data collected from USAID from: "USAID Foreign Aid Explorer". Accessed January 2019: https://explorer.usaid.gov/

was affected much more severely by the earthquake than Somalia[41] but had also enjoyed much closer ties to the U.S., it would be difficult to substantiate our proposed mechanism based on anecdotal evidence alone. We thus test the following hypothesis through statistical modelling:

> HYPOTHESIS 2: Natural disasters present an opportune window for donors to exert influence over recipients who are their strategic opponents and as such, donors are more likely to send additional **civil society aid** to their strategic opponents ~~.~~

If on the contrary, donors are purely driven by the potential intrinsic or instrumental payoffs of supporting civil society, then donors should be no more motivated to support the civil society of their strategic opponents over that of their strategic allies and we should find no support for this hypothesis.

Natural Disasters and Development Aid. Whereas humanitarian aid provides stop-gap measures to address the immediate aftermath of a natural disaster, the focus of development aid is to build the conditions for long-term, sustainable economic growth. Here we simply expect that donor countries are more likely to give this type of aid to countries that they want to see economically develop and prosper, namely, their strategic allies. This accords with the more simple notion of realism, similar to H1B, that countries will seek to support allies rather than opponents irrespective of the number of natural disasters. This results in the following hypothesis:

> HYPOTHESIS 3: Donors are more likely to send greater **development aid** to their strategic ~~opponents~~ allies irrespective of the number of natural disasters.

If on the contrary, donors seek only to promote development according to recipient need and without regard to its own potential benefit, then donors should be no more motivated to support the development of their strategic allies over that of their strategic opponents and we should find no support for this hypothesis.

[41] "India, Indonesia, Maldives, Myanmar, Somalia, Thailand: Earthquake and Tsunami OCHA Situation Report No. 14". *ReliefWeb*. 7 January 2005. Accessed January 2019: https://reliefweb.int/report/india/india-indonesia-maldives-myanmar-somalia-thailand-earthquake-and-tsunami-ocha-situation

Measuring Strategic Relationships

One reason for evaluating the *motivations* for aid and not aid *outcomes* is that aid given for strategic reasons may still further development objectives, albeit incidentally, while aid given for humanitarian reasons may also bring unexpected strategic benefits (Maizels and Nissanke, 1984). However, evaluating the motivations for aid is not a straightforward process – any given aid project may work toward providing assistance to a recipient country as well as strategic benefits to a donor country.

Of critical importance to investigating whether strategic considerations (and by extension, the interaction between strategic considerations and humanitarian need) affects foreign aid considerations then is constructing a reliable measure of strategic interest. Unfortunately, we find that ~~Alesina and Dollar (2000)'s remark that~~Alesina and Dollar (2000, 35)'s observation that, "the measurement of what a 'strategic interest' is varies from study to study and is occasionally tautological," still holds true. Indeed, strategic interest has alternately been operationalized as: trade intensity (Berthélemy and Tichit, 2004; Bermeo, 2008; Hoeffler and Outram, 2011), UN voting scores ~~(Alesina and Dollar, 2000; Weder and Alesina, 2002; Hoeffler and Outram, 2011; ?)~~(Alesina and Dollar, 2000; arms transfers (Maizels and Nissanke, 1984), colonial legacy ~~(Alesina and Dollar, 2000; Bermeo, 2008; Berthélem~~ alliances (Bermeo, 2008; Schraeder et al., 1998), regional dummies (Bermeo, 2008; Berthélemy, 2006; Maizels and Nissanke, 1984), bilateral dummies (Alesina and Dollar, 2000; Berthélemy and Tichit, 2004; Berthélemy, 2006)[42] or some combination of the above.[43]

Such inconsistency in the operationalization of strategic interest is not simply a matter of using different variables to measure the same concept but a matter of using different variables to measure different *aspects* of the underlying concept. However, while a dyad's strategic bilateral relationship is quite multifaceted, to date, there has not been a readily available measure of strategic relationships which captures its various aspects the same way that scholars have done for

[42] A US-Egypt or US-Israel dummy seems to be the most common instance of a bilateral dummy.

[43] Meanwhile other papers take a negative approach and argue that any shortfall between what would theoretically be expected from poverty-efficient aid allocation and actual aid allocation (Collier and Dollar, 2002; Nunnenkamp and Thiele, 2006; Thiele et al., 2007), or similarly between a theoretical allocation based on good governance and actual aid allocation (Dollar and Levin, 2006; Neumayer, 2005), is evidence of strategic interest at play.

other complex concepts.[44] To address this problem, we create a new measure of strategic interest that is able to account for varying aspects of strategic interest.

A new measure of strategic relationships

To generate a measure of strategic relationships we adopt a latent variable approach that enables us to estimate a relational measure of interest between countries by taking into account the direct and indirect ways in which states are connected across a variety of dimensions. Specifically, we utilize three dimensions of state relations to construct our strategic interest measure: dyadic alliances, UN voting, and joint membership in intergovernmental organizations (IGOs). We focus on these dimensions because each provides distinct a representation of the ~~political and military~~ strategic relations between countries in the international system ~~. Additionally, these measures are~~ and have been commonly employed in the foreign aid literature~~to measure strategic interest. Dyadic alliances~~ . Alliances largely capture the strategic and military aspect of ~~country relationships. Meanwhile~~the dyadic relationships. In contrast, joint membership in IGOs reflects the dyadic relationship across many ~~political issue areas , and~~ diverse issue areas expressed across correspondingly many fora while UN voting is better able to capture this relationship in a centralized forum.

To estimate a measure of strategic interest across these dimensions, we take a network based approach that allows us to leverage both the direct and indirect ways in which states are connected to one another. To do this we employ a latent factor model as described in Hoff (2005). The model is structured as follows:

$$\begin{aligned} Y &= \mathbf{u}_i^T \mathbf{u}_j + \epsilon_{ij}, \text{ where} \\ \mathbf{u}_i &\in \mathbb{R}^{R=2}, \; i \in \{1, \ldots, n\} \end{aligned} \tag{1}$$

[44]For example, Polity and Freedom House have provided measures or political institutions while the World Bank's World Governance Indicators (WGI) project provides measures for six dimensions of governance

Y here is a $n \times n$ undirected sociomatrix in which y_{ij} designates whether there exists a link (e.g., an alliance) between i and j. The goal of the model is to provide a projection of the systematic variation in Y into a two-dimensional social space.[45] More precisely, the types of systematic variation that we are interested in include the concepts of (a) transitivity, (b) balance and (c) clusterability. Formally, a set of three countries ijk is said to be transitive, if for whenever $y_{ij} = 1$ and $y_{jk} = 1$, we also observe that $y_{ik} = 1$. This follows the logic of " a friend of a friend is a friend". Meanwhile, the relationships between ijk are said to be balanced if $y_{ij} \times y_{jk} \times y_{ki} > 0$. Conceptually, if the relationship between i and j is "positive", then both will relate to another unit k identically, either both positive or both negative. Finally, relationships between ijk are said to be clusterable if it is balanced or all the relations are all negative. It is a relaxation of the concept of balance and seeks to capture groups where the measurements are positive within groups and negative between groups.

Thus third order dependencies suggest that "knowing something about the relationship between i and j as well as between i and k may reveal something about the relationship between i and k, even when we do not directly observe it" ~~(Hoff and Ward, 2004)~~(Ward and Hoff, 2008, 141). Such dependences would seem especially relevant for our purposes, as one cannot understand the strategic relationship between two countries without taking into account their respective relationships with other countries. The importance for accounting for these dynamics have long been acknowledged in the foreign aid literature. ~~Trumbull and Wall (1994)~~ Trumbull and Wall (1994, 877) for example, note that, "donors do make their decisions with knowledge of what each other are doing, and may actually act cooperatively. Any study that ignores the interrelationship of donor behavior risks problems with simultaneity bias." However, we find that until now, this critique has largely gone unaddressed by ~~the existing literature~~existing analyses.

The main advantage of calculating the latent space of different dyadic variables as opposed to using alternative specifications such as the S Score algorithm[46] is that it allows us to better

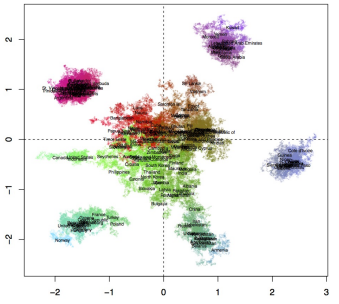
[45]The latent factor model we utilize here is based on an eigvenvalue decomposition that seeks to represent relations between countries as the weighted inner-product of country-specific vectors of latent characteristics. In this application, we project our $n \times n$ sociomatrix into a $n \times 2$ matrix of country positions in a latent social space.

[46]Leeds and Savun (2007), for example, measure a states "threat environment" as the set of all states for which ones is contiguous with or which is a major power and with an S score below the population median.

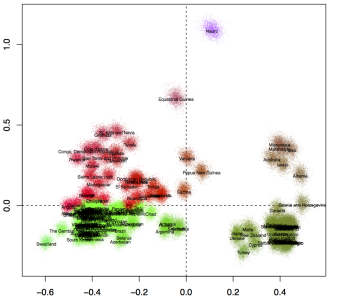
account for indirect ties that states share. Indirect ties are accounted for within this framework because the latent factor model takes patterns such as transitivity into account~~, as~~. As a result, the relation between two actors can be inferred even if no direct interaction between them is observed.

We employ this latent factor model on every year for each of our three measures.[47] In Figure 2, we present a visualization of the resultant latent space we calculated for each variable for the year 2005.

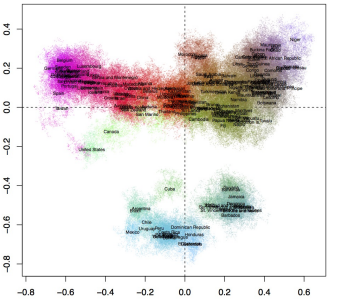
~~Latent Spaces for components of Political Strategic Interest Measure during 2005~~



(a) Alliances



(b) UN voting



(c) IGO membership

Figure 2: Latent Spaces for components of Strategic Interest Measure during 2005

Countries that cluster together in this two-dimensional latent space are more likely to interact with each other. The plots for alliances, UN voting and IGO membership suggest that

[47]The models are estimated via Gibbs sampling from the full conditional distributions of $\mathbf{u}_i^T \mathbf{u}_j$. For a more detailed discussion of this model, see Hoff (2005).

there is distinct clustering among countries. Moreover, these clusters are different across the three measures, suggesting that each variable is indeed capturing different aspects of strategic interest.

After estimating the latent spaces for these components, we estimate the distance between each dyadic pair for the three components ~~and every~~ for each year. We then combine them in a principal components analysis (PCA) to reduce the dimensionality of our measure while retaining as much variance as possible ~~. That is, alliances, UN voting and joint membership in IGOs all capture certain aspects of political strategic interest. Instead of choosing only one of them as our measure of strategic interest as other papers have done, we combine them in order to increase~~ to maximize our explanatory power. We estimate the PCA of these variables for each year separately[48] and use the first principal component for each year as our measure of strategic interest. [49] For more information about how this PCA was conducted, please see the Online Appendix. The end result of this process is a measure of strategic interest that takes into account indirect ties while also accounting for multiple dimensions in which states interact with one another.[49]

Data

Aid flows

Our data from foreign aid flows is taken from the AidData project (Tierney et al., 2011). This database includes information on over a million aid activities from the 1940s to the present. We use the country level aggregated version of this database to create a directed-dyadic dataset of total aid dollars committed. In this analysis, we focus specifically on OECD donor countries as they both are the best able and have the best incentive to give foreign aid to advance their

[48] For each year, we conduct a bootstrap PCA of 1000 subsamples.

[49] ~~On average over all the years, we find that the first component of our PCA of alliances, UN voting and joint membership in IGOs, which we use as our measure of strategic interest, explains about 51% of its variance.~~

[49] With regards to the strategic interest measure, we also estimate a model in which we incorporate the uncertainty in the estimation of our latent variable (see Figure A6 in the Online Appendix).

strategic interests. In the final tally, our dataset includes the 18 most active senders[50] and 167 receivers of aid flows from 1975 to ~~2006.~~ 2005. Accounting for all possible senders of aid during this time frame is difficult because of the amount of missing data. That being said, issues with missingness in our dataset still exist and we deal with them by employing a multiple imputation method developed by Hoff (2007) and shown to have good performance by Hollenbach et al. (2014).

We use the AidData's Sector coding scheme in order to disaggregate bilateral ODA into humanitarian aid, development aid, and civil society aid.[51] To that end, our measure of humanitarian aid encompasses the sectors of:

"Emergency response"	"Reconstruction Relief"	"Disaster Prevention and Preparedness"

Meanwhile, civil society aid is measured as aid to the sectors of:

"Government and Civil Society"	"Women"	"Support to Non-Governmental Organizations and Governmental Organizations"

Finally, development aid is defined as aid given to the following sectors:

[50]More specifically, the included donor countries are: Australia, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States. These countries were chosen both to maximize comparability with previous work as well as for reasons of data availability. Research on non-DAC donors suggests that like DAC donors, they seem to be primarily driven by strategic motivations in distributing aid (Neumayer, 2003; Dreher et al., 2011; Fuchs and Vadlamannati, 2013; Dreher et al., 2015, 2018). Existing evidence suggests that non-DAC donors do seem more likely to give aid following a natural disaster however (Dreher et al., 2011), though they still only account for at most 12% of humanitarian aid in any given year (Harmer et al., 2005). This research suggests that our findings might be even stronger among non-DAC donors. Future work investigating this possibility will become increasingly important the more foreign aid non-DAC donors distribute.

