

Doing Harm by Doing Good? The Negative Externalities of Humanitarian Aid Provision during Civil Conflict

Reed M. Wood and Christopher Sullivan

Abstract:

Humanitarian assistance is intended to ameliorate the human costs of war by providing relief to vulnerable populations. Yet, the introduction of aid resources into conflict zones may influence subsequent violence patterns and expose intended recipients to new risks. Herein, we investigate the potential negative externalities associated with humanitarian aid. We argue that aid can create incentives for armed actors to intentionally target civilians for violence. Aid incentivizes rebel violence by providing opportunities for looting and presenting challenges to rebel authority. It potentially incentivizes state violence where it augments rebel capabilities or provides rebels a resource base. We evaluate both arguments using spatially disaggregated data on aid and conflict violence for a sample of nearly two-dozen post-Cold War African countries. The results of multiple statistical analyses provide strong support for the argument that humanitarian aid is associated with increased rebel violence but less support for the relationship between aid and state violence.

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AidData – a joint venture of the College of William and Mary, Development Gateway and Brigham Young University – is a research and innovation lab that seeks to make development finance more transparent, accountable, and effective. Users can track over \$40 trillion in funding for development including remittances, foreign direct investment, aid, and most recently US private foundation flows all on a publicly accessible data portal on AidData.org. AidData's work is made possible through funding from and partnerships with USAID, the World Bank, the Asian Development Bank, the African Development Bank, the Islamic Development Bank, the Open Aid Partnership, DFATD, the Hewlett Foundation, the Gates Foundation, Humanity United, and 20+ finance and planning ministries in Asia, Africa, and Latin America.

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1. Introduction

During civil wars, foreign donors often attempt to ameliorate the suffering of vulnerable populations in conflict-affected states through the contribution of humanitarian aid. This aid typically provides food, medical care, shelter, and other services for the millions of persons adversely impacted by violent conflict each year. The volume of aid flowing into conflict zone has rapidly increased in recent years. For instance, total humanitarian aid commitments by member states of the Organization for Economic Cooperation and Development (OECD) nearly doubled between 2000 and 2010, increasing from \$7 billion to \$13.8 billion annually (GHA 2013, 20). In addition, humanitarian aid plays an increasingly active role within conflict zones. Since the end of the Cold War, aid organizations have become common features in intrastate armed conflict, engaging in the provision of vital services and attempting to provide security to internally displaced persons and other civilians adversely affected by violence (e.g. Duffield 1997). Increased penetration into active conflict zones places both workers and the communities they serve at risk; moreover it has prompted donors and aid organizations to carefully consider how their activities might (unintentionally) influence the behaviors of armed groups and how they might effectively balance between security and the pursuit of humanitarian objectives in unstable areas (Anderson 1999; Médecins Sans Frontières 1997; Terry 2011).

Humanitarian assistance also occupies an increasingly important position in the counterinsurgency efforts of many Western military forces and the states in which they conduct, oversee, or assist in such operations (British Army 2009; US Army 2007; Terry 2011). The deployment of aid to active conflict zones reflects a counterinsurgency strategy in which the provision of public goods is intended to bolster regime legitimacy, build state capacity, and reduce local popular support for rebels. Despite its increasing favor among Western militaries, the application of aid as a tool of counterinsurgency has produced skepticism and cynicism among many practitioners and activists. Organizations such as the International Committee of the Red Cross (ICRC) and International Crisis Group (ICG) have increasingly argued for an explicit decoupling of aid provision from counterinsurgency operations on the grounds that the strategy blurs the line between aid providers and security forces, fails to achieve its stated goals, and endangers aid workers and local civilians alike (ICG 2011; Terry 2011; Williamson 2011). Some recent studies support these reservations and suggest that inflows of humanitarian aid often produce negative externalities, including violence against civilians and the perpetuation of conflict (e.g., Barber 1997; Cooley and Ron 2002; Narang 2014). Given both the human costs associated with conflict and the billions of dollars devoted annually to aid projects in unstable states, it is important to understand precisely how aid flows influence conflict processes and impact the populations donors intend to support. More specifically, what

impact does aid have on patterns of violence within unstable and conflict-affected states? Does the accumulation of humanitarian aid exacerbate or help to quell violence in the areas in which it is deployed?

We directly address these questions in this manuscript. We focus our attention specifically on the relationship between humanitarian aid and violence against civilian populations largely because humanitarian aid is primarily intended to benefit non-combatants. As such, it is important to evaluate what (if any) impact humanitarian aid has on this group. In the subsequent sections we first discuss the role of humanitarian aid in conflict zones, highlighting the intentions of this aid and the types of materials and services it provides. We then turn our attention to the central arguments. In brief, we argue that inflows of international humanitarian assistance into conflict zones generates strong, negative externalities by incentivizing both rebel and government forces to engage in violence against the local population. However, we believe the relationship is likely strongest between aid and rebel violence. We then present our data and research design. We evaluate hypotheses drawn from our arguments using novel new datasets that provide geo-referenced data on both humanitarian aid and civilian victimization in a sample of nearly two-dozen post-Cold War African countries. To test the validity of our hypotheses, we rely on both conventional regression models as well a quasi-experimental research design that leverages genetic matching techniques and a difference-in-difference estimator to account for the nonrandom assignment of humanitarian aid. The results of these analyses provide strong support for the hypothesized relationship between aid and rebel violence. We find less support for the argument that humanitarian aid incentivizes government violence. We conclude with remarks on the implications of these findings and comments on potential extensions.

2. Humanitarian Aid and Conflict

In recent years, donor states and agencies have committed roughly \$14 billion annually in humanitarian assistance to aid the victims of natural disasters and violent conflicts (GHA 2013, 19).¹ The majority of this aid is allocated to programs in and around conflict zones—since 2000 well over half of all international humanitarian assistance was explicitly directed to conflict-affected states (GHA 2013, 41, 79).² This aid principally provides for the immediate needs of persons displaced or otherwise adversely affected by violence, with the vast majority devoted to material relief and assistance, emergency food aid, and relief coordination, protection, and support services (Banatvala and Zwi 2000; GHA 2013, 51). Aid distribution facilities range from small-scale projects such as aid stations, which provide food and basic medical care to a relatively small population, to large-scale camps that may house and provide extensive

¹ The majority of humanitarian assistance comes from OECD's Development Assistance Committee (DAC) and its member states (~90% since 2007).

