Supplemental Appendix for

Cyclones and Violence Against Civilians: Evidence from the Cabo Delgado Insurgency[1]

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Overview

This Supplemental Appendix proceeds in several parts. In the section immediately below, we begin by explaining how we selected stories for our qualitative assessment of the scope conditions as well as the insurgency's background. We then provide an overview on the socioeconomic background of Mozambique's Cabo Delgado region and the history of the rebellion, followed by a more detailed qualitative assessment of our main paper's scope conditions. After this, we provide additional details on our data, with several associated plots. This is followed by tables of relevant summary statistics and robustness models that support the findings in our paper.

News Source Approach

For our qualitative process tracing, we conduct a systematic news search for relevant articles pertaining to insurgent violence against civilians in the Cabo Delgado region using Factiva. Our

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searches in this respect encompassed the following news sources: Reuters News, CNN, New York Times, Agence France Press, BBC, Associated Press, and All Africa. To this end, we sought to identify articles containing the following keywords "killed or kills or massacre or bomb or bombing or bomber or beheaded or mass grave." These news sources and choices of keywords were selected to mirror an established data collection effort for global violence against civilians (Schrodt and Ulfelder 2016). All retrieved news articles were then qualitatively analyzed to construct a single timeline summary (available upon request), which we also supplemented with additional relevant articles and reports identified across academic, news media, and policy sources.

Political and Socioeconomic Background on Cabo Delgado

Mozambique's long-running status as a "post-conflict success story with close to 20 years of peace and stability" has seen a number of contemporary challenges due to corruption, donor dependency, economic mismanagement, re-emerging political violence, and the onset of an Islamist insurgency in October 2017 (Mukwakwa 2020; Faleg 2019, 6). The country has also continued to struggle with widespread food insecurity (Mukwakwa 2020; Matsinhe and Valoi 2019), which has recently been exacerbated by natural disasters, as well as by the adverse effects of these disasters on (i) public mistrust and frustration with the state and (ii) broader social instability (Mukwakwa 2020, 4). To this end, Faleg contends that the "alienation of the country's marginalized and disenfranchised youth"—most notably those in Mozambique's northern Cabo Delgado province—has been "an incubator for violence in Mozambique" (Faleg 2019, 5).

Cabo Delgado is also notable for its unique religious composition. Whereas Mozambique's broader population is predominantly Christian, the country's 18-20% Muslim minority predominantly reside in Cabo Delgado and surrounding coastal areas (AP 2018; Reuters 2018a;

Faleg 2019). Cabo Delgado itself is home to 2.3 million people—of whom 58% identify as Muslim—and borders Tanzania (Morier-Genoud 2018; Matsinhe and Valoi 2019). The province has long suffered from significant government inattention, with economic development in recent times being largely concentrated in Mozambique's southern areas, including the capital of Maputo (AP 2018). As a consequence, Cabo Delgado remains "primarily rural [...] and ranks lowest in human development among all the provinces of Mozambique" (Armand et al. 2019). This lies in contrast to Cabo Delgado's significant natural resource wealth. Major natural gas discoveries in Cabo Delgado's Rovuma Basin in 2010 led to the approval of major investment plans by the Mozambique government in 2017-2018 (Armand et al. 2019) and a potential for Mozambique to become the third-largest global exporter of natural gas (Armand et al. 2019, 6); whereas ruby deposits discovered in 2009 led to Cabo Delgado's characterization as the world's largest deposit of rubies by some (e.g., Faleg 2019).

Yet, despite these resources, the "population of the province derives little to no benefit from the growing extractives industry" (Matsinhe and Valoi 2019, 13). Matsinhe and Valoi further characterize Cabo Delgado as having "nothing to show but illiteracy, ignorance, misery, poverty and strife," where "only 0.3% of Cabo Delgado's population has post-secondary education, the lowest percentage in the country" (Matsinhe and Valoi 2019, 13). Feijó adds that "poverty is widespread and transversal to all ethnic groups in Cabo Delgado," and Morier-Genoud highlights an oft-spouted point by scholars investigating conflict in Mozambique, that "material deprivation, particularly poverty, marginalization and lack of perspectives among the youth" provide a foundation for conflict to spawn (Feijó 2020, 2; Morier-Genoud 2020, 396-397). It was against this backdrop that ASWJ Reuters 2018a—arose in 2017.