[51]"AidData's Sector Coding Scheme." http://docs.aiddata.org/ad4/files/aiddata_coding_scheme_0.pdf

"Education"	"Health"	"Water Sanitation"
"Other Infrastructure and Services"	"Economic Infrastructure and Services"	"Environmental Protection"
"Other Social Infrastructure and Services"	"Agriculture Forestry and Fishing"	"Industry, Mining and Construction"
"Other Development Aid"	'"Food Aid"	"Debt Relief"

We note that bilateral ODA often represents only one channel through which ~~a donor country~~ donors may allocate foreign aid and that an increasing number of papers have argued for accounting for the heterogeneity of aid channels donors may use when estimating drivers of foreign aid (Nunnenkamp and Öhler, 2011; Buthe and Cheng, 2013; Dietrich, 2013). ~~For our paper~~Here, we choose to focus solely on bilateral aid in order to maintain greater comparability with previous studies.

Strategic Interest

As previously stated, ~~for~~ we created our measure of ~~political strategic relationships , we conducted~~ strategic relationships by conducting a PCA on the latent distances for alliances, UN voting and joint IGO membership. Data for alliances was retrieved from the Correlates of War (COW) Formal Alliance dataset (Gibler, 2009). Following Bueno de Mesquita (1975) and Signorino and Ritter (1999), we distinguish between different types of alliances with the following weighting scheme: 0 = no alliance, 1 = entente, 2 = neutrality or nonaggression pact, 3 = mutual defense pact.[52]

UN voting data was obtained from the United Nations General Assembly Data set (Strezhnev and Voeten, 2012). ~~Here we~~ We calculate the proportion of times two states agree out of the total number of votes they both voted on. Agreement means either both vote yes, both vote

[52]Note, as for alliances, we had attempted to distinguish between different types of membership but found that very few states were listed as Associate Members or Observers of an IGO for the time period that we are conducting our analysis. Thus we used the simpler coding scheme.

no, or both abstain. This measure is similar to the 'voting similarity index' readily available from the dataset except the voting similarity index does not account for mutual abstentions.

Meanwhile IGO voting data was obtained from the Correlates of War International Governmental Organizations Data Set (Pevehouse et al., 2010). A total of 529 IGOs across a broad swath of topics, including trade, communications, and health and security, are represented in this dataset. Dyads were coded as 1 if they belonged to the same IGO as a full member or an associate member and coded as 0 if one or both of them was an observer, had no membership, was not yet a state or was missing data. [53]

Natural Disasters

Almost all the empirical work on natural disasters relies on the publicly available Emergency Events Database (EM-DAT) maintained by the Center for Research on the Epidemiology of Disasters (CRED) at the Catholic University of Louvain, Belgium[54]. EM- DAT defines a disaster as a natural situation or event which overwhelms local capacity and/or necessitates a request for external assistance. For a disaster to be entered into the EM-DAT database, at least one of the following criteria must be met: i) 10 or more people are reported killed; ii) 100 people are reported affected; iii) a state of emergency is declared; or iv) a call for international assistance is issued. We use a count of the number of natural disasters a country has experienced a year as our measure of natural disaster severity. ~~Disasters can be hydro-meteorological, including floods, wave surges, storms, droughts, landslides and avalanches; geophysical, including earthquakes, tsunamis and volcanic eruptions; and biological, covering epidemics and insect infestations (the latter are less frequent).~~

[53] ~~Note we had attempted to make distinctions between different types of membership much like for alliances but found that very few states were noted to be Associate Members or Observers of an IGO for~~ Information on the ~~time period that we~~ IGOs included in the dataset are ~~conducting our analysis. Thus we chose to use~~ available from the ~~simpler coding scheme.~~ Correlates of War website: http://www.correlatesofwar.org/data-sets/IGOs

[54]

Additional Covariates

~~*Developmental Need*~~

In addition to our dyadic strategic relationship measures, we include a number of covariates to ~~captute characteristics of the countries receiving aid~~ capture characteristics of aid recipients.

For our ~~measures of developmental need, we use (1) Log GDP per capita and (2) life expectancy at birth. This measure "indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life." Both of these measures are extracted from the World~~ Bank ~~(~~2013~~).~~

~~*Additional Covariates*~~

~~We also include a number of covariates in our model, including macroeconomic variables and measures for political institutions. For our macroeconomic indicators~~measure of political institutions, we use ~~GDP per capita, available from the World Bank (~~Bank~~,~~ 2013~~). For our measure of political institutions, we use~~ Polity IV data available from the Center for Systemic Peace (Gurr et al., 2010). Polity IV captures differences in regime characteristics on a 21 point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy)~~. Note we rescale Polity IV~~, rescaling it to range from 1 to 21 for greater ease of interpretation. We also controlled for colonial history using the Colonial History Data Set from the Issue Correlates of War Project (Hensel, 2009). This variable is coded as a one when the receiver in a sender-receiver dyad is a former colony of the sender and zero otherwise.

~~We~~ Meanwhile, for our measures of developmental need, we use (1) Log GDP per capita and (2) life expectancy at birth. Both of these measures are extracted from the World Bank (2013). Finally, we control for the incidence of civil war in a recipient country as it ~~certainly~~ informs the ability for a donor country to dispense aid. We do so with data retrieved from the Uppsala Conflict Data Program (UCDP)/International Peace Research Institute (PRIO) Armed Conflict Database. (Gleditsch et al., 2002). We code as civil war any armed conflict which either (a) "Internal armed conflict occurs between the government of a state and one or more internal opposition group(s)

without intervention from other states" or (b) "Internationalized internal armed conflict occurs between the government of a state and one or more internal opposition group(s) with intervention from other states (secondary parties) on one or both sides."

~~Finally for our data on former colonies, we used the Colonial History Data Set from the Issue Correlates of War (ICOW) Project (Hensel, 2009). This variable is coded as a one when the receiver in a sender-receiver dyad is a former colony of the sender and zero otherwise.~~

ANALYSIS

Estimation Method

To model aid flows using our directed-dyadic panel dataset, we utilize a hierarchical model. We include random intercepts in our model for every dyad and year. More concretely, we fit the following model:

$$
\begin{aligned}
Log(Aid)_{sr,t} = {} & \beta_1(Pol.\ Strat.\ Distance_{sr,t-1}) \\
& + \beta_2(Colony_{sr,t-1}) + \beta_3(Polity_{r,t-1}) \\
& + \beta_4 Log(GDP\ per\ capita_{r,t-1}) + \beta_5(Life\ Expect_{r,t-1}) \\
& + \beta_6(No.\ Disasters_{r,t-1}) + \beta_7(Civil\ War_{r,t-1}) \\
& + \beta_8(Pol.\ Strat.\ Interest_{sr,t-1} \times No.\ Disasters_{r,t-1}) \\
& + \delta_{s,r} + \rho_t
\end{aligned}
$$

Where $\delta_{s,r}$ and ρ_t are the ~~sender and receiver~~ sender-receiver and year random effects respectively.[54] We use one year lags because while our natural disaster data is pinpointed to the day,

[54] In terms of the model, we find that our results hold when we estimating the model with donor and year fixed effects, though the results from a Hausman test suggest that a random effects model is still a better fit for our data (see Figure A3).

we do not have correspondingly fine-grained data on foreign aid distributions. Thus we take a conservative approach and lag by one year to guarantee that the aid is committed after the incidence of a natural disaster.

The results of this analysis are shown below in a coefficient plot in Figure 3. [55] ~~We test Hypothesis~~ We test Hypotheses 1A, 1B and 1C using ~~the model with 'Humanitarian Aid'~~ "Humanitarian Aid" as the dependent variable. The results show a positive and statistically significant relationship between the interaction of *Strategic Distance* and the *No. Disasters*. To interpret these results, we turn to Figure 4 (~~'Humanitarian Aid'~~ "Humanitarian Aid" panel) where we plot the substantive effect of this interaction term on humanitarian aid over the range of *Strategic Distance* for different levels of natural disaster severity.

[55] ~~Note, to examine the model results without the interaction effects, please see Figure ?? in Appendix ??~~

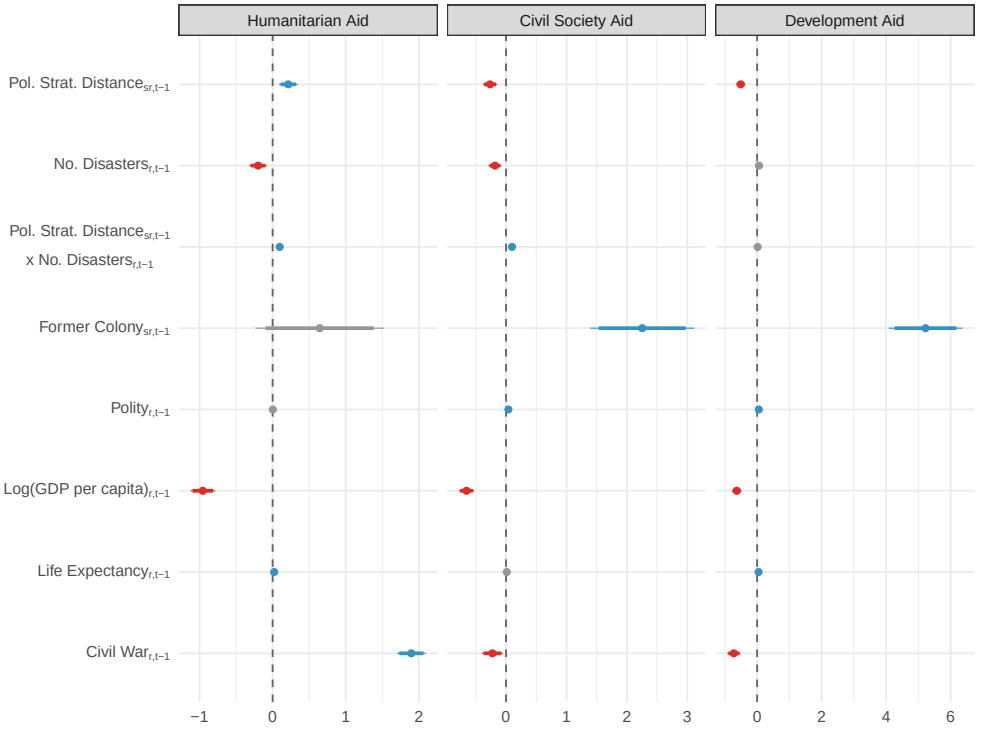


Figure 3: Coefficient plots for the main analyses with interaction terms across each dependent variable, humanitarian aid, civil society aid and development aid. Coefficients that are significant at the 5% level are shaded in blue if the coefficient is positive and red if the coefficient is negative. Coefficients that are not significant at the 5% level are shaded in gray.

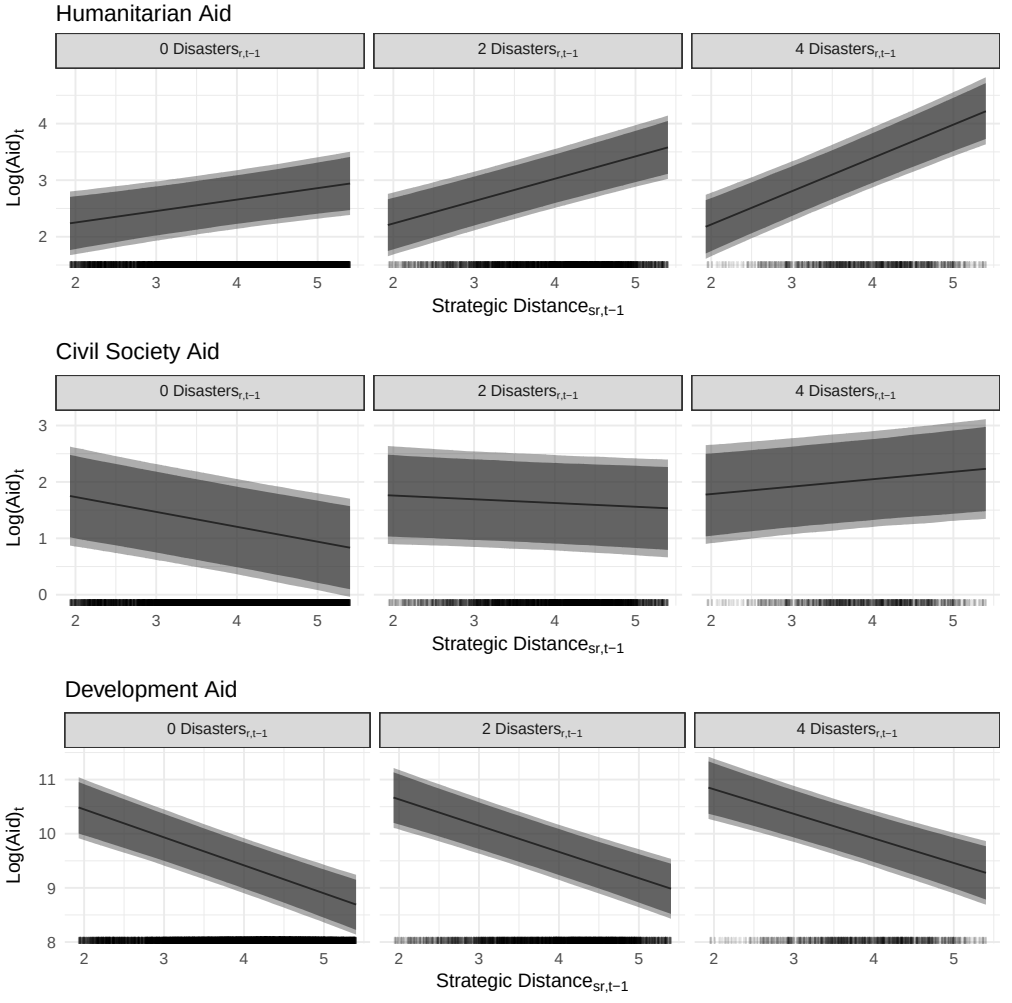


Figure 4: Simulated substantive effect plots for each dependent variable (humanitarian aid, civil society aid, and development aid) for different levels of natural disaster severity across the range of the strategic distance measure. A rug plot is provided below each panel.