² Between 2002 and 2011, 15 of the 20 largest recipients of humanitarian aid were currently experiencing or had recently experienced major episodes of civil conflict.

services such as education, training, labor programs, public health programs, and/or long-term housing to thousands of persons.

Yet, in spite of the large volumes of humanitarian aid devoted annually to conflict zones, the impact of aid—and particularly its potential to produce negative externalities in these areas—has received only limited attention. While a number of qualitative studies conducted in 1990s and early 2000s were critical of the manner in which aid was delivered within conflict zones and highlighted the potential for unintentional adverse consequences (e.g., Baitenmann 1990; Lischer 2005; Ron and Cooley 2002), recent quantitative studies have generally been somewhat more optimistic about aid's ability to reduce conflict risk (Collier and Hoeffler; 2002; de Ree and Nillesen 2009). The central limitation of these studies, however, is that they largely examined the role of aid in preventing the outbreak of large-scale civil violence in recipient states rather than examining its impact on violence patterns within states already involved in rebellions. One recent study examining the role of aid projects in suppressing rebel violence in Iraq finds that aid can promote local security and support for the state—at least under some conditions (Berman, Shapiro and Felter 2011). However, other recent quantitative studies suggest that humanitarian assistance may produce unintended consequences, including worsening or prolonging civil wars or contributing to the diffusion of conflict (e.g., Nunn and Qian 2014; Narang 2014). At the more micro-level, a recent survey experiment conducted in Afghanistan found little support for many of the key mechanisms that undergird the anticipated success of humanitarian and development aid projects in unstable areas (Böhnke and Zürcher 2013). Finally, a related strain of literature demonstrates a robust link between concentrations of displaced persons and the spread of conflict, terrorism, and instability (Choi and Salehyan 2013; Lischer 2005; Milton, Spencer and Findley 2013; Salehyan and Gleditsch 2006). Given the close connection between humanitarian aid inflows and these populations, these findings may suggest that aid inadvertently exacerbates violence in or around the areas in which is distributed.

The ambiguity of the empirical results stems in part from the limited attention most previous studies have devoted to the manner in which the introduction of humanitarian aid into a conflict zone influences the tactics and strategies actors employ at the local level. Previous studies have largely considered aid as an aggregate entity and assumed that it, like the revenues from other resources, accrues to the capital. While a significant portion of aid does flow directly to the capital, donors often direct aid to specific projects in specific areas in order to address the needs of the local population (Collier and Hoeffler 2002, 437; Dietrich 2013). Acknowledging that aid often accrues to specific locales and that aid projects often serve specific populations prompts scholars to consider the manner in which it interacts with and reshapes the behaviors of local actors. Below, we consider the impact of humanitarian aid on rebel and government decisions to employ intentional violence against civilians in nearby areas.

3. Aid and Incentives for Violence

In this section we build on and extend previous studies of aid and conflict to argue that humanitarian aid can unintentionally create incentives for armed political actors to employ intentional violence against civilians in and around the areas in which it accumulates. We consider the influence of aid on both rebel and government violence. In brief, we argue that aid prompts rebel violence in two ways. First, it encourages looting and predation, which often result in significant abuses against the local population. Second, rebels often perceive humanitarian aid projects as direct challenges to their authority over local populations. Where control or authority is threatened, rebels are increasingly likely to use violence as a means to deter civilian defections or to eliminate the perceived threat. The relationship between humanitarian aid inflows and government violence is less clear. Inflows of humanitarian assistance may create incentives for government attacks on civilian populations, particularly if rebels are able to successfully coopt aid and use it to augment their capabilities or to manipulate the loyalties of the local population. However, several factors likely mute government incentives for such violence. First, governments and foreign donors often employ humanitarian aid as a tool for reducing instability and promoting civilian support for the state. In this sense, aid represents an alternative to violent counterinsurgency operations. Second, because humanitarian aid sites necessarily attract large numbers of foreign aid workers, events in these areas are likely to receive greater scrutiny than those in areas where the international community's monitoring capacity is weaker. Heightened international scrutiny and fears of backlash create disincentives for government violence. We discuss each of these items in greater detail below.

3.1 Rebel Violence

As the typically weaker party in a conflict, rebels face significant pressures to acquire resources. Humanitarian aid sites such as refugee camps and aid stations often concentrate large amounts of valuable resources in specific geographic areas. As a consequence, these sites present valuable targets for rebels attempting to replenish depleted resources or augment their capabilities (Johnson 2011; Médecins Sans Frontières, 1997, 18-19). Predation is a common strategy of rebel resource acquisition, and rebels often engage in strategic looting and violence as a means to compensate for short-term resource constraints (e.g., Weinstein 2007; Wood 2014). Expropriating food, medical supplies, vehicles, money, or other materials from aid sites feeds the immediate resource needs of the rebellion, allowing it to survive and potentially to expand its campaign against the state (Anderson 1999; Fast 2010, 366; Stoddard, Harmer and DiDomenico 2009). For example, rebel factions looted food aid, medical supplies, communications equipment, and vehicles from aid organizations operating in Monrovia during the Liberian Civil War—in total, rebels expropriated some \$20 million worth of aid (Anderson 1999; Lischer 2005).

Unlike conflict resources such as gems or drugs, aid resources do not need to be extracted, processed, or brought to market for rebels to derive benefits from them. Rather, rebels can rapidly convert these resources to their war effort: food aid feeds hungry soldiers, medical supplies treat injured rebels, commandeered vehicles increase rebel mobility, and communications equipment reduces coordination and information problems that limit rebel effectiveness. Similar to other conflict resources, rebels can also sell or exchange some lucrative aid resources on the black market in order to acquire war materials or pay recruits (Metelits 2010, 162; Stoddard, Harmer and DiDomenico 2009). Thus, acquiring these goods provides immediate benefits to rebel capabilities, allowing them to sustain or expand the movement.