Some analysts argue that socio-economic and political issues in Mozambique—such as youth unemployment—are some of the main drivers for locals joining or being sympathetic to

ASWJ, in addition to ASWJ being perceived as an "antidote" to the incumbent "corrupt, elitist rule" (Reuters 2018b; West 2018, 5). West argues that the emergence of ASWJ is an "indication that Islamist influence is spreading in East Africa," and that the group was inspired by "the successes of al-Shabaab in Somalia and Kenya" (West 2018, 7). AP also reports that the Mozambican insurgency "by a shadowy band of young Muslims has intensified worries that Islamic extremism has found a beachhead in southern Africa," but that the "killings in Cabo Delgado appear localized and the attackers, whose fundamentalist ideology seems undeveloped to some observers, could also be driven by ethnic and economic resentments, as well as the interests of criminal syndicates" (AP 2018). Matsinhe and Valoi argue that the extremists "appear to consist of local youth who have devised a deviant form of Islam," giving further credit to the notion that the insurgents are predominantly young people (Matsinhe and Valoi 2019, 2). The AFP noted in 2018 that Mozambique's northern region has "largely missed out on the economic growth of the last 20 years, and the region sees itself as a neglected outpost, giving the radical Al-Shabaab-style ideology a receptive audience" (AFP 2018).

The ASWJ insurgency has stalled and delayed the development of offshore gas fields (BBC 2020a). In October 2019, "ExxonMobil unveiled plans to invest more than $500m in the initial construction phase of its gas project in the region" (BBC 2020b). Italian Eni, U.S. Anadarko, and Canadian Wentworth Resources, Japanese Mitsui, Thai BTTEP, and Indian ONG Videsh and Beas Rovuma Energy all had oil and/or gas operations in Cabo Delgado (AP 2018; Matsinhe and Valoi 2019, 14). Initially, there were "no indications that the attacks [from 2017 to 2018] were carried out in protest of the gas production," but in February 2019 an Anadarko employee was killed and six others sustained injuries (All Africa 2018; Reuters 2019). In 2018, there were suspicions that a "religious motive" was "unlikely" and that, instead, it may be "criminal networks" as the "governments of Tanzania and Mozambique are cracking down on poaching, illegal mining, and

illegal fishing" and they are "strengthening the borders and trying to better protect flora and fauna" (All Africa 2018). However, in 2019, the AFP reported that "militants are reportedly seeking to impose Sharia law in the Muslim-majority [Cabo Delgado] province" (AFP 2019c; Matsinhe and Valoi 2019, 6). This was reiterated in 2020, with the AFP reporting that the "violence has been blamed on a jihadist organization apparently intent on imposing Islamic Sharia law" (AFP 2020). Morier-Genoud echoes this, stating that it was the "initial goal" of the insurgents, and they attempted to enforce it by "withdrawing from society and the state whose schooling, healthy system and laws it rejected" (Morier-Genoud 2018, 2).

The above dynamics parallel the broader theoretical dynamics outlined further above. In examining the resource curse in Mozambique, Armand et al. note that by increasing trust in government among citizens through large-scale information campaigns, there will likely follow a decrease in violence (Armand et al. 2019, 31). Similarly, Vicente and Vilela found that "religious intervention" (as a "religious sensitization campaign calling for a moderate Islam") "decreased the prevalence of anti-social behavior," but their study does not illustrate that "conflict was prevented by the interventions" that they examined (Vicente and Vilela 2019, 21–22). However, this finding runs counter to the interview-based evidence from Matsinhe and Valoi, who note that community leaders "held several meetings to discourage 'native youngsters' from adhering to ideologies that contradict the Islamic commandments long upheld in the community. The youngsters refused to attend the meetings and continued to defy the established Islamic orthodoxy in town, which culminated with their expulsion from their communities" (Matsinhe and Valoi 2019, 9).

Additional Qualitative Evidence

This section expands upon the qualitative evidence that our main paper provides in relation to the scope conditions associated with our theory. In doing so, we primarily discuss ASWJ's characteristics in relation to our aforementioned scope conditions of local disembeddedness and ideological signaling, while endeavoring to rule out several other factors.