These results suggest that the greater the number of natural disasters a country experiences, the more likely it is to receive humanitarian aid from a strategic adversary. This is apparent in the rising slope ~~of the relationship~~ between strategic interest and humanitarian aid as the number of natural disasters increases. As such, these results are consistent with H1C, which suggests that donors may be more likely to dispense humanitarian aid to their strategic adversaries because such disasters present unique opportunities to improve bilateral relations. Notably when natural disasters are particularly severe, donors may dispense a great deal more aid to strategic opponents compared to strategic allies to further their strategic interests.

Conversely, support for H1A is missing. In particular, we would have expected there be a downward sloping relationship between strategic interest and humanitarian aid when there are no natural disasters. However, if natural disasters had a humanizing effect on strategic opponents, then we would have expected the slope between strategic interest and humanitarian aid to flatten as the number of natural disasters increased, which we do not find.

Support for H1B is also ~~missing~~lacking. To find support for H1B, which hypothesizes that donors are more likely to give to their strategic allies in the wake of a natural disaster to further their own self-interest, we would have expected the parameter estimate for the interaction term between strategic interest and natural disasters to be negative, which it is not. Moreover, we would have expected ~~there to be~~ to observe a downward sloping relationship between strategic interest and humanitarian interest as the number of natural disasters increases. This is clearly not evidenced in the "Humanitarian Aid" panel in Figure 4.

Meanwhile, we test H2 by examining the effect of the interaction between strategic interest and natural disasters on civil society aid. In Figure 3~~we similarly~~ , we find a positive and significant relationship between this interaction and civil society aid. The substantive effects plot (in the ~~'~~"Civil Society Aid~~'~~" panel in Figure 4) meanwhile also suggests that donors are more likely to target aid to civil society in their strategic adversaries the more natural disasters that country experiences, supporting H2. These results ~~are somewhat suggestive of~~ provide support for the idea that donors may be acting to take advantage of vulnerable recipients to mold the relationship to their interests.

Finally, we test H3 by analyzing how the interaction between strategic interest and natural disasters affects development aid allocation. From, Figure 3, we can see that this coefficient is not statistically significant. However, examining the substantive significance in Figure 4 (~~'Development Aid'~~ "Development Aid" panel) we can see that the relationship between strategic interest and development aid allocation is consistently downward sloping. This suggests that donors tend to give more development aid to strategic allies rather than strategic opponents, showing strong support for H3. These results indicate that irrespective of natural disaster intensity, development aid is reserved for strategic allies of donor countries and does not alter the strategic calculus donor countries undertake.

Overall, we believe that we have found strong evidence showing how the role of strategic interest can be heavily conditioned by context. That is, we find donors are more likely to give both more humanitarian and civil society aid to strategic opponents in the face of natural disasters. Our findings are consistent with the argument that they do so in order to take advantage of the opportunities natural disasters provide to improve their relationships with strategic opponents. These results are all the more interesting given that, consistent with the existing literature, we also find that donors are more likely to give development aid to strategic allies irrespective of the number of natural disasters a recipient country experiences. This suggests that donor countries strategically use different types of aid to further their interests in different contexts.

Persistence of foreign aid allocation over time

How persistent are these estimated effects? To answer this question, we re-estimate the original models for different lag lengths of the main interaction and constituent terms[55]. These models are estimated separately for each lag length (lags of 1, 3, and 5 years). The simulation results when using different lags for the interactions and constituent terms are shown in Figures 5, 6, and 7 for the outcome variables humanitarian aid, civil society aid and development aid, respectively.

From Figure 5, we can see that the interaction between strategic interest and natural disasters is ~~rather~~ persistent until approximately five years after a natural disaster. This suggests that donors

[55]The controls are measured using a one-year lag throughout.

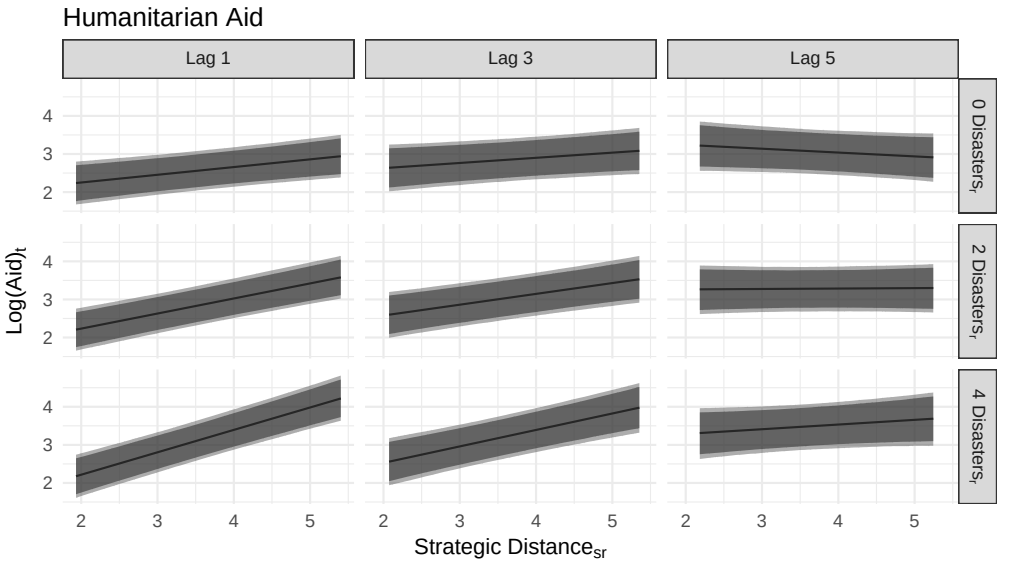


Figure 5: Simulated substantive effect plots for humanitarian aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure.

~~are more likely to allocate humanitarian aid to their strategic adversaries for some time following a natural disaster, suggesting that donors~~ seek to use natural disasters as a tactic to improve relations with strategic opponents for a number of years after the initial disaster (supporting H1C).

Figure 6 shows that while the interaction between strategic interest and natural disasters positively affects the allocation of civil society aid, this effect is only consistent for a short time following a natural disaster. One way to interpret these results is that donors recognize the difficulty of trying to influence domestic politics through civil society aid relatively quickly, and ~~, as a consequence,~~ thus waste relatively little time in pursuing such attempts. Another interpretation is that civil society aid is actually rather effective and as such, recipients governments are likely to push back against allowing it in fairly short order. Teasing out the exact mechanism would be a fruitful area for future research.

Last, Figure 7 extends the earlier finding that the interaction between strategic interest and natural disasters has little effect on development aid across a variety of different lags. This result further suggests that there is strong support for H3, that is donor counties focus on reserving development aid for strategic allies.

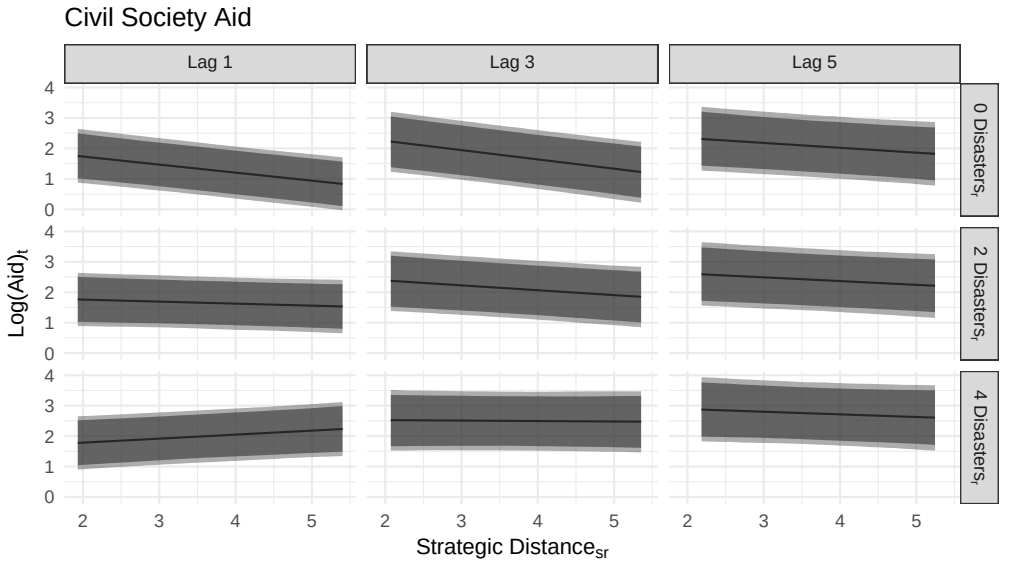


Figure 6: Simulated substantive effect plots for civil society aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure.

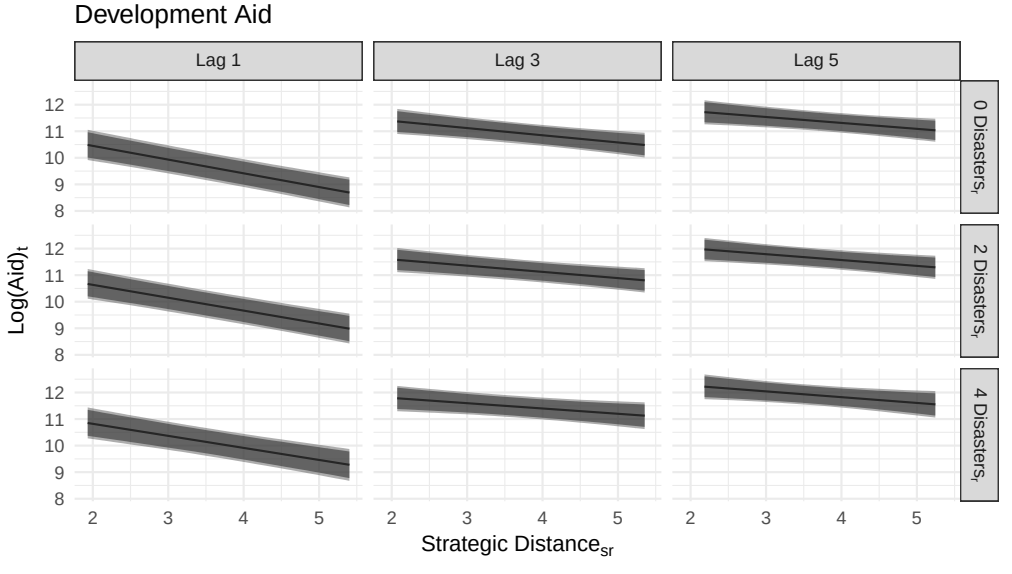


Figure 7: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure.

Robustness Checks

We also ran a number of checks to test the robustness of our findings. We discuss these checks briefly here and invite readers to learn more in the Online Appendix. In particular, we find that our findings are robust to different operationalizations of the disaster variable, including when using a binary variable for the number of disasters (see Figure A1 in the Online Appendix) as well as when using the number killed in natural disasters (see Figure A2).

Finally, we also examined whether our results hold across different sub-samples of our data. For instance, Bermeo (2017, 2018)'s recent work suggests that in the post 2001 era, it is increasingly in the donor's self interest to promote development against negative spillovers from developing countries. If a similar logic predominates in the event of a natural disaster, then we would expect it to wash out any consideration of more traditional self interest on the part of the donor. That is, if the prevention of negative spillovers were donor's only concerns, then we would expect donors to give most to countries for whom the potential negative spillovers from natural disasters would be greatest and thus would not expect to find any statistically significant relationship between more traditional strategic interest concerns and humanitarian aid in the event of a natural disaster. Given that, we test whether our findings hold when we restrict our sample to the post 2001 era and find that they do (see Figure A5 in the Online Appendix). Numerous works also suggest that aid became less tied to security concerns after the end of the Cold War (Fleck and Kilby, 2010; Clist, 2009). As such, we also investigate whether our results are based on a similar dynamic by examining how our findings fare when we restrict our analysis to after the Cold War and find them to be robust (see Figure A4 in the Online Appendix).