To the extent that aid resources encourage looting by rebel forces, they are also likely to increase the risk of civilian abuse. While such attacks on civilians are most likely within poorly disciplined movements (Humphreys and Weinstein 2006), previous studies draw close connections between anti-civilian violence and rebel reliance on predatory resource acquisition (Weinstein 2007). Moreover, anecdotal evidence suggests that looting and civilian victimization often occurs in tandem. During the civil war in Sierra Leone, the Revolutionary United Front (RUF) repeatedly attacked refugee camps along the Guinean border, killing and abducting inhabitants and looting supplies (Human Rights Watch 2001). In what represents a common tactic for the group, the Lord's Resistance Army (LRA) attacked the 24,000-inhabitant Achol-Pii settlement camp in August 2002, killing and abducting inhabitants and looting food stocks and other supplies (Bagenda and Hovil 2003). As these examples suggest, rebel violence often increases in areas in which easily lootable aid resources concentrate.

Challenge to rebel authority represents a second mechanism through which aid inflows incentivize rebel violence. Specifically, rebels may intentionally target civilians in and around aid sites if they perceive aid projects as threats to their ability to maintain the loyalty of the local population. Previous studies suggest that violence against aid projects and workers are most likely where rebels perceive them as politically biased or a tool of the government (Fast 2010; Stoddard, Harmer and DiDomenico 2009). Moreover, groups that advocate nonviolence and reconciliation may encourage attacks because insurgents view these messages as threats to their ability to mobilize local support (Murdie and Stapley 2014). Analyses of Taliban violence in Afghanistan and Pakistan provide support for this argument, though the pattern is common to civil conflicts in other geographic areas as well (Jackson and Giustozzi 2012; Terry 2011).

This discussion suggests that attacks on civilian targets are most likely where states and aid agencies develop close relationships. The trend toward using aid as a means to expand government control over an area and win the loyalty and support of the local population may therefore unintentionally place civilians at risk for violence (Terry 2011). If the successful deployment of aid improves government capacity and control in the area, it may simultaneously reduce rebel influence over the population. Even

where aid projects and government counterinsurgency activities do not directly overlap, aid agencies may compete with rebels for the loyalty of the civilian population by providing alternative sources of public goods, including food, healthcare, sanitation, and (nominal) security. Indeed, previous studies suggest that the introduction of humanitarian aid, particularly in the form of large-scale aid projects or through refugee camps, may place civilians at greater risk of violence by denying the opportunity of neutrality and inhibiting their ability to accommodate rebel demands (Baines and Paddon 2012). Given the zero-sum nature of loyalty and control during civil conflicts, such competition can create strong incentives for violence. Consequently, where aid projects threaten rebel interests or compete for civilian loyalty, rebels may target civilians in order to dissuade them from utilizing these goods and service or may target aid workers in an attempt to force them from the area.

While rebels have at times successfully coopted aid activities, these cases are rare (e.g., Duffield 1997; Jackson and Giustozzi 2012). Insurgent organizations typically lack the organizational or military capabilities to establish and maintain firm control over aid sites, let alone the capacity to integrate projects into their governance structures. More typically, rebels use violence or the threat of violence to acquire resources where resource needs are acute and civilian support is not forthcoming (Wood 2014). Moreover, even where such control is potentially feasible, rebels often rely on coercive violence to enforce compliance from the local population under their control (Aspa 2011). Even in the case of SPLA, coercion played a significant role: aid groups were forced to either work through the group's governance structure or face expulsion from insurgent-controlled areas (Mampilly 2011). Thus, unless aid groups cede significant authority to rebel, we therefore expect violence to emerge as the most likely rebel strategy. These arguments produce our first testable hypothesis regarding the relationship between humanitarian aid and violence against civilians.

H1: Rebel attacks on civilians are more frequent in areas that receive larger commitments of humanitarian aid.

3.2 State-based Violence

While we argue that the local accumulation of humanitarian aid may encourage rebel attacks on civilians, we are more agnostic about the impact of such aid on state-sponsored violence. Aid's role in sustaining rebels and augmenting their capabilities, coupled with counterinsurgent difficulties in discriminating between rebels and civilians in and around aid sites (particularly refugee camps), creates incentives for government forces to target civilians. However, the state often maintains some ability to manipulate the management and distribution of aid that can directly or indirectly offer it an alternative strategy to violence.

In addition, international scrutiny in and around aid sites may create disincentives for government violence against civilians.

As discussed above, humanitarian aid sites concentrate large pools of material and human resources that insurgents can utilize to augment their capabilities and perpetuate their war against the regime. These locations—particularly refugee camps—may also present opportunities for rebels to mobilize human resources. Indeed, previous studies demonstrate that refugee camps often provide significant recruitment opportunities for rebels (e.g., Lischer 2005). Where rebels can successfully expropriate or otherwise exert control over aid resources, they are able to augment their military and organizational capabilities, thus presenting a more substantial challenge to the state. As a result, these sites may contribute to the diffusion of conflict and the escalation of anti-state violence (Choi and Salehyan 2013; Milton, Spencer and Findley 2013).

To the extent that humanitarian aid fuels insurgency, it contributes to ongoing or increased threats to the states, particularly where aid organizations operate beyond the state's control. Rising insurgent challenges may therefore encourage state forces to target civilians, particularly where these challenges affect the changing patterns of local control (Kalyvas 2006). Recent events in Syria provide some support for this relationship. For instance, Syrian forces have blockaded refugee camps outside of Damascus and killed civilians within the camps because they suspect inhabitants of providing aid to rebels (Mourtado and Gladstone 2012). Even where the population does not directly support the insurgents, aid sites, refugee camps, and related facilities offer refuge and camouflage to rebels (Baitenmann 1990; Cooley and Ron 2002; Lischer 2005). By creating opportunities for insurgents to blend into the civilian population and complicating the government's ability to distinguish between neutral civilians and militants, aid sites may encourage indiscriminate state violence (see Valentino, Huth and Balch-Lindsay 2004). This argument suggests that aid may also contribute to an escalation of state violence against civilians. This motivates our second testable hypothesis.

H2: Government force attacks on civilians are more frequent in areas that receive larger commitments of humanitarian aid.