Prior to the landfalls of Cyclones Idai and Kenneth, news, academic, and policy reports generally noted that ASWJ's tactics remained consistent over time, involving the killing of both civilians and government forces by shooting followed by decapitation, often alongside arson of buildings and vehicles (Morier-Genoud 2018, 1). At the same time, we note that some accounts of the Cabo Delgado insurgency do emphasize that the initial attack in October 2017 was targeted at police forces and not civilians, despite one civilian death (Morier-Genoud 2018; Matsinhe and Valoi 2019), which potentially suggests that civilians were not a primary target for the insurgency at its outset. Nevertheless, given that many early accounts uniformly stressed that civilians—including women, children, oil and gas companies, and passenger vehicles—were a primary focus of this insurgency's pre-cyclone attacks (Matfess 2019; Matsinhe and Valoi 2019, 7–8), we proceed to our assessment of this insurgency in relation to Cyclones Idai and Kenneth's impacts with the acknowledgement that ASWJ was already targeting civilians prior to the onset of these cyclones.

Regarding Cabo Delgado's recent experiences with natural disasters, our qualitative analyses suggested that the Mozambican "government's lack of adequate preparedness for a country prone to natural disasters and its failure to warn citizens in areas mostly affected could be attributed to lack of planning and resources for unexpected hazards" (Mukwakwa 2020, 4). This indicates that the potential for citizen grievances over government disaster responses was widespread prior to the landfalls of Cyclones Idai and Kenneth. In support of this contention, and in the months following Cyclone Idai's landfall, accounts also increasingly stress that the deepened

food insecurity facing Cabo Delgado and other "regions marginalized by the government" in Mozambique were "exacerbated by the natural catastrophes deepening citizen's mistrust and frustration with the state and consequently leading to instability" (Mukwakwa 2020, 4). In this same vein, others further noted that "[m]ismanaged or sluggish post-disaster recovery efforts, combined with pre-existing social grievances, would create a 'storm after the storm' scenario in Mozambique, exacerbating conflict drivers" (Faleg 2019, 5).

While Cyclone Idai had an impact on broader food insecurity throughout Mozambique, and on the government's capacity to continue its efforts to combat insurgents in Cabo Delgado, our review of relevant news accounts nevertheless suggested that the direct effect(s) of Idai on Cabo Delgado was limited, given that the path that Idai took most directly affected central and southern Mozambique. Cyclone Kenneth, in contrast, predominantly hit Cabo Delgado, having a more direct impact on the landscape and, in turn, more severely affected government-insurgent-citizen relations due to issues such as food and water insecurity, destruction of state capacities, and subsequent emotional stress, disease outbreak, and displacement of people (whether from loss of homes or evacuation). Collectively, these factors act as stressors that could have subsequently affected insurgent activity (e.g., attacks, recruitment, or lack thereof) and government response (e.g., capacity to respond, (in)effectiveness, dependency on international organizations, vulnerability).

Idai, then, played an important contextual role in the initial strain it placed on the government, especially when considering the fact that Idai's damage to Mozambique as a whole was considered worse than that of Kenneth, despite Kenneth (i) being a higher category cyclone at the time of landfall and (ii) undoubtedly adding to the initial strain placed on both humanitarian organizations and government forces by Idai. Within Cabo Delgado, however, Kenneth's damage outweighed Idai's broader country-wide impacts. Therefore, for our purposes, Idai can be seen as

a contextual factor in relation to Cyclone Kenneth, in which the latter forms the primary focus in analyzing the storm's impact on violence against civilians in Cabo Delgado.

The quick unfolding of Kenneth's detrimental impacts (e.g., severe flooding, landslides, and power cuts) classify it as a rapid-onset natural disaster, which can have more significant implications for conflict risk than slower-onset disasters. Indeed, Kenneth hit Cabo Delgado on April 25th, 2019, and the first post-disaster incident of violence, where a teacher was killed, and others were "burned" (AFP 2019b), occurred on May 4th, 2019. In the ensuing weeks, ASWJ killed "nearly two dozen villagers" and torched hundreds of homes in Nacate, Ntapuala, and Banga-Vieja villages—all of which are in Cabo Delgado (Nhamirre 2019). According to AFP, this was their "deadliest attack since they launched" the insurgency in October 2017 (AFP 2019a). In what could then be perceived not only as a further escalation of violence but also as supporting evidence for our contentions of ideological signaling, Islamic State (IS) "claimed its first-ever attack in Mozambique" in June 2017 (with the attack occurring in May), in which 16 people died and approximately 12 were wounded in a "gunfight between government soldiers and Islamist militants" (Weiss 2019; Kajjo and Solomon 2019). Alongside this, the attacks summarized above also demonstrated Cabo Delgado's insurgents transition from predominantly attacking villages and farms to targeting a major town—Mocimboa da Praia. This was noted as proof of a "radical change in strategy" for the insurgency (BBC 2020c), and was further described as a coming out party of sorts for a group that "has spent the past two years operating in the shadows, attacking remote villages across the province, ambushing army patrols on isolated roads, instilling terror in many rural communities, forcing perhaps 200,000 people to flee from their homes, but rarely giving any indication about its motives, its leadership, or its demands" (BBC 2020c). Together, this evidence is in (i) line with our quantitative findings in showing a strong trend toward intensification of