Note, a potentially important covariate that we do not control for in our analysis is the role of media and public opinion. While Eisensee and Strömberg (2007) and Strömberg (2007) find that news coverage of a natural disaster is a big factor in shaping US humanitarian aid allocation, Olsen et al. (2003) find that media coverage has only a limited effect on shaping humanitarian aid across a larger cross-section of donors. Other studies suggest that public opinion can help shape aid allocation (Bryant et al., 2018), including whether aid is given bilaterally or multilaterally (Milner and Tingley, 2013). This work strengthens our findings to the extent they suggest that increased media coverage and public opinion pushes donors to give purely for humanitarian motivations, in line with H1A. If so then this should have made it our findings in support of

H1C less likely, as opposed to more likely, to have been found. All of these studies have either been conducted on select countries or select cross sections of time however; the relevant data to test these propositions over a large panel of countries over time is unfortunately not available and prohibitively costly to collect. Further research on how media coverage and public opinion affect aid allocation following a natural disaster however, will be an important avenue for future research.

Discussion

Our analysis suggests that a more nuanced understanding of the drivers of foreign aid is in order. While recent work has shown that accounting for the channel of aid delivery can go a long way toward understanding aid allocation decisions (Dietrich, 2013, 2016), we show that following natural disasters, donor countries actually direct greater levels of humanitarian aid to strategic opponents rather than allies. We argue that donor countries may allocate foreign aid in this way because they see natural disasters as an opportunity improve relations with their strategic opponents. As shown in our lag models, these findings are surprisingly persistent.

Moreover, natural disasters not not only affect how donor countries allocate aid for short-term purposes. We find that strategic considerations also reign large when one considers the effect on the distribution of aid with longer-term targets. Specifically, donor countries are more likely to distribute civil society aid to strategic adversaries as the numbers of natural disasters these countries face increase. Civil society aid inherently involves engagement and intervention in the domestic politics of a recipient country, an increase in civil society aid is indicative of a greater desire to increase donor influence over a recipient country, at least relative to development aid.

Meanwhile, in the wake of a natural disaster, we find that donors are more likely to give development aid to strategic allies irrespective of exogenous shocks such as natural disasters. Why might donors pursue a sophisticated realist strategy for humanitarian and civil society aid but a naive one for development aid? To answer this question, ~~it is~~ we argue that context matters; what may further strategic interest in one situation may not work for another. It is nevertheless useful to note that almost 60% of the total aid flowing from donor countries can be categorized as

development aid. This suggests that donors who seek to develop better relations with traditional strategic opponents by dispersing humanitarian and civil society aid recognize the inherent risk in this strategy and invest accordingly.

These results should be of particular interest as climate change continues to increase the incidence and the intensity of natural disasters. They suggest that while countries that experience natural disasters can expect humanitarian aid even from their strategic adversaries, such help can also open the doors to efforts to influence domestic politics in line with the interests of donors who have historically been antagonistic.

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APPENDIX

Berthélemy, J.-C. (2006). Bilateral donors? interest vs. recipients? development motives in aid allocation: do all donors behave the same? Review of Development Economics 10(2), 179–194.

Using PCA of latent distance between dyadic pairs to construct measure of strategic interest

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Nunnenkamp, P. and R. Thiele (2006). Targeting aid to We identified a number of issues with the original coding that we have adapted for our analysis. In particular, we adjusted the code to : i) scale and center the data as PCA analysis is sensitive to relative scaling of data ii) sample with replacement as best practice with bootstrapping would seem to indicate that the sample size of each bootstrapped sample should be the same as the size of the needy and deserving: nothing but promises? The World Economy 29(9), 1177–1201original sample iii) adjusted the code so that the directions of the eigenvectors are consistent across the dyads. We then use the adapted version of this code to calculate the PCA for each dyad pair for a given year and then used the

first principle component as our measure of strategic interest, which on average explains 42% of the variability across the three original measures.

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APPENDIX

Validating our measure of strategic interest

We further conduct a series of post-estimation validation tests for our resulting strategic variable. In particular, we (1) evaluate the relationship between our political strategic interest variable against S scores and Kendall's τ_b for alliances and (2) investigate how our measure of strategic interest describe well-known dyadic relationships.

First, we perform a simple bivariate OLS with and with year fixed effects to evaluate how our measures compare to S scores and Kendall's τ_b.[56] Note in order to make our strategic measures somewhat interpretable, for the validation we scale our strategic measures to be between 0 and 1 just as S scores and Kendall τ_b is scaled. The results are shown in Table A.1.

[56]Note for comparison that the bivariate relationship of S scores on Kendall's τ_b is statistically significant with a coefficient of 0.62 while the bivariate relationship of Kendall's τ_b on S Scores is statistically significant with a coefficient of 0.31.

TABLE A.1: Validation of Political Strategic Interest Variable against S scores and Kendall's τ_b

	Unweighted S Scores	Unweighted S Scores	Weighted S Scores	Weighted S Scores	Tau-B	Tau-B
(Intercept)	0.97^{***}	1.03^{***}	1.01^{***}	1.02^{***}	0.29^{***}	0.25^{***}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Strategic Interest	-0.80^{***}	-0.84^{***}	-1.22^{***}	-1.26^{***}	-0.89^{***}	-0.87^{***}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Year FE?	No	Yes	No	Yes	No	Yes

$^{***}p < 0.001, ^{**}p < 0.01, ^{*}p < 0.05$

In brief, we find that our political strategic measure performs well against S scores and Kendall's τ_b for alliances with and without fixed effects. Note that because the PCA is of latent distances between any two dyads, dyads that are closer in space will have smaller values and therefore represent a stronger strategic relationship. Therefore the negative relationship we find between the political strategic measure and S scores and τ_b are interpreted to mean the greater the foreign policy similarity as measured by the S score or Kendal's τ_b , the smaller the latent distance or the greater the political strategic relationship between a dyad.

Alternative Parameterization of Disaster Severity

We have also run our analysis using a dummy variable for whether a natural disaster occurred instead of a count. We show the substantive results of this analysis below in Figure A1. The findings from this analysis reflect those that we observe when we use the count variable. However, given the variation in relationships that we observe when using a count of the number of natural disasters, we choose to focus on that in the main portion of our paper.

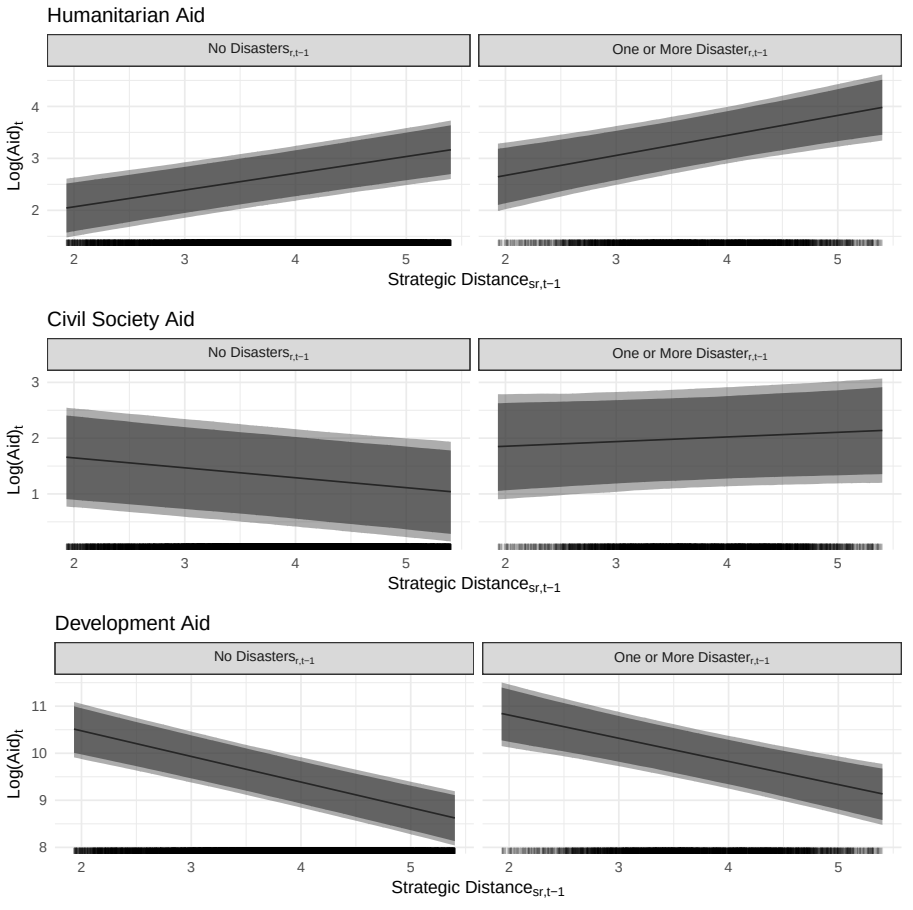


Figure A1: Simulated substantive effect plots for development aid for varying lags of variables of interest and whether or not a recipient country experienced a natural disaster across the range of the strategic distance measure.

We have also run our analysis using the number killed from a natural disaster instead of a count of the number of natural disasters. We show the substantive results of this analysis in Figure A2.

~~*Analyses for models without interaction terms*~~

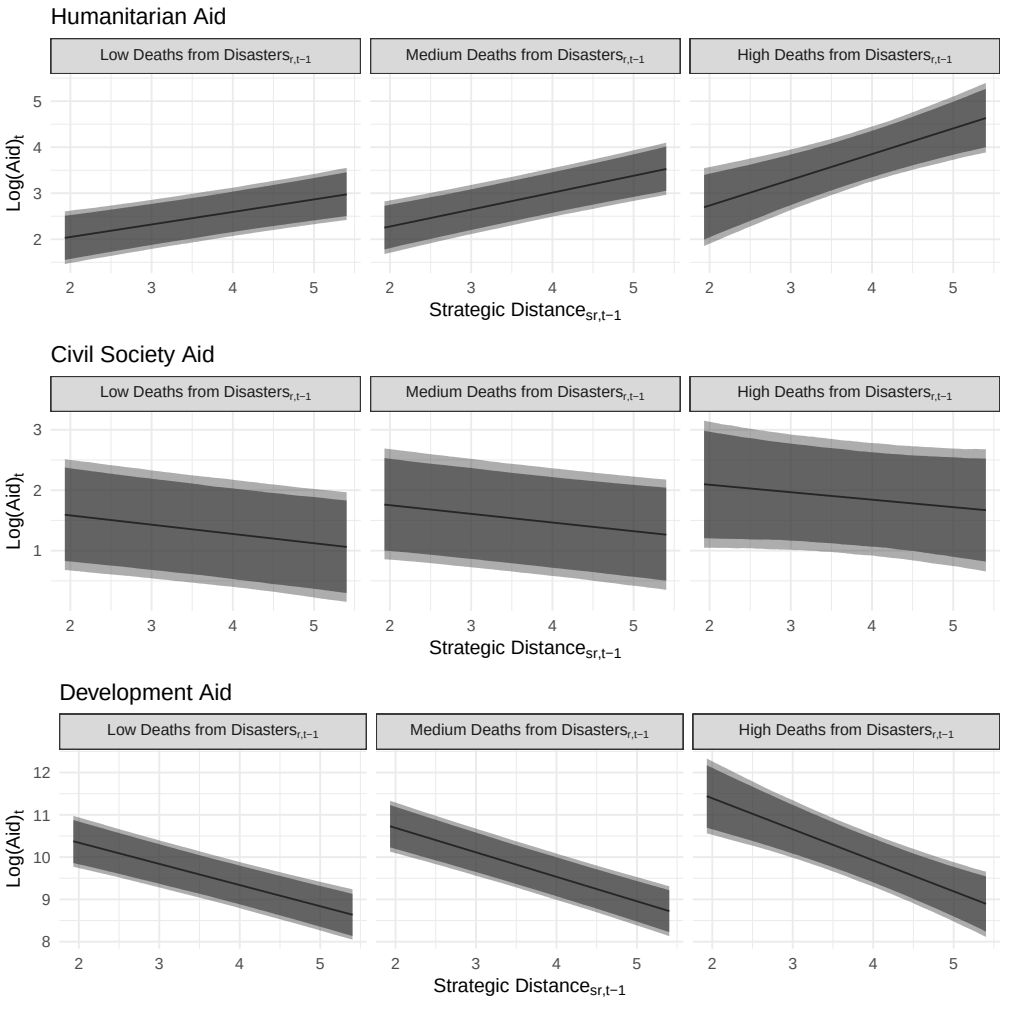


Figure A2: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity (specifically, the log of the number killed) across the range of the strategic distance measure.

The substantive trends with respect to humanitarian aid and development aid are notably similar to results that rely on a count of the number of natural disasters. There is a difference, however, with respect to the finding for the civil society aid dependent variable. In our analysis with the count of the number of natural disasters we saw that at higher counts of natural disasters the slope between the amount of civil society aid given and strategic distance became positive. Here we see a less pronounced change in the slope between strategic distance when there are a

higher number of deaths. This is perhaps explained by the fact that this measure has a missingness rate of 10.8%.

With regards to other potential measures, the EM-DAT database provides the data on number people injured, homeless, or affected and the dollar amount of the disaster. However such data has a high degree of missingness and, by their own admission, frequently imprecise or under-reported. For instance there is 79% missingness for the number of injured, 36% missingness for the total number of homeless and 33% for the total damages. The number of affected has comparatively less missingness, with 9.6%, however the EM-DAT Gudelines note that, "The indicator affected is often reported and is widely used by different actors to convey the extent, impact, or severity of a disaster in non-spatial terms. The ambiguity in the definitions and the different criteria and methods of estimation produce vastly different numbers, which are rarely comparable." Generally all the indicators have varying degrees of imprecision. For instance, the guidelines further state, "Any related word like 'hospitalized' is considered as injured. If there is no precise number is given, such as 'hundreds of injured', 200 injured will be entered (although it is probably underestimated)." Given these problems with these other potential measures, we decided to focus on the number of disasters as our measure of disaster intensity.