In spite of the incentives for state violence potentially created by rebel access to resources or control over aid sites, several characteristics associated with humanitarian aid provision may mitigate the state's desire or willingness to target civilians in these areas. As such, we are less confident in the robustness of the expected relationship between aid and government violence. First, humanitarian aid projects present states with an alternative to harsh counterinsurgency strategies. As noted above, humanitarian aid is often directly or indirectly tied to states' and donors' efforts to promote political stability and reduce

opportunities for insurgent violence.³ In line with logic of “hearts and minds” strategies, the besieged incumbent can use (or simply allow) foreign humanitarian and development assistance to address some of the core grievances of the population. The provision of food, medical care, shelter, and other basic services is intended to reduce popular support for the rebels and increase state capacity in the areas in which it is deployed. To the extent that aid succeeds in accomplishing these objectives, government forces may need to rely less on coercion.⁴

Second, aid provides donors some leverage over the actions of recipient governments and can serve as an important lever through which donors can influence recipient behavior. Donors can rescind aid when recipients fail to comply with expectations or engage in high levels of violence against civilians—though humanitarian, political, or strategic concerns may make many donors reluctant to do so. While changes in aid flows or pressures from the donor states are likely to influence recipient state behaviors at the macro-level, they should also impact local level behaviors. To the extent that governments prefer to conduct abuses and atrocities with as little attention from the international community as possible, they should be least likely to commit them in areas in which there are large numbers of witnesses. Because larger inflows of foreign humanitarian assistance also bring with them significant numbers of foreign aid workers, the level of scrutiny of government behaviors is likely to be highest in these areas. Consequently, the additional scrutiny applied to these areas should help ameliorate government abuse in these locations provided that the incumbent regime desires to avoid the opprobrium of the international community. Two points are worth noting, however. First, governments weigh the costs associated with increased international monitoring against the expected benefits of violence. Second, this may lead to the displacement of abuses, and thus a subsequent escalation of violence in areas that receive less international scrutiny. In either case, it is possible that these factors reduce incentives for government violence in the areas in which aid accumulates.

4. Data

Testing the relationships hypothesized above requires fine-grained spatial data on both conflict events and the distribution of humanitarian aid sites within conflict-affected states. Recent advancements in geographically disaggregated data facilitate the analysis of important questions regarding the complex spatial patterns and temporal dynamics of insurgency. For our unit of analysis, we rely on the recently constructed PRIO-Grid system (Tollefsen, Strand and Buhaug 2012), which provides a standardized temporal-spatial grid structure for use in spatial analyses. Within this structure, each grid measures

³ Even where aid is not tied to counterinsurgency efforts, recipient states governments still typically exercise some latitude over aid distribution decisions, including authority over the locations of aid sites and access to them.

⁴ This is consistent with the argument that aid may incite rebel violence because it challenges rebel control and authority. For a discussion of control and violence see Kalyvas (2006).

approximately 0.5 x 0.5 decimal degrees (55km x 55km at the Equator). We choose this gridded system over other subnational units such as political or administrative districts because it absorbs some of the spatial uncertainty involved in geocoding landmarks. Domestic and international political boundaries vary tremendously in size from one state to the next; moreover, the size (and even existence) of these units may fluctuate over time, sometimes in response to conflict. Relying on apolitical gridded units avoids such obstacles. We aggregate our variables of interest to the grid-year.

Our dependent variables, *Government One-sided Violence* and *Rebel One-sided Violence*, reflect the number of discrete attacks on civilian targets by either insurgent or government forces observed within a conflict grid during a given year.⁵ These spatially disaggregated conflict event data come from the Uppsala Conflict Data Program's (UCDP) Georeferenced Event Dataset (GED) (v1.5) (Melander and Sundberg 2013). The GED includes information on post-Cold War conflict events in Africa, including both battles and attacks on civilian targets. These events are based on information extracted from a variety of national and international media sources.⁶ Each event in the dataset is connected to a specific geographic location represented by longitude and latitude coordinates. We filter the data by event and actor type to ensure that our dependent variables appropriately capture only one-sided violence by either state or rebel forces.

We rely on new data on the approximate locations of foreign aid projects to construct our principle independent variable, *Humanitarian Aid*. Specifically, we use information in the UCDP/AidData georeferenced dataset to construct our measure (Findley et al. 2011; see also Tierney et al., 2011). These data capture annual project-level bilateral and multilateral aid commitments (in constant \$US) referenced to a set of geographic coordinates. In addition to providing information on the locations of specific aid projects, the dataset codes each aid project according to its sector classification as reported in the OECD Creditor Reporting System (CRS). We identify aid commitments to projects designated as "humanitarian" by their CRS codes and filter out aid to all other sectors.⁷ These projects reflect immediate food aid; shelter, water, sanitation, and health services; relief coordination and logistics; infrastructure improvement and reconstruction; and other short-term activities designed to promote the return and protection of civilians displaced by disasters and conflict. We sum the value of all humanitarian aid committed to a grid unit in a given year. This ensures that we are only capturing information on aid that would plausibly be

⁵ We rely on counts of events rather than estimated deaths resulting from such encounters primarily because our argument posits that insurgents will more frequently attack areas in which aid is distributed, and we do not explicitly theorize on the severity of the conflicts.

⁶ A principal limitation with these data is they absorb media biases. We attempt to mitigate the impact of reporting bias by limiting the sample to African states involved in conflict, which creates more homogenous units, and we control for numerous grid-level characteristics that should reasonably account for variations in reporting.