violence against civilians following the cyclones' landfalls and is (ii) consistent with our suggested scope condition concerning the use of violence as a means of ideological signaling.

With regards to our first scope condition (social dismbeddedness), it is clear throughout the evidence presented above and below that the insurgents did not care much for public sentiment in Cabo Delgado. This is exemplified by the numerous violent methods the insurgents employed against civilians over the years, including beheadings, arson, and setting villagers on fire. There is no evidence that such violence decreased in the aftermath of the cyclones; indeed, the evidence and quantitative analysis discussed in the main paper and above suggests intensification. Furthermore, and although civil society and international organizations—and the government—all came together to support the victims of the two cyclones, there is no evidence that the same was true for the insurgents, as there were no recorded attempts to peacefully try and spread the group's ideology in tandem with any aid provision, or even to endorse aid provision in an effort to illustrate the group's viability as an effective political-ideological alternative to the state, as happened, for example, in the Philippines and Indonesia (Beardsley and McQuinn 2009; Walch 2018). Instead, it is clear that aid workers were concerned that their efforts to help victims were being impeded by insurgent activity, in addition to being physically attacked by insurgents (CoM 2019; de Greef 2019). This further supports the notion that, rather than trying to establish themselves as civil and political leaders, the Cabo Delgado insurgents at least maintained, if not increased, their orientation as Islamist fundamentalists seeking to impose their ideals on an unwilling and uncooperative society during the aftermath of Cyclones Idai and Kenneth.

The insurgents' own public ideological orientation is also illustrative in this regard, which engages our second scope condition (ideological signaling). In 2017, details of Cabo Delgado's insurgency were relatively sparse in international media—and most reports included in international sources were originally published in local media outlets in Portuguese. At that time

(i.e., pre-disaster), the insurgents were typically referred to as 'Ansar al-Sunna' but this begins to diversify from 2018 onward, with the notable emergence of 'Al Shabaab'—which is distinct from Somalia's Al Shabab and is the unofficial local term for the insurgency in Cabo Delgado—and 'ISIS,' 'ASWJ,' or 'Islamic State' as alternate names in the media. Yet even as of June 2018, the insurgency remained a "mystery because it ha[dn]'t publicly provided a clear outline of its motives or loyalties" (AP 2018). Hence, and even with some evidence that "pro-IS channels on Telegram cheered a deadly 27 May attack in Macomia" (BBC 2018), the insurgency's motives and tactics remained unclear to many outside observers prior to 2019.

This all changed following Cyclone Kenneth. The insurgency implemented a shift towards more direct vocalization of its intensions and agenda in the aftermath of these two cyclones. To this end, one widely circulated WhatsApp video featured an insurgent leader speak "frequently about Islam, and his desire for an 'Islamic government, not a government of unbelievers,'" whilst referencing alleged abuses by Mozambique's military and asserting that the Mozambican government was unfair (BBC 2020c). This was the first instance in which the ASWJ "spoke to the public" in a "clear gain of confidence," given that the faces in the video were unmasked (BBC 2020c). A related handwritten letter that emerged on social media in February 2020 provided further insight into ASWJ's intensions: to move further south in Mozambique (AP 2020). These increased expressions of a belief in an extreme form of Islamic governance—and an unwillingness to accommodate either the Mozambican government or "unbelievers"—shows greater willingness to (publicly) characterize civilians and society as ideological enemies following Cyclone Kenneth, in support of both scope conditions outlined earlier.