Fixed versus random effects

In Figure A3 below we present the results of our analysis when using fixed effects. The results remain broadly the same. Additionally, when running a Hausman specification test for our models we fail to reject the null hypothesis at both the 90 and 95% confidence intervals, providing at least some initial evidence that we are justified in our choice (Greene, 2008).

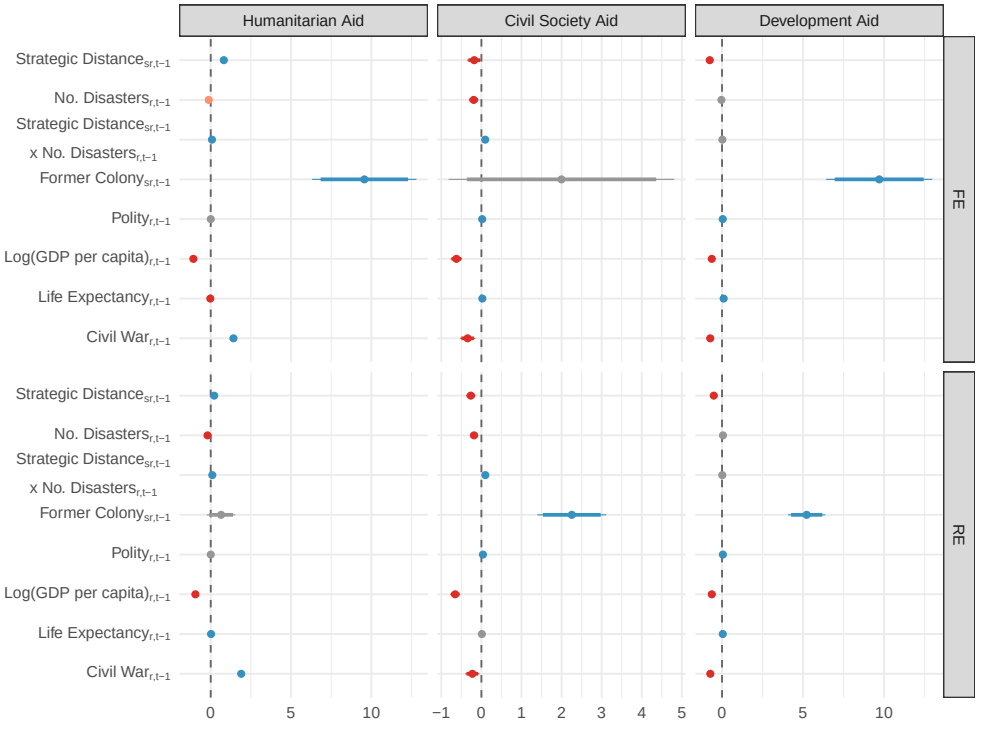


Figure A3: ~~Coefficient plots for the analyses without interaction terms for each dependent variable, humanitarian aid, civil society aid~~ Comparison between parameter estimates using fixed and ~~development aid~~random effects.~~Coefficients that are significant at the 5% level are shaded in blue if the coefficient is positive and red if the coefficient is negative. Coefficients that are not significant at the 5% level are shaded in gray.~~

Temporal variation in patterns of aid

A limitation of our study is that it ends in 2005 because we face the constraint that the IGO data, an important component of our strategic interest measure, is simply not available past 2005. However, to show the potential relevance of our findings for more recent periods we have run our models using only data from the post Cold War period. The results are presented in Figure A4 below and mirror the findings presented in the paper.

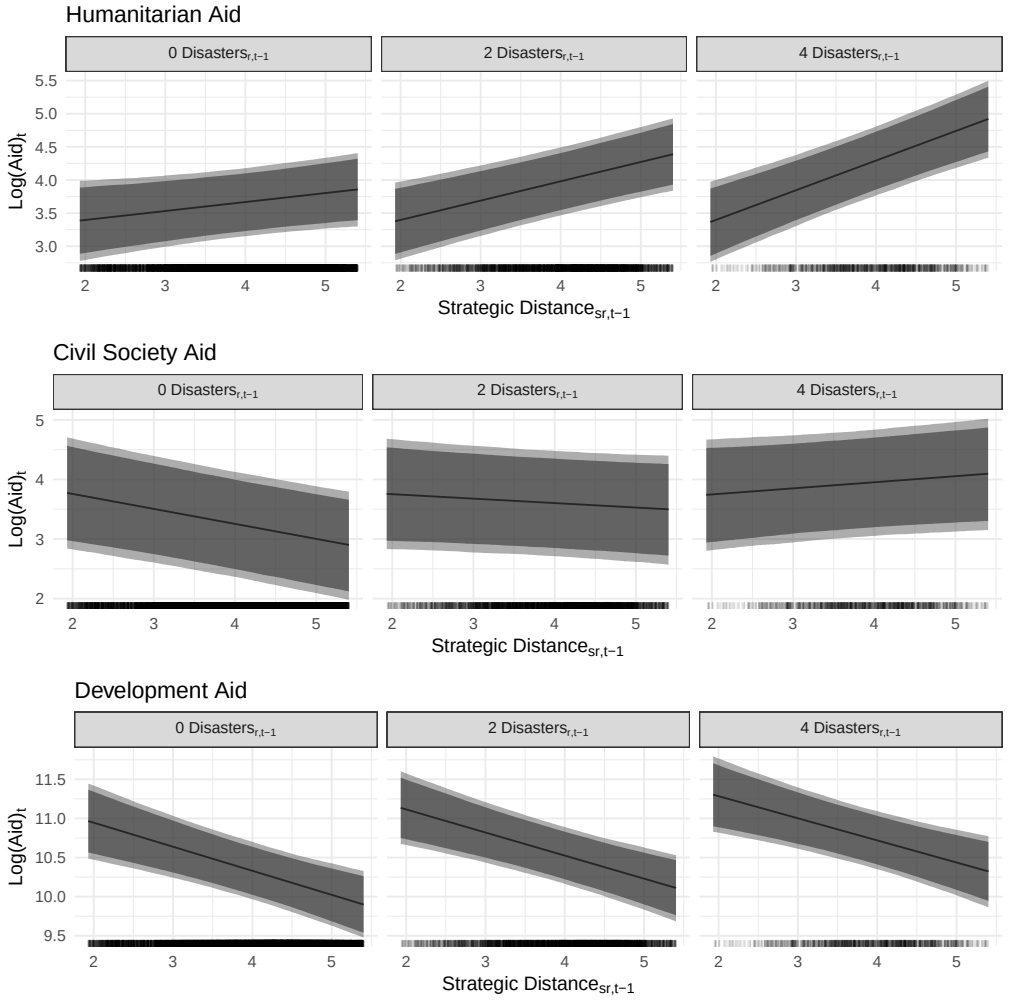


Figure A4: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure for the post Cold War period.

Additionally, we also run our models using only data from 2002-2005 (post-2001 period in our sample). The results are presented in Figure A5 below and mirror the findings presented in the paper.

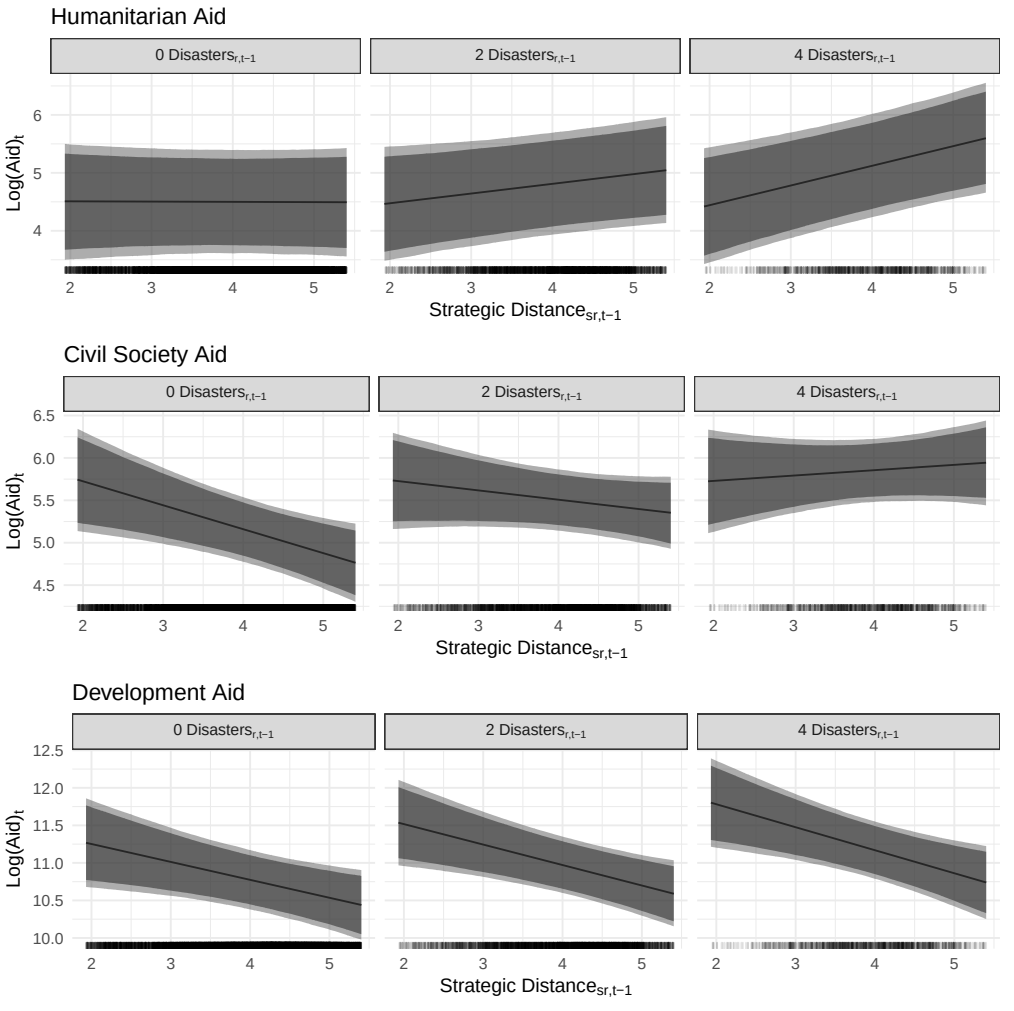


Figure A5: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure for 2001-2005.

Accounting for uncertainty in strategic interest measure

One methodological concern about our strategic interest measure is that since it is estimated from a model it comes with uncertainty. In Figure A6, we show results when taking into account uncertainty in the latent variable compared with our original estimates. We do this by simulating 1000 values of each latent variable estimate from the underlying distribution. From this we create 1000 versions of our dataset in which for each dataset we have a different sampled value

of the strategic interest variable. We then run each of our models on those 1000 datasets and combine the parameter estimates using Rubin's rules (Rubin, 1987). We present the results of this analysis juxtaposed against our original model where we just use the average value of the strategic uncertainty variable.

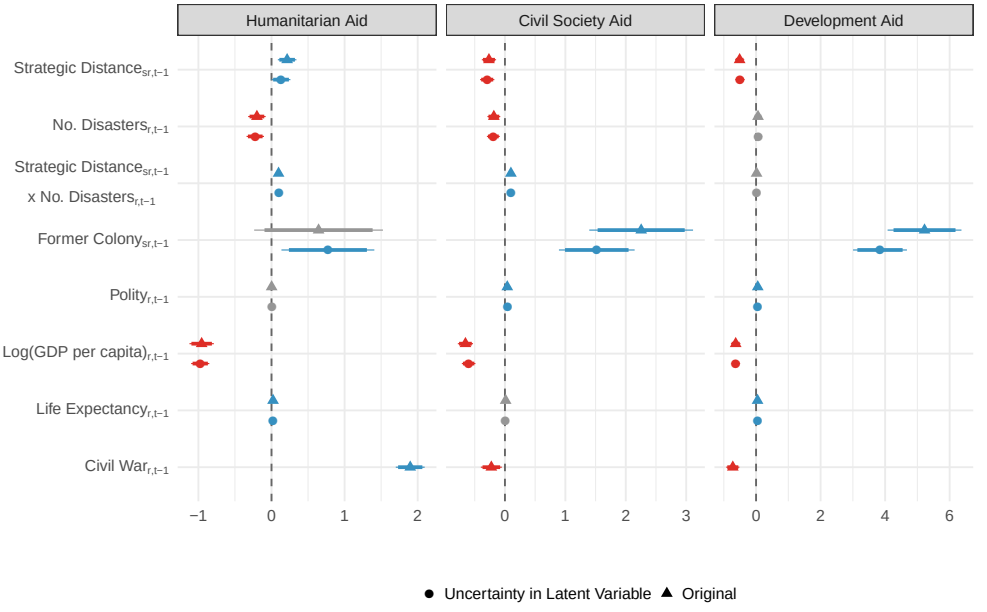


Figure A6: Effect of accounting for uncertainty in latent variable.