⁷ We include projects with CRS codes between 70000 and 70410. More detailed descriptions are available at: <http://www.oecd.org/dac/stats/purposecodessectorclassification.htm>

used to support the types of projects and programs that we argue create conditions that result in increased attacks on civilians.⁸

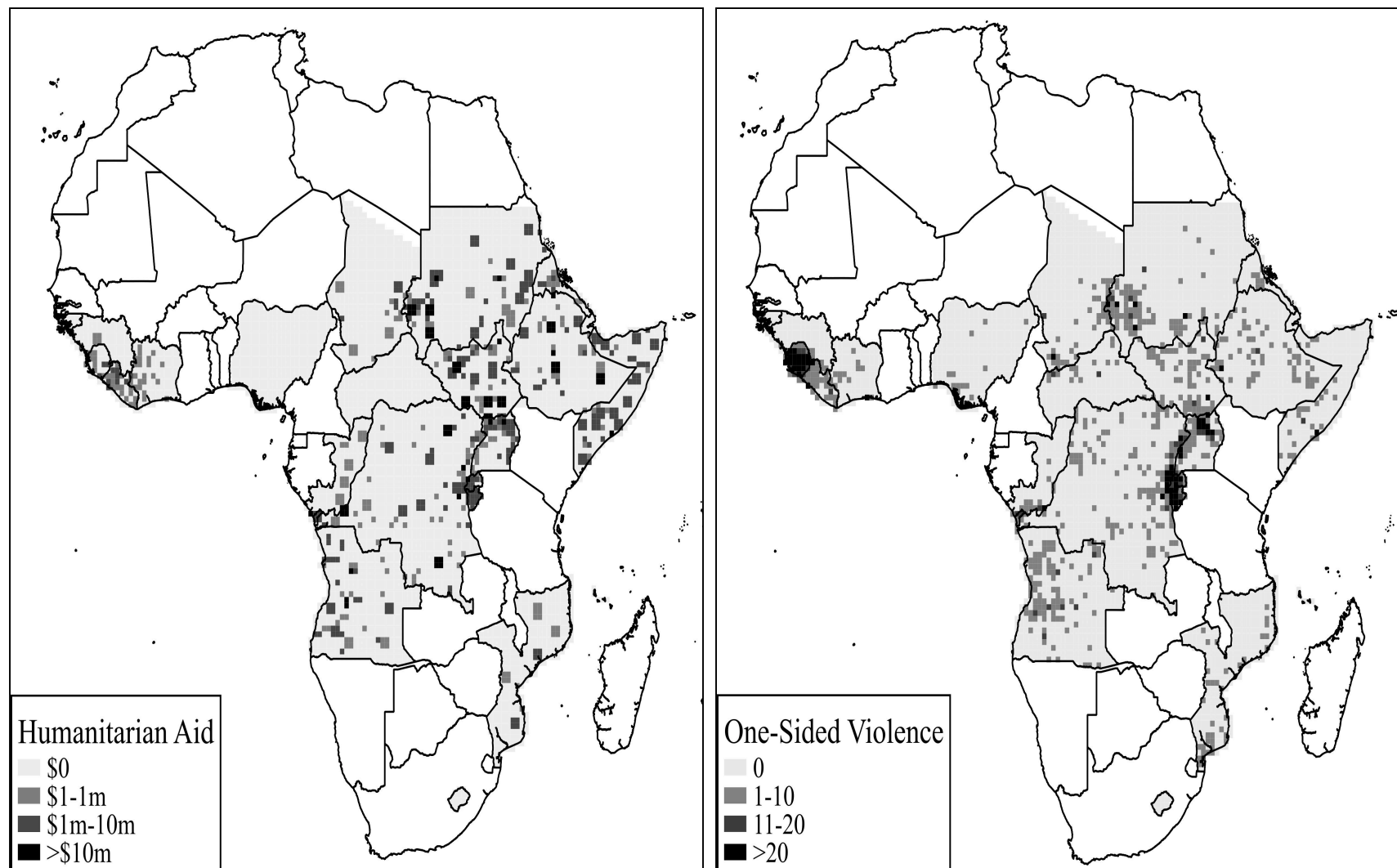
A potential limitation of AidData is that it reflects commitments rather than disbursements. Thus, we cannot be certain what portion of the aid actually arrived at the specified project or whether it arrived as one sum or in portions over time. While this is unfortunate, no effective remedy currently exists that would allow us to more precisely identify the timing or value of aid to specific locations (Findley et al. 2011; Tierney et al. 2011). However, given that governmental and organizational budgets tend to be set annually, we believe annual commitments represent a reasonable proxy for project disbursements.⁹ In spite of these limitations, these data represent among the best available for analyzing the spatial distribution of aid in conflict countries. We log-transform the aid variable due to significant positive skew, then lag it for one year to account for the time lapse between commitment and distribution and to guard against reverse causality.

Because we are primarily interested in the influence of humanitarian aid during civil conflicts, we limit our analysis to years in which the states for which disaggregated aid data are available were involved in active conflicts. Merging the conflict events and aid datasets and aggregating to the temporal-spatial units discussed above produces a sample of approximately 55,000 grid-years, representing 22 sub-Saharan African states between 1989 and 2008. Figure 1 graphically illustrates the spatial distributions of the aid and conflict data in our sample. The left panel illustrates the locations of humanitarian aid projects (in constant \$US) within the states included in the sample (shaded gray), while the right panel shows the locations of one-sided violence events perpetrated by either government or rebel forces. Darker colored grids reflect larger aid volumes and more frequent one-sided violence. While this map demonstrates the distribution of aid and one-sided violence in our sample, it is difficult to discern spatial patterns at the continent level. In order to illustrate the spatial relationship between humanitarian aid and violence in greater detail, Figure 2 overlays points data (estimated coordinates) of one-sided violence events by both insurgent and state forces on a grid-level heat map of humanitarian aid inflows to specific locations within the Sudan between 1989 and 2008. As this map more clearly illustrates, violence tends to cluster in and around areas that received humanitarian aid.

⁸ We exclude aid that is national in scope or devoted directly to the central government or administrative capital and cases where the location was unknown or unclear.