At the same time, we do not find comparable support for the notion that scarcity and pressures on consumption may have contributed to ASWJ's increasing use of violence against

civilians in the aftermath of Cyclones Idai and Kenneth.[5] Partly, this could be the result of an effective, coordinated response by international organizations and the government to address the immediate health and food security-related effects of Cyclones Kenneth and Idai—the result of "experience acquired from the previous outbreaks [...] particularly in healthcare assistance and services of sanitation and hygiene" (Cambaza et al. 2019, 6). Nevertheless, the damage inflicted on infrastructure was a cause for concern for aid workers, particularly for delivery of emergency food assistance (de Greef 2019). In this regard, the lack of specific evidence on resource-based insurgent motivations for violence does not preclude the possibility that at least some share of the attacks against civilians analyzed in our quantitative section were motivated by the goal of improving food security. That being said, organizations at the time did express fears in this context concerning insurgents' standard strategies of procuring food by forcing civilians to give up crop-shares (CoM 2019).

Already facing constraints on resource allocations even before the natural disaster strikes, using limited resources for disaster mitigation and relief further strains the regime. As a result, natural disasters such as cyclones can reduce a government's counterinsurgency capacity, which further limits the resources available for (i) fighting said ongoing conflict and (ii) countering the effects of the disaster itself (Eastin 2016; Nel and Righarts 2008; Koehnlein and Koren 2022). Likewise—and given the impacts of cyclones in particular—massive flooding and destruction of transportation networks can further undermine the government's ability to actively access disaster-affected regions, reducing its physical presence locally. Under these circumstances, the government's attention is diverted, which creates opportunities for insurgents to exploit this expanding governance vacuum, accelerating a decline in the government's administrative and

[5] As has been shown at times in the contexts of droughts (Bagozzi, Koren, and Mukherjee 2017).

military capacity. At the same time, as more people come under the group's *de facto* control, insurgents may find themselves unable to effectively control the territory, or they might simply be uninterested in doing so. This, in turn, could give the group incentives to engage in violence without consequences (Mkandawire 2002).

However, in Mozambique, "little work has been done to either engage politically with the insurgents or to rein in the leaders," suggesting there is a lack of appetite for negotiations on either side of the conflict in Cabo Delgado (NS 2022, 23421B). In fact, a combined force of 2,000 to 3,000 troops from Rwanda and the South African Development Community were deployed in 2021 to "help the beleaguered Mozambican army" in the face of continued beheadings, shootings, and kidnappings of civilians in Cabo Delgado, and the continued targeting of army camps and "Christian" villages (NS 2022, 23421A; Cook 2022, 2). The continued attacks on civilians and government forces that do not conform to ASWJ's efforts to "supplant the secular state with Islamic Sharia law-based governance" aligns with our findings for our first and second scope conditions that insurgents are targeting attacks on the "population that does not support them" (Cook 2022, 2; Njelezi 2022, 363; Mashimbye 2022, 65).

Other scholars have identified the capture and consolidation of territory from the government into rebel control to likely result in a "negotiated settlement" (Wood and Kathman 2014, 701), but there is little evidence to suggest that ASWJ has successfully captured territory from the regime. On the one hand, "attacks on civilians" can, it has been argued, "increase the likelihood that insurgents achieve concessions" from the government, which implies that "violence is an effective strategy through which rebels can achieve their goals" (Wood and Kathman 2014, 702). On the other hand, as noted above, there has been little in the way of negotiations between the insurgents and government forces regarding attacks in Cabo Delgado. Although Kreutz (2012,

486) finds that democratic governments are more likely to "offer concessions to an armed opponent in the wake of a natural disaster" due to "scarce resources, sympathy for the victims, and cooperation in disaster management," they argue that autocracies are not subject to the same pressure for "political survival." Wood and Kathman (2014, 701), however, find that conflicts in democratic states are "no more likely to terminate via negotiated settlement" than conflicts in autocratic states. It could be argued that resource challenges have undermined the Mozambican government's ability to effectively deliver aid to civilians, restore infrastructure, and quell the spread of disease whilst simultaneously combatting insurgents. It is likely the fact that ASWJ is socially disembedded that leaves it less of a threat as it fails to capitalize on discontent among civilians, be it from Cabo Delgado's status as an especially poor region (Matsinhe and Valoi 2019, 13; Feijó 2020, 2; Morier-Genoud 2020, 396-397) or from challenges delivering aid post-Cyclones (de Greef 2019; CoM 2019).