APPENDIX

Using PCA of latent distance between dyadic pairs to construct measure of strategic interest

After having first estimated the latent space and then subsequently calculating the latent distance between each dyadic pair for each of our three variables, dyadic alliances, UN voting and joint membership in intergovernmental organizations, we then needed to combine these separate distances into one coherent measure.

To do so, we built off of the work of Chen et al. (2012). They developed a measure of relation strength similarity (RSS) which facilitates the discovery of relationships in complex networks. It allows for the combination of multiple-relationship networks (for the purposes of our paper, these are the latent distances between dyads as measured through alliances, UN voting scores and IGO membership), into a single weighted network (our measure of strategic interest). It does so using a principle components analysis (PCA) for each dyad. To that end, Chen et al. (2012) developed an R package *dils* to calculate the RSS.

We identified a number of issues with the original coding that we have adapted for our analysis. In particular, we adjusted the code to : i) scale and center the data as PCA analysis is sensitive to relative scaling of data ii) sample with replacement as best practice with bootstrapping would seem to indicate that the sample size of each bootstrapped sample should be the same as the size of the original sample iii) adjusted the code so that the directions of the eigenvectors are consistent across the dyads. We then use the adapted version of this code to calculate the PCA for each dyad pair for a given year and then used the first principle component as our measure of strategic interest, which on average explains 42% of the variability across the three original measures.

Validating our measure of strategic interest

We further conduct a series of post-estimation validation tests for our resulting strategic variable. In particular, we (1) evaluate the relationship between our political strategic interest variable against S scores and Kendall's τ_b for alliances and (2) investigate how our measure of strategic interest describe well-known dyadic relationships.

First, we perform a simple bivariate OLS with and with year fixed effects to evaluate how our measures compare to S scores and Kendall's τ_b.[56] Note in order to make our strategic measures somewhat interpretable, for the validation we scale our strategic measures to be between 0 and 1 just as S scores and Kendall τ_b is scaled. The results are shown in Table A.1.

TABLE A.1: Validation of Political Strategic Interest Variable against S scores and Kendall's τ_b

	Unweighted S Scores	Unweighted S Scores	Weighted S Scores	Weighted S Scores	Tau-B	Tau-B
(Intercept)	0.97^{***}	1.03^{***}	1.01^{***}	1.02^{***}	0.29^{***}	0.25^{***}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Strategic Interest	-0.80^{***}	-0.84^{***}	-1.22^{***}	-1.26^{***}	-0.89^{***}	-0.87^{***}
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Year FE?	No	Yes	No	Yes	No	Yes

$^{***}p < 0.001, ^{**}p < 0.01, ^{*}p < 0.05$

In brief, we find that our political strategic measure performs well against S scores and Kendall's τ_b for alliances with and without fixed effects. Note that because the PCA is of latent distances between any two dyads, dyads that are closer in space will have smaller values and therefore represent a stronger strategic relationship. Therefore the negative relationship we find between the political strategic measure and S scores and τ_b are interpreted to mean the greater the foreign policy similarity as measured by the S score or Kendal's τ_b , the smaller the latent distance or the greater the political strategic relationship between a dyad.

Alternative Parameterization of Disaster Severity

We have also run our analysis using a dummy variable for whether a natural disaster occurred instead of a count. We show the substantive results of this analysis below in Figure A1. The findings from this analysis reflect those that we observe when we use the count variable. However,

[56]Note for comparison that the bivariate relationship of S scores on Kendall's τ_b is statistically significant with a coefficient of 0.62 while the bivariate relationship of Kendall's τ_b on S Scores is statistically significant with a coefficient of 0.31.

given the variation in relationships that we observe when using a count of the number of natural disasters, we choose to focus on that in the main portion of our paper.

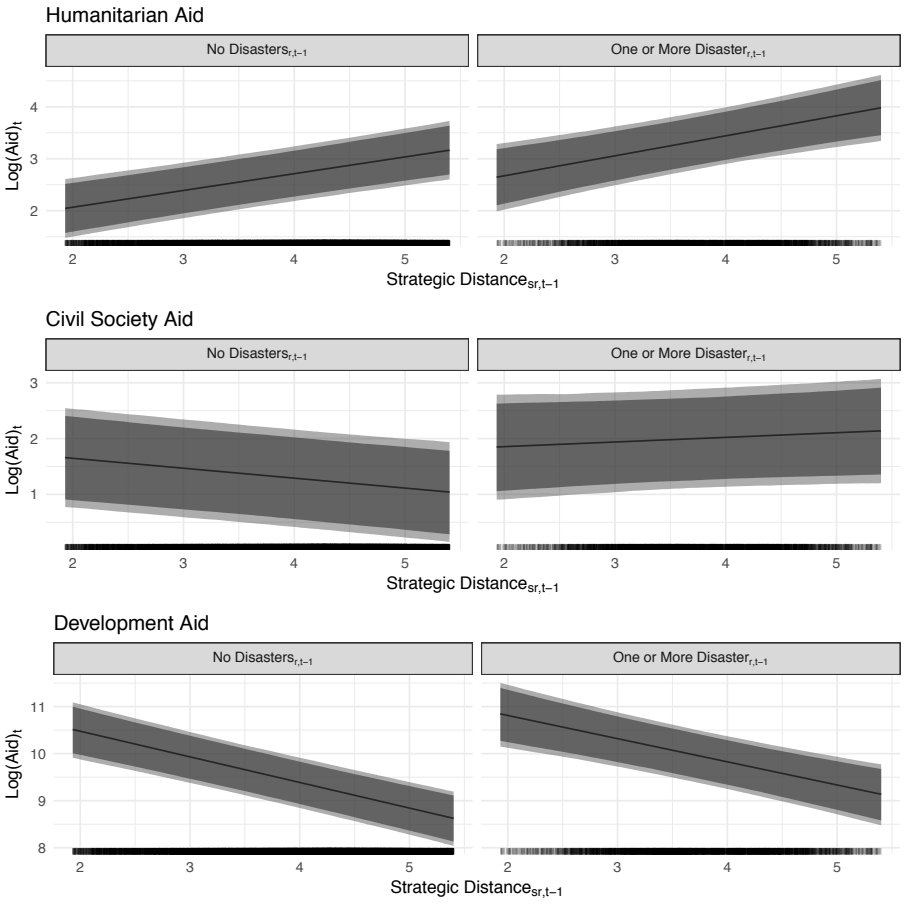


Figure A1: Simulated substantive effect plots for development aid for varying lags of variables of interest and whether or not a recipient country experienced a natural disaster across the range of the strategic distance measure.

We have also run our analysis using the number killed from a natural disaster instead of a count of the number of natural disasters. We show the substantive results of this analysis in Figure A2.

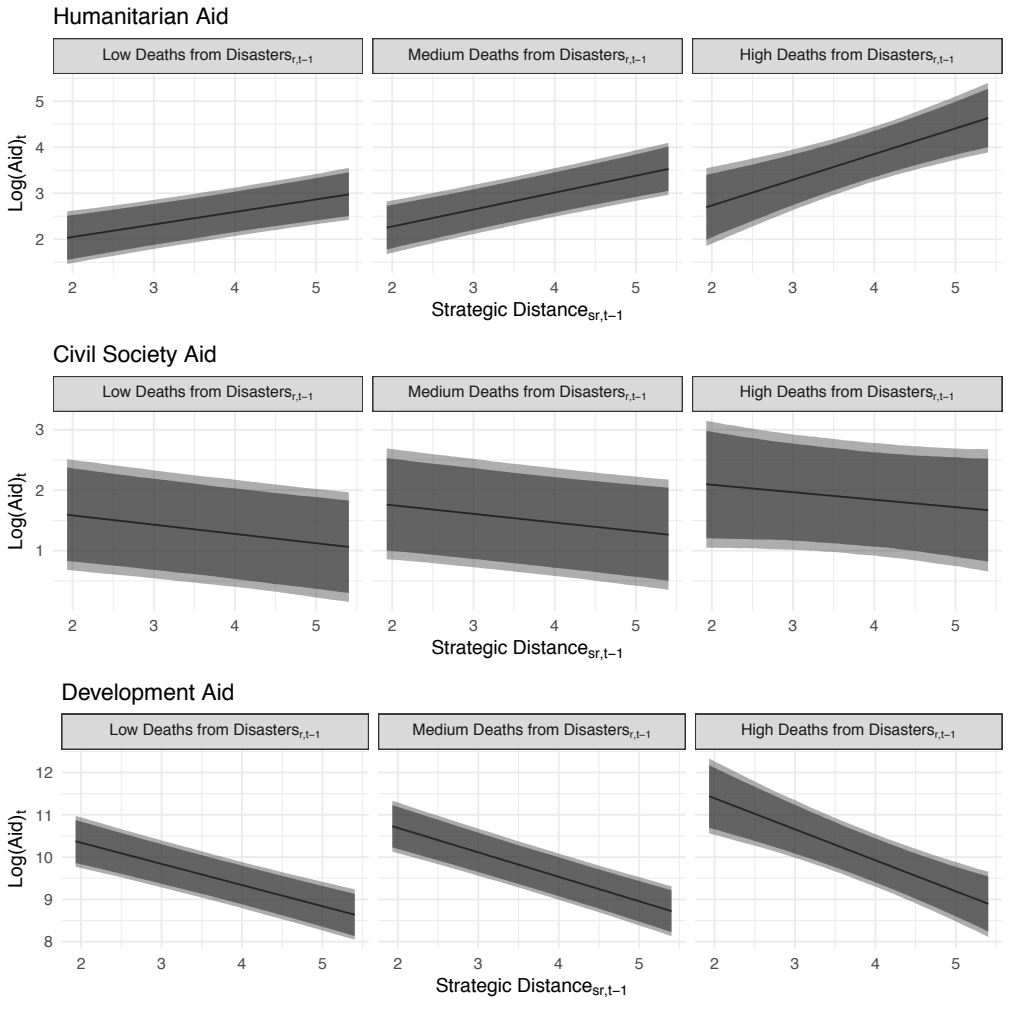


Figure A2: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity (specifically, the log of the number killed) across the range of the strategic distance measure.

The substantive trends with respect to humanitarian aid and development aid are notably similar to results that rely on a count of the number of natural disasters. There is a difference, however, with respect to the finding for the civil society aid dependent variable. In our analysis with the count of the number of natural disasters we saw that at higher counts of natural disasters the slope between the amount of civil society aid given and strategic distance became positive. Here we see a less pronounced change in the slope between strategic distance when there are a

higher number of deaths. This is perhaps explained by the fact that this measure has a missingness rate of 10.8%.

With regards to other potential measures, the EM-DAT database provides the data on number people injured, homeless, or affected and the dollar amount of the disaster. However such data has a high degree of missingness and, by their own admission, frequently imprecise or under-reported. For instance there is 79% missingness for the number of injured, 36% missingness for the total number of homeless and 33% for the total damages. The number of affected has comparatively less missingness, with 9.6%, however the EM-DAT Gudelines note that, "The indicator affected is often reported and is widely used by different actors to convey the extent, impact, or severity of a disaster in non-spatial terms. The ambiguity in the definitions and the different criteria and methods of estimation produce vastly different numbers, which are rarely comparable." Generally all the indicators have varying degrees of imprecision. For instance, the guidelines further state, "Any related word like 'hospitalized' is considered as injured. If there is no precise number is given, such as 'hundreds of injured', 200 injured will be entered (although it is probably underestimated)." Given these problems with these other potential measures, we decided to focus on the number of disasters as our measure of disaster intensity.

Fixed versus random effects

In Figure A3 below we present the results of our analysis when using fixed effects. The results remain broadly the same. Additionally, when running a Hausman specification test for our models we fail to reject the null hypothesis at both the 90 and 95% confidence intervals, providing at least some initial evidence that we are justified in our choice (Greene, 2008).

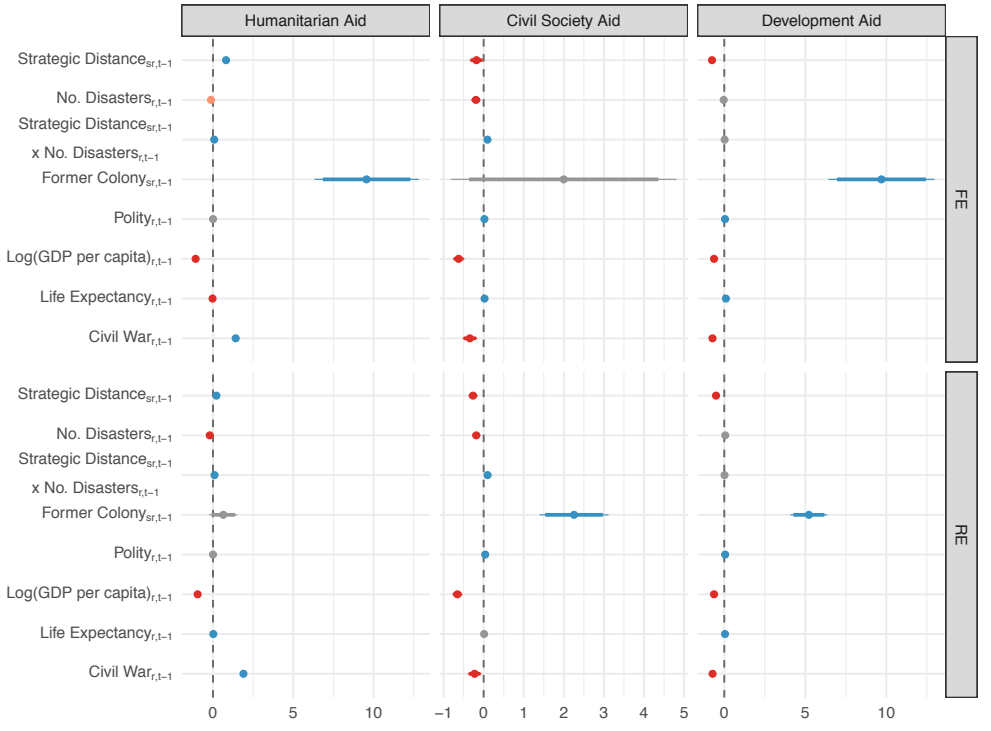


Figure A3: Comparison between parameter estimates using fixed and random effects.