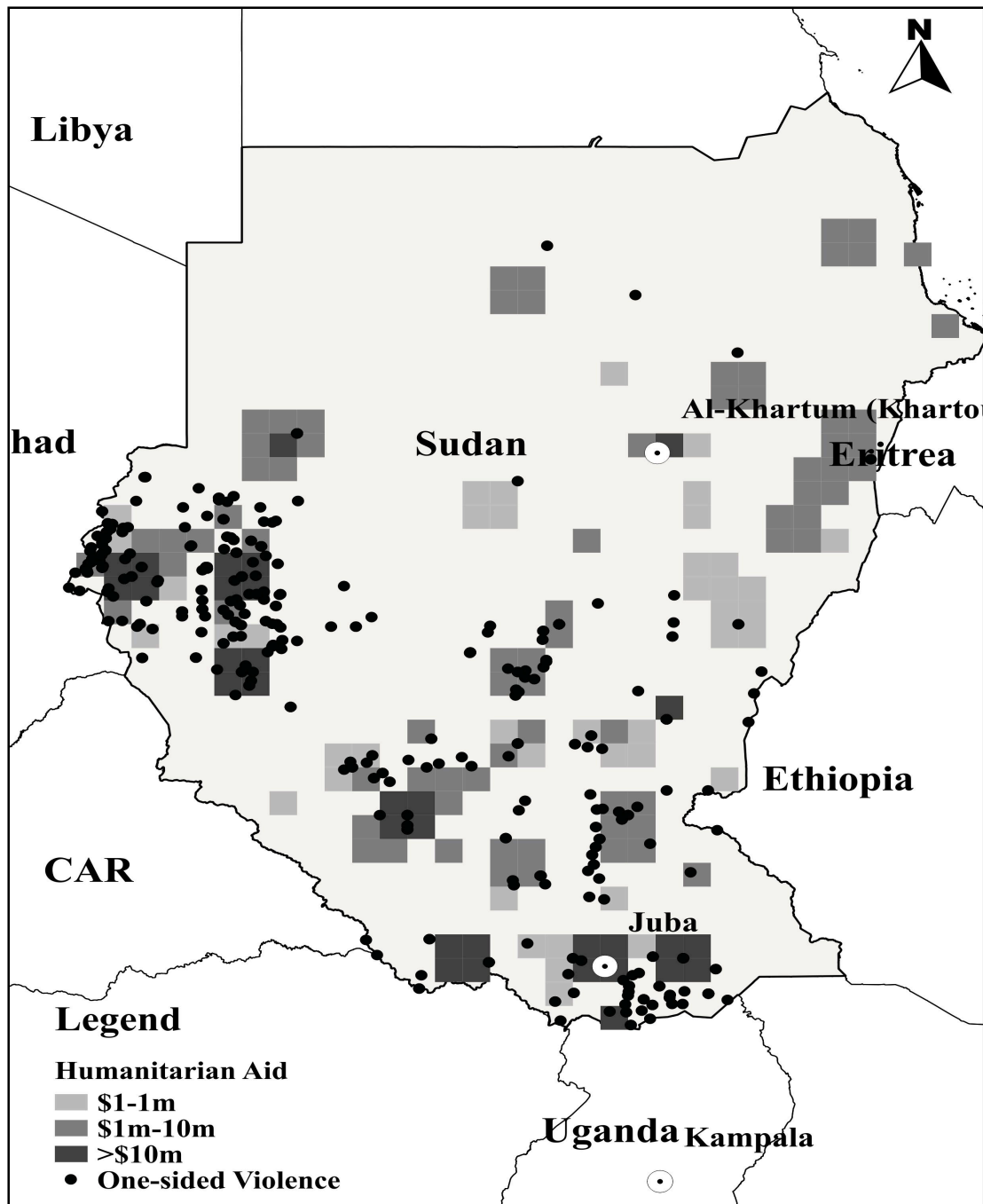
⁹ We also conduct multiple robustness checks to help account for this issue, including using a three-year moving average of aid and a variable in which aid decayed by 50% per period for up. In all cases, the results are very similar. See the online appendix for more detail.

Figure 1: One-sided violence and humanitarian aid in Africa



Notes: The heat maps illustrate the grid-level frequency of accumulated Humanitarian Aid (left) and One-sided Violence (right) for states included the sample for the years 1989-2008. Gray shaded areas represent states included in sample.

Figure 2: Humanitarian aid and one-sided violence in the Sudan



Notes: The map illustrates the total volumes of Humanitarian Aid committed to a grid-unit (gray scale) and the estimated locations of One-sided Violence (points) in the Sudan between 1989 and 2008.

We include a number of confounding variables in the analysis. First, because one-sided violence typically occurs within the context of other violent events, we control for *Battles* between government and insurgent forces as well one-side violence by the opposition. Because violent events cluster spatially, we also account for spatial dependence. We include the variables *Government OSV Spatial Lag*, *Rebel OSV Spatial Lag*, and *Battles Spatial Lag*, which reflect the proportion of cells adjoining the cell under observation that contemporaneously experienced the specified type of violence. In some specifications we also include a one-year lag of the dependent variable. We further control for a variety of unit-level structural variables. We include estimated unit-level *Wealth*, measured in logged per capita GDP, and *Population Size* using data available from the PRIO-Grid dataset (Nordhous 2006; CIESIN 2005). Both are measured at five-year intervals, and we linearly interpolate between data points. We also include controls for international *Border Distance* and *Capital Distance* from the grid in logged kilometers, both of which are included in the PRIO-Grid dataset. Because the ethnic composition of a geographic area may influence local violence (Fjelde and Hultman 2014), we include the variable *Rebel Constituency* to indicate the presence of ethnic groups affiliated with active insurgent groups. This binary indicator is based on data from the Geo-coded Ethnic Power Relations dataset (GeoEPR) (Wucherpfenning et al. 2011) and the ACD2EPR (Wucherpfenning et al. 2012).

5. Empirical Approach

We rely on multiple statistical approaches to evaluate the hypotheses proposed above and to identify the causal relationships we specified. The most significant methodological hurdles we face are omitted variable bias and the non-random geographic allocation of aid resources. First, the level of spatial aggregation in the data makes it difficult to account for all unit-level characteristics that likely influence both aid inflows and violence. While we account for several key unit-level characteristics for which data are available, peculiarities exist within each unit. Second, because donor states and aid providers adapt their efforts to changing local conditions, the locations of aid projects as well as the levels and types of aid change in response to local conflict events. This often occurs because donors, recipient states, or aid agencies on the ground explicitly choose to reallocate aid dollars to projects within conflict zones in an attempt to stabilize the region or ameliorate human suffering. Consequently, aid likely follows conflict events in addition to potentially provoking them. While this relationship is consistent with our argument, it strongly suggests that aid is non-randomly assigned, which could bias our estimates.