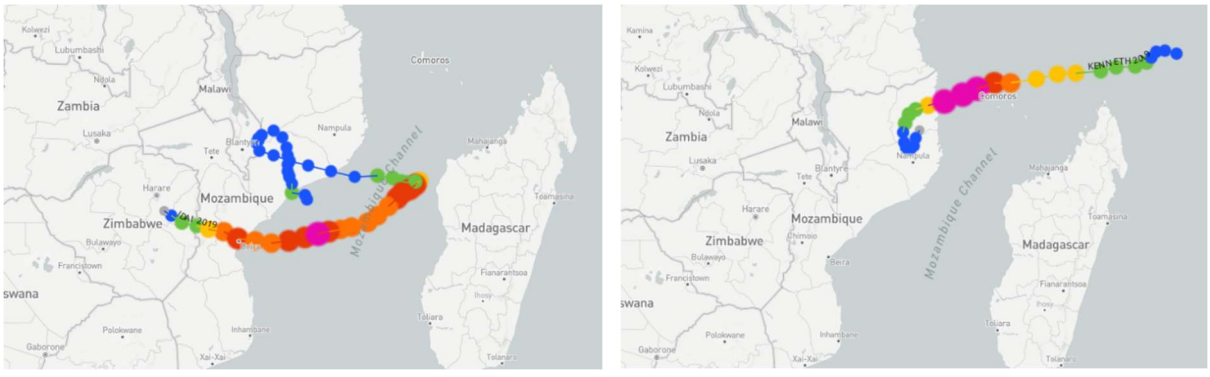
In sum, although the extant research suggests that Cabo Delgado's insurgents could have responded to Cyclones Idai and Kenneth by adopting a long-term perspective on cooperation with proximate civilians, and by building up their capacities and attacking the weakened government, there is more support for behaviors that contradict this approach. Partly, this could be because grievances were not as widespread in the wake of Cyclones Idai and Kenneth as in other post-disaster contexts, thereby limiting the ASWJ's ability to increase their support peacefully by building on widespread resentment, especially considering there was a relative absence of civilian unrest targeted at the government's response. Yet, this cannot fully explain the rise in ASWJ's violence against civilians. Indeed, while both cyclones may have impeded the government's capacity to combat insurgents in the immediate aftermath of the cyclones, the military's renewed campaign against the insurgency (with external assistance) starting in October 2019 suggests that these capacity limitations were short lived. A set of more constant, if not increasing, factors in

this case relate to the two scope conditions discussed earlier. Since ASWJ's inception, the group exhibited signs of being socially disembedded from the local population, both in its ideology and in its behaviors towards this population. Likewise, ASWJ showed a clear trajectory towards increasingly using its tactics and resources to signal ideological kinship with IS during our period of analysis, and especially following Cyclones Idai and Kenneth. The results of this qualitative assessment hence strongly reaffirm the scope conditions outlined in our main paper, while providing secondary evidence for our quantitative findings concerning an increase in insurgent violence against civilians resulting from Cyclones Idai and Kenneth.

Spatial and Time Series Plots

Figure A.1: Historical Tracks of Cyclone Idai and Cyclone Kenneth, Plotted Using NOAA's Historical Hurricane Tracks Utility[6]

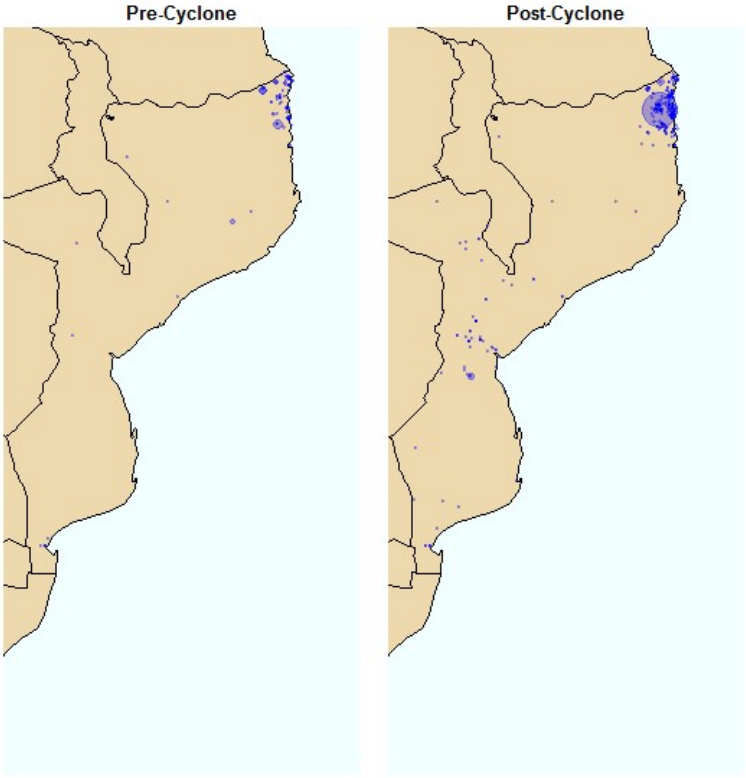
A.1a: Cyclone Idai *A.1b: Cyclone Kenneth*