Temporal variation in patterns of aid

A limitation of our study is that it ends in 2005 because we face the constraint that the IGO data, an important component of our strategic interest measure, is simply not available past 2005. However, to show the potential relevance of our findings for more recent periods we have run our models using only data from the post Cold War period. The results are presented in Figure A4 below and mirror the findings presented in the paper.

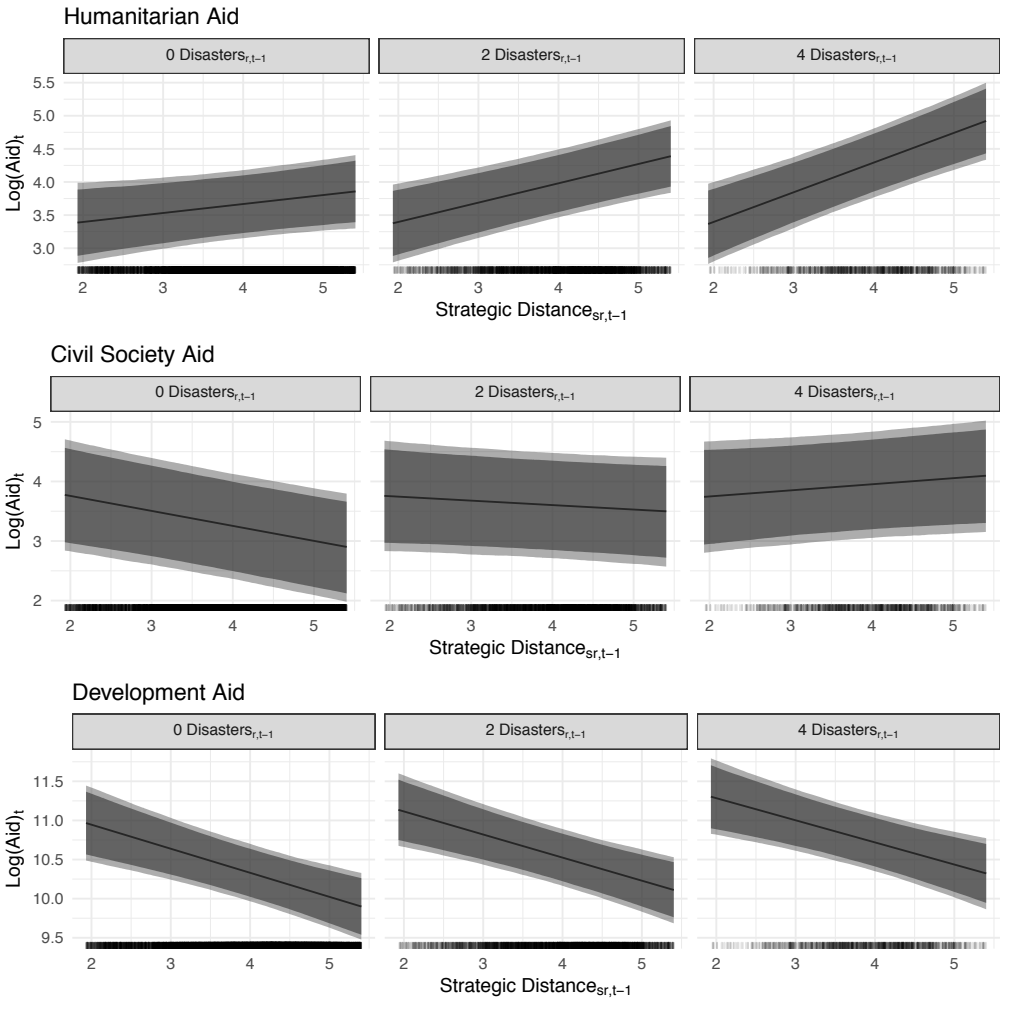


Figure A4: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure for the post Cold War period.

Additionally, we also run our models using only data from 2002-2005 (post-2001 period in our sample). The results are presented in Figure A5 below and mirror the findings presented in the paper.

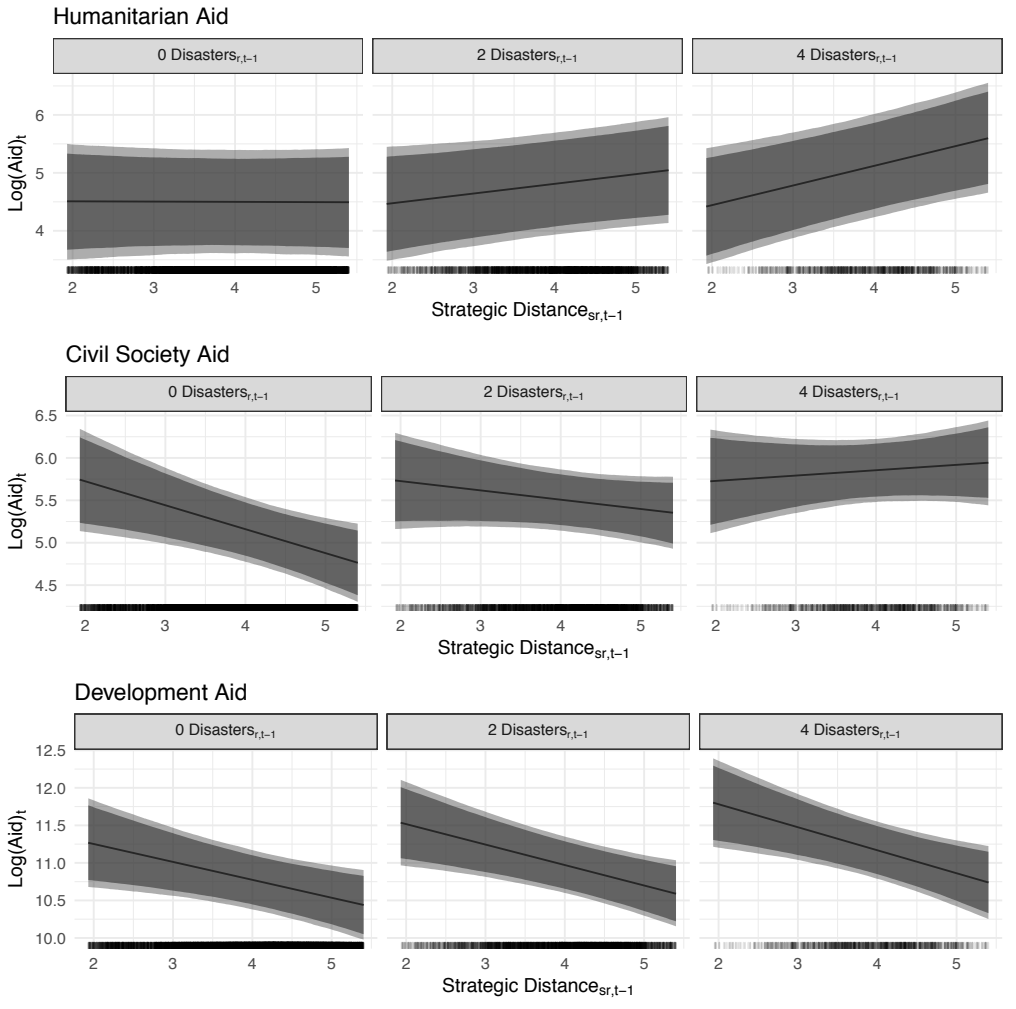


Figure A5: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure for 2001-2005.

Accounting for uncertainty in strategic interest measure

One methodological concern about our strategic interest measure is that since it is estimated from a model it comes with uncertainty. In Figure A6, we show results when taking into account uncertainty in the latent variable compared with our original estimates. We do this by simulating 1000 values of each latent variable estimate from the underlying distribution. From this we create 1000 versions of our dataset in which for each dataset we have a different sampled value

of the strategic interest variable. We then run each of our models on those 1000 datasets and combine the parameter estimates using Rubin's rules (Rubin, 1987). We present the results of this analysis juxtaposed against our original model where we just use the average value of the strategic uncertainty variable.

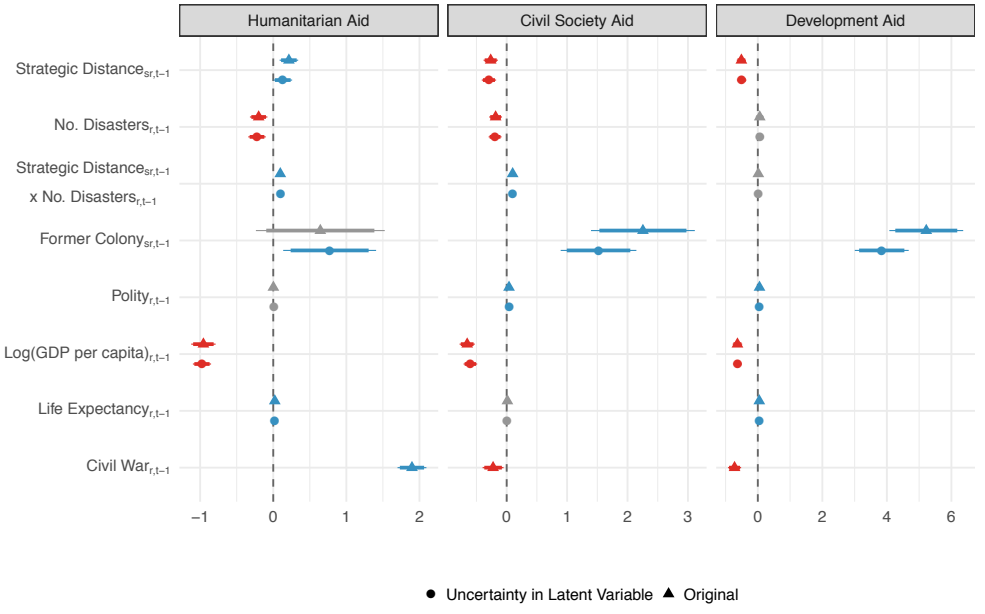


Figure A6: Effect of accounting for uncertainty in latent variable.

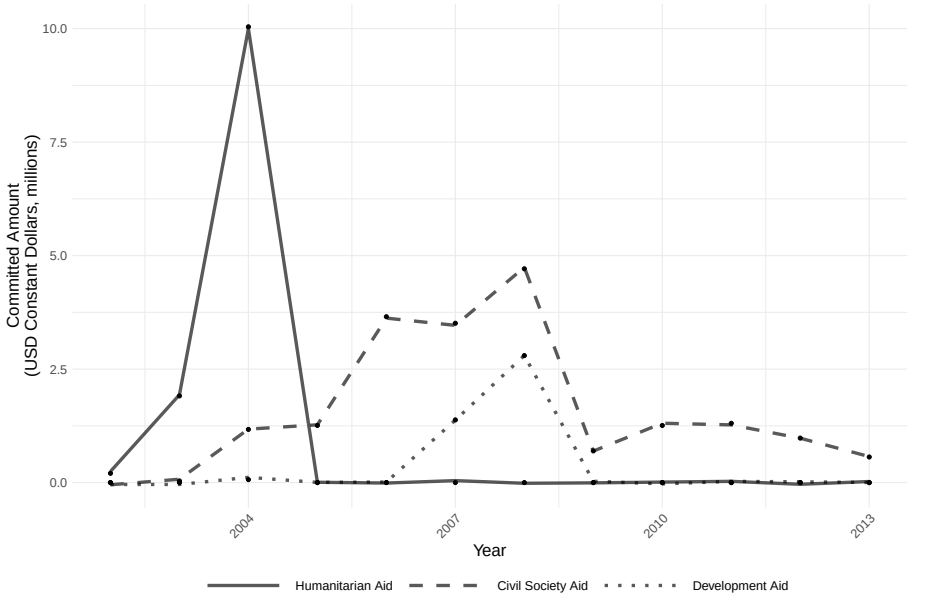
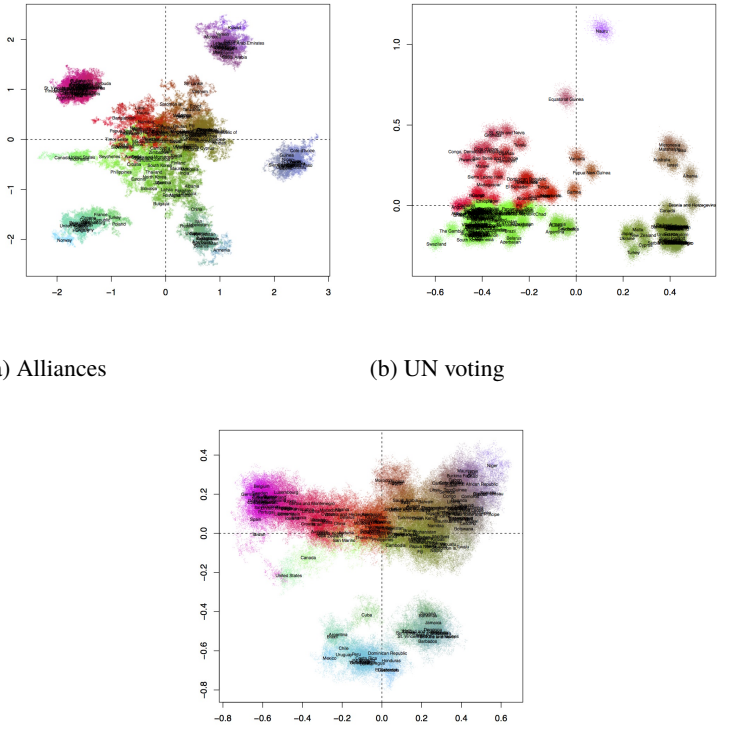