We take two steps to address these issues. First, we employ two sets of conventional regression models. Because our dependent variable is the annual count of one-sided violence committed by rebel government forces respectively, we rely on time-series cross-sectional negative binomial models as our first cut at analyzing the relationship hypothesized. We evaluate models with both random- and fixed-

effects estimators.¹⁰ Fixed-effects approaches, which explicitly model within-panel changes in the outcome variable, address some of the limitations of observational data to account for unobserved heterogeneity among highly diverse units.¹¹

Second, because of limitations in drawing causal inferences from observational data, we supplement the control-based analysis with a more rigorous empirical approach that helps account for any selection bias that may influence our analysis. Following recent studies on related topics (e.g., Kocher, Pepinsky and Kalyvas 2011; Sullivan 2014), we address the non-random assignment of our treatment (humanitarian aid) by first preprocessing the data using a modified genetic matching approach (Diamond and Sekhon 2013). Genetic matching populates a sample of control areas (i.e., those not receiving humanitarian aid) that best approximates the areas receiving aid across a wide set of observable confounding variables. Practically, this list includes lagged measures of all the covariates included in the regression analyses plus three additional variables influencing aid allocation: *Humanitarian Aid Spatial Lag*, *Drought Conditions*, and *Flooding*.¹² We include a weighted spatial lag of aid because aid flows exhibit significant spatial clustering. We include the precipitation variables in order to account for other, non-conflict events that may prompt inflows of aid. While these variables are fairly blunt, they should also be relatively flexible in that many of the specific events that trigger aid inflows (crop failures, storm damage, etc.) result from drastic changes in precipitation.

We exactly match treatment and control units within country-years. For all other covariates, we then further pre-processed the data using a genetic matching algorithm (Sekhon and Mebane 2008). During the matching process, we also exclude units for the three years prior to the assignment of humanitarian aid and the three years following aid commitments in order to prevent their inclusion in the control group. In the absence of random assignment, it is impossible to rule out all potential selection mechanisms. However, the matching process ensures common support for counterfactual inference while also ensuring that the two samples have comparable underlying propensities for receiving the treatment (Imbens 2009). Across the distribution of covariates, the sample of control units generated through this process best approximates our treatment sample of grid-years receiving aid.¹³

We analyze the matched sample using a series of difference-in-difference (DiD) estimators. The general intuition behind this approach is to estimate whether any change between pre- to post-assignment levels

¹⁰ A characteristic of the fixed-effect negative binomial model is that it drops all panels for which the outcome does not vary, thus eliminating some 50,000 observations.

¹¹ This requires a tradeoff among methodological concerns. Namely, our dependent variable exhibits an overabundance of zeroes (~20:1). Results from zero-inflated models are quite similar.

¹² We measure droughts and floods as years in which the grid received precipitation that was two standard deviations above/below the ten-year average for the unit. Information on precipitation levels is available as part of the PRIO-GRID data (see NOAA 2011).

¹³ A table detailing pre- and post-matching balance statistics can be found in the appendix.

of violence is significantly higher in areas assigned to the treatment group compared to areas assigned to the control group. DiD models are estimated using two dichotomous control variables along with their interaction term. The inclusion of the two binary controls allows the models to account for any potential confounders that remain in the sample (Angrist and Pischke 2009). The first variable represents the *Treatment Group* and controls for systematic unobservable differences between the treatment and control groups occurring across both time periods. The second reflects the *Post-Assignment Period* and controls for any secular trends that exist in both groups before and after the intervention. Interacting these variables yields a third dichotomous measure estimating the average treatment effect for the treated (ATT), which identifies changes in the treatment group occurring as a response to treatment. We estimate negative binomial models to account for the functional form of the data.¹⁴

6. Results and Discussion

We present our results in Table 1. We first present the results from the more traditional control-based approaches (Models 1-4). The first two models show the results for the equations predicting rebel violence against civilians. Model 1 shows the results of the cross-sectional time-series negative binomial model estimated with random effects, which report a positive and statistically significant association between recent *Humanitarian aid* and subsequent *Rebel one-sided violence*. Model 2 repeats the analysis but adds unit fixed effects to account for unobserved heterogeneity. The results are very similar. Based on these results, compared a unit that received no aid, a unit that received aid equal to half the sample maximum would on average experience a 25% increase in the rate of rebel attacks on civilian targets.

¹⁴ See Puhani (2012) on DiD approaches in the context of maximum likelihood models.

Table 1: Effect of humanitarian aid on one-sided violence

	<i>Full Sample</i>				<i>Matched Sample DiD</i>	
	<i>Rebel OSV</i>		<i>Govt. OSV</i>		<i>Rebel OSV</i>	<i>Govt. OSV</i>
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Humanitarian Aid_(t-1)[†]	0.041* (0.007)	0.025* (0.007)	0.020* (0.008)	-0.002 (0.009)		
Government OSV	0.067* (0.014)	0.060* (0.016)				
Government OSV Spatial Lag	0.688* (0.219)	0.489* (0.239)	5.614* (0.233)	4.508* (0.012)		
Rebel OSV			-0.011 (0.011)	-0.007 (0.012)		
Rebel OSV Spatial Lag	3.577* (0.182)	3.415* (0.188)	-1.416* (0.277)	-0.905* (0.293)		
Battles	0.007+ (0.004)	0.011* (0.004)	0.039* (0.005)	0.037* (0.006)		
Battles Spatial Lag	2.563* (0.192)	1.695* (0.197)	1.943* (0.243)	1.254* (0.272)		
Border Distance[†]	-0.029 (0.040)		-0.104* (0.039)			
Capital Distance[†]	0.122* (0.055)		0.264* (0.058)			
Wealth[†]	0.010 (0.064)	-0.004 (0.102)	-0.029 (0.063)	0.257* (0.114)		
Population[†]	0.353* (0.038)	-0.228* (0.064)	0.541* (0.040)	0.033 (0.061)		
Rebel Constituency Government OSV Temporal Lag	0.071 (0.086)	0.481* (0.104)	0.628* (0.094)	0.778* (0.120)		
Rebel Government OSV Temporal Lag	0.003 (0.007)		-0.035* (0.015)			
DiD ATT					0.599* (0.208)	0.032 (0.306)
Treatment Dummy					0.412* (0.193)	0.757* (0.212)
Post-Assignment Dummy					-0.739* (0.127)	-0.344 (0.252)
Constant	-6.275* (0.597)	0.145 (1.097)	-7.799* (0.582)	-4.839* (1.022)	-1.605* (0.144)	-2.301* (0.170)
Unit Fixed-effect	No	Yes	No	Yes	No	No
Wald χ^2	1749.61	986.42	1729.04	766.52	127902.07	1729.04
N	58,518	5,820	58,518	6,015	7,052	7,052

Coefficients and standards errors (in parentheses) from negative binomial models.

*= $p \leq 0.05$; += $p \leq 0.10$ (two-tailed test)

[†]=natural log; OSV=one-sided violence; ATT=Average Treatment

Models 3-4 report the results for the equations estimating the relationship between humanitarian aid commitments and government violence against civilians. Model 3 presents the random effects specification and reports a positive and statistically significant relationship between aid and government violence. However, in the fixed-effects specification (Model 4), the coefficient is negative and fails to achieve statistical significance. This result somewhat reduces our confidence in the relationship between aid and government violence, and suggests that the mitigating factors discussed above might impact the state's willingness to target civilians.

On balance, these results provide initial evidence to support our arguments regarding the expected relationship between humanitarian assistance and violence discussed above. While offering a useful starting point, the initial tests possess only a limited capacity to uncover causal relationships among different indicators. We therefore attempt to improve our efforts at causal inference by employing a quasi-experimental design. In the matched sample analyses, we evaluate the effect of the binary treatment (aid) on the government and insurgent one-sided violence.¹⁵ Results from the DiD models are presented in Models 5 and 6 of Table 1.¹⁶ Looking first at the *ATT* for the effect of aid commitments on rebel violence in Model 5, we see that, controlling for both any unobservable differences between treatment and control groups as well as the declines in violence common to both groups, aid commitments are positively and statistically significantly related to insurgent one-sided violence. Moreover, the substantive size of the predicted effect for humanitarian aid commitments is large: the introduction of humanitarian aid is predicted to nearly double the rate of rebel one-sided violence compared to highly similar areas that did not receive aid.¹⁷

Turning to the effects of humanitarian aid on government violence in Model 6, we find much less support for the contention that aid commitments are related to increased government one-sided violence. The DiD specifications predict that areas receiving aid commitments do not experience significantly more government violence as compared to what would be predicted to experience had aid not been committed. Combined, the results present strong evidence for our first hypothesis, while the second hypothesis receives much more mixed support.¹⁸

¹⁵ The binary treatment corresponds to the assignment algorithm used in our matching process.

¹⁶ We also employed t-tests measuring the differences in means for rebel and government one-sided violence after assignment to the treatment or control groups, which should provide a reliable estimate for the *ATT*. The results provide support for both hypotheses.

¹⁷ We estimate the marginal effect and statistical significance for the *ATT* estimates using the delta method (Green 2008)

¹⁸ As robustness check, we also replicate the results using a "doubly robust" specification that includes the controls (Bang and Robins 2005). The results are substantively identical.

7. Conclusion

Humanitarian aid funds the provision of resources and services to persons displaced or otherwise threatened by violence. This aid sustains vulnerable populations and likely prevents many thousands of deaths by malnutrition, starvation, and disease annually. Aid provision has become an essential component of the international community's response to violent conflict and the abuses that accompany it, and aid organizations have taken increasingly active roles in civil conflict, including the provision of vital services and attempting to provide security to internally displaced persons (Anderson 1999; Duffield 1997). Moreover, annual aid commitments to unstable and conflict-affected states continue to increase at a rapid rate (GHA 2013), underscoring the international community's commitment to delivering resources in these areas.

Problematically, the impact of introducing aid into conflict environments has not been thoroughly evaluated. Particularly, few studies have sought to systematically assess how aid influences patterns of violence at the local level. In this manuscript, we have undertaken a first cut at assessing these relationships at a local level. Using novel, recently released data that captures variations in both violence against civilians and international aid commitments at the micro-level and a mix of methodological approaches, we provide robust evidence that inflows of humanitarian aid increase the risk of rebel violence against civilian targets. By contrast, we find only weak support for aid's role in promoting government violence.

Though the finding that humanitarian aid produces negative externalities is concerning, it is substantively important and should have particular relevance to policymakers and practitioners interested in developing effective strategies for responding to mounting human costs during conflicts. While aid agencies and donors are often reluctant to pair humanitarian assistance with armed troops, protecting civilians from the abuses of predatory rebels or insecure government security forces may necessitate more substantial security efforts than current aid strategies entail. Robust multidimensional peacekeeping missions can effectively reduce violence against civilians both by monitoring and by actively defending vulnerable civilian and humanitarian targets from belligerents (e.g., Hultman, Kathman and Shannon 2013). Consequently, greater coordination among donor states, aid agencies, and international and regional peacekeeping organizations may lead to improved protection of refugees and other civilians located in and around the sites of humanitarian aid distribution. Consistent with this discussion, in exploratory analyses (presented in the appendix) we find that the presence of international peacekeepers can potentially diminish the impacts of aid on violence. Future research may explore these issues in greater detail, particularly as new geo-referenced data on peace keeping operations become available. Our

preliminary investigations also reveal that that negative externalities of aid on violence may have become increasingly potent in the post-2000 period. Given that assertions about the changing nature of aid distribution appears common, this might be an interesting area for future research.

Our study represents an examination of the general relationship between humanitarian aid and conflict violence. However, we note that factors we have not explicitly considered herein might condition these relationships. Additional local-level factors warrant consideration, such as pre-existing relations between the target population of the aid and the incumbent regime. Different types of aid projects also possess distinct characteristics that may alternatively inhibit or facilitate conflict. For instance, aid to local civil society groups and NGOs, rule of law programs, infrastructure development, etc. may affects local violence patterns in distinct ways. Finally, it is also possible that the introduction of foreign humanitarian assistance may produce short-term instability and increased violence but exert a pacifying influence over the longer-term. More systematic investigations of these issues would benefit both policy makers and the international NGO community, and could help improve strategies of aid allocation.

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