Figure 1: US aid commitments to Iran, 2002 - 2013



(a) Alliances

(b) UN voting

(c) IGO membership

Figure 2: Latent Spaces for components of Strategic Interest Measure during 2005

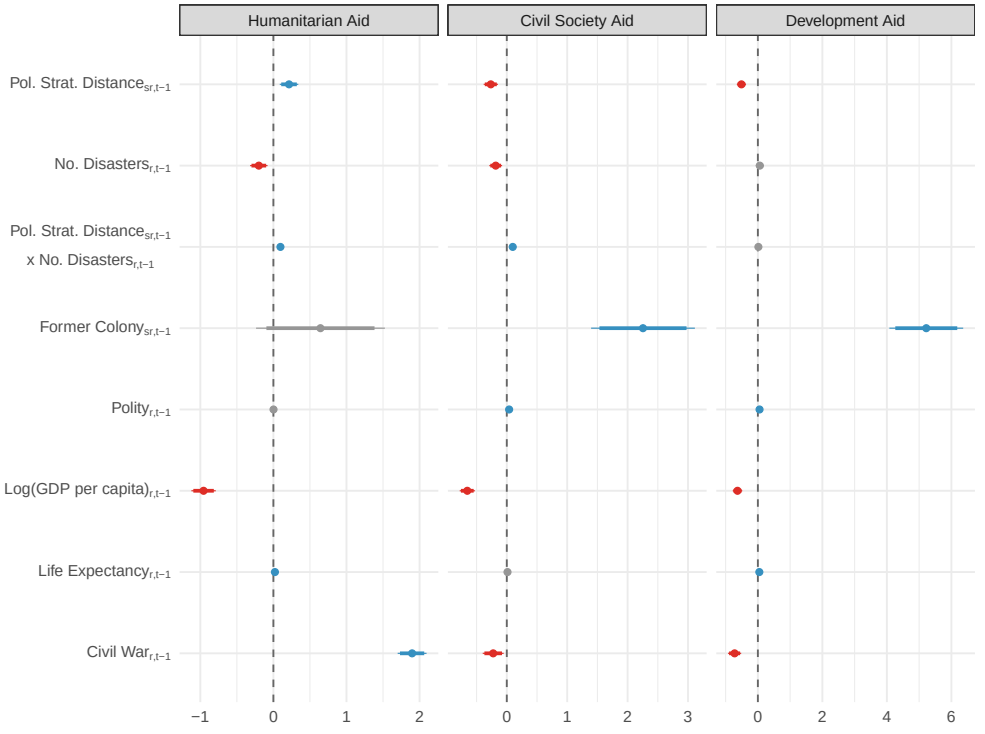


Figure 3: Coefficient plots for the main analyses with interaction terms across each dependent variable, humanitarian aid, civil society aid and development aid. Coefficients that are significant at the 5% level are shaded in blue if the coefficient is positive and red if the coefficient is negative. Coefficients that are not significant at the 5% level are shaded in gray.

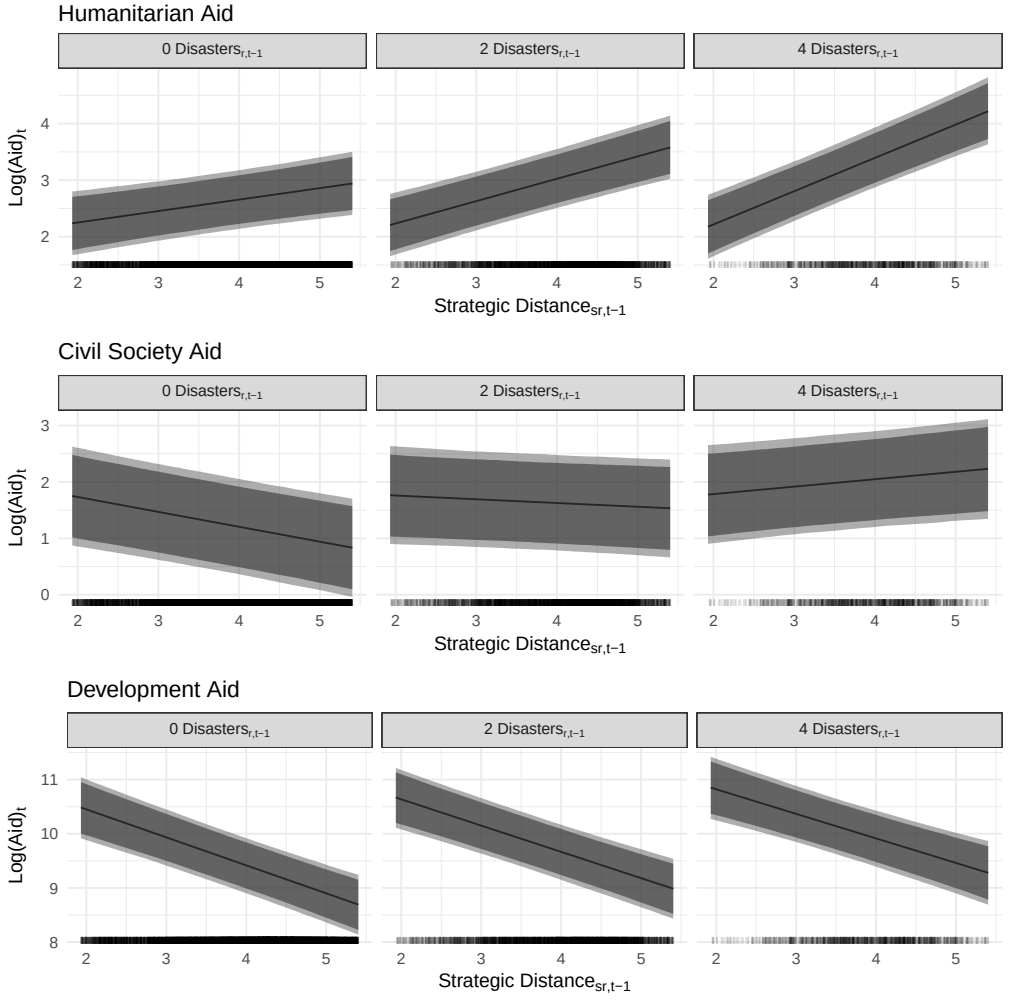


Figure 4: Simulated substantive effect plots for each dependent variable (humanitarian aid, civil society aid, and development aid) for different levels of natural disaster severity across the range of the strategic distance measure. A rug plot is provided below each panel.

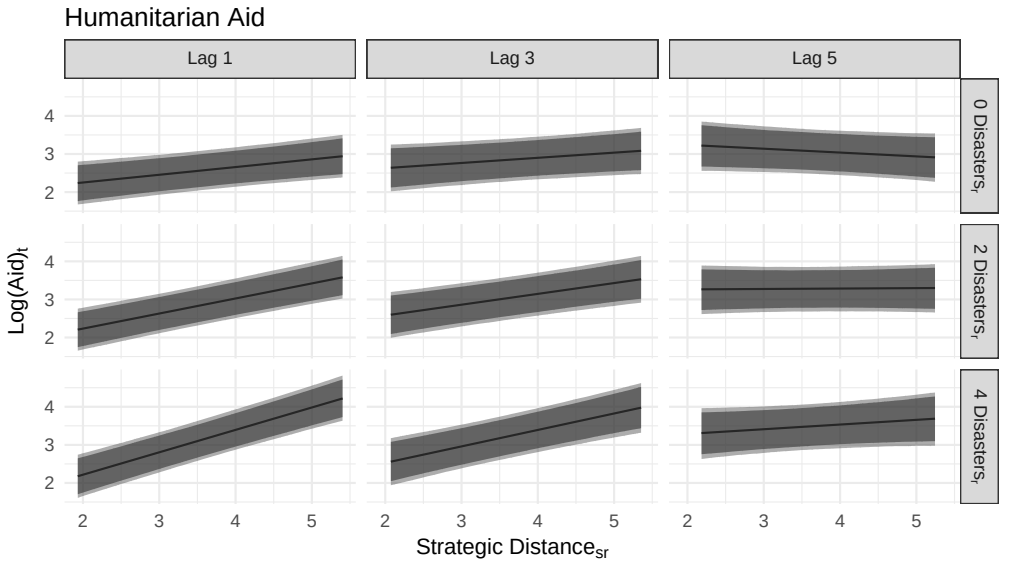


Figure 5: Simulated substantive effect plots for humanitarian aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure.

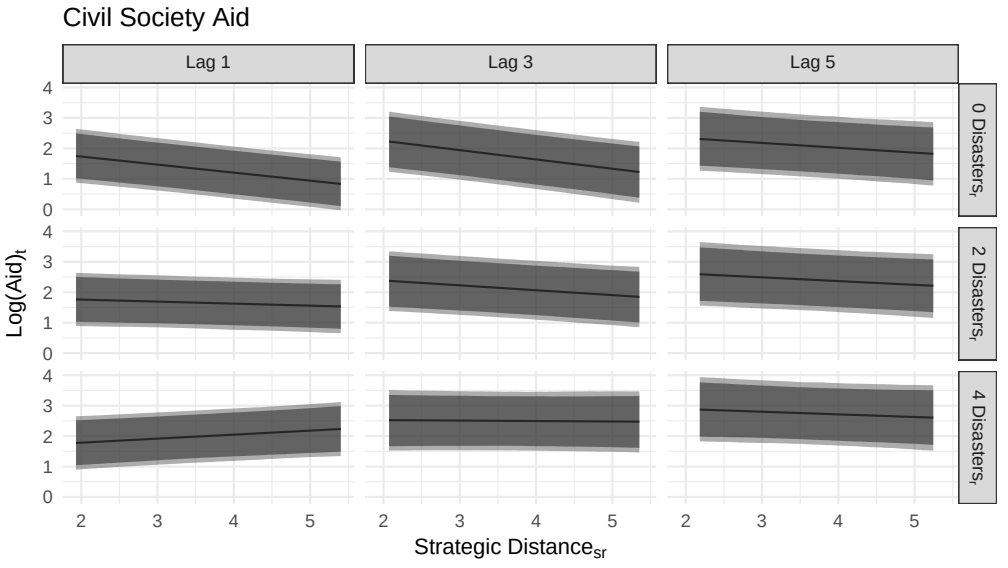


Figure 6: Simulated substantive effect plots for civil society aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure.

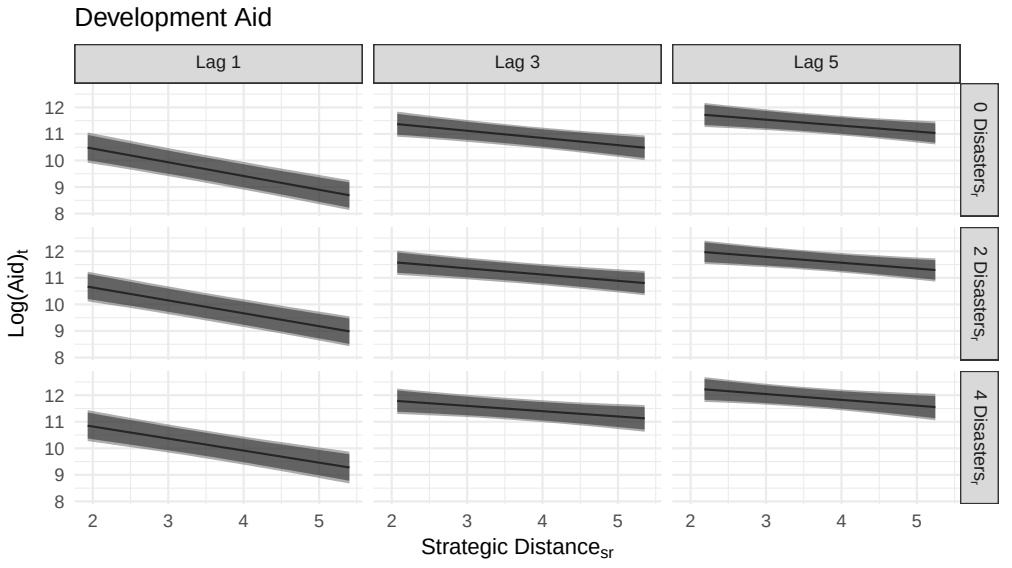


Figure 7: Simulated substantive effect plots for development aid for varying lags of variables of interest and different levels of natural disaster severity across the range of the strategic distance measure.