Color Legend: Tropical Depression (Blue), Tropical Storm (Green), Category 1 (Yellow), Category 2 (Orange), Category 3 (Red), Category 4 (Magenta)

[6]https://coast.noaa.gov/hurricanes/#map=4/32/-80

Figure A.2: ACLED-derived Non-Governmental Violence against Civilians in Mozambique for 1st March, 2018-13th March, 2019 (left) and 14th March 2019-30th April 2020 (right)



Note: Individual events plotted, scaled by fatalities/10. Unlike the primary *Insurg.→Civ. Violence* dependent variable used in the time series analysis, Figure A.2 also plots insurgent violence against civilians perpetrated by any insurgent actor in ACLED in Mozambique, so as not to undercount violence arising outside of Cabo Delgado. The plotted Cabo Delgado events still correspond to those pertaining only to ASWJ, as defined in the main paper.

Figure A.3: Weekly Insg.→Civ. Violence, March 2018 – April 2020

A.3a: Full Time Series *A.3b: Full ACF*

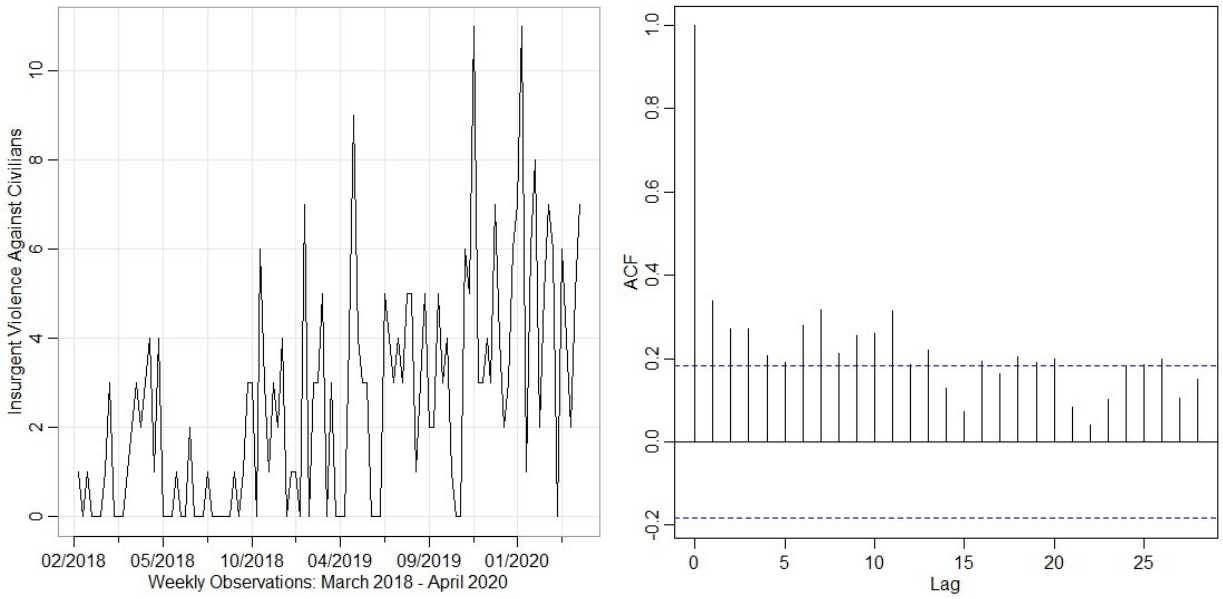


Figure A.4: Weekly Insg.→Civ. Violence, March 2018 – March 2019

A.4a: Pre-Cyclone Time Series *A.4b: Pre-Cyclone ACF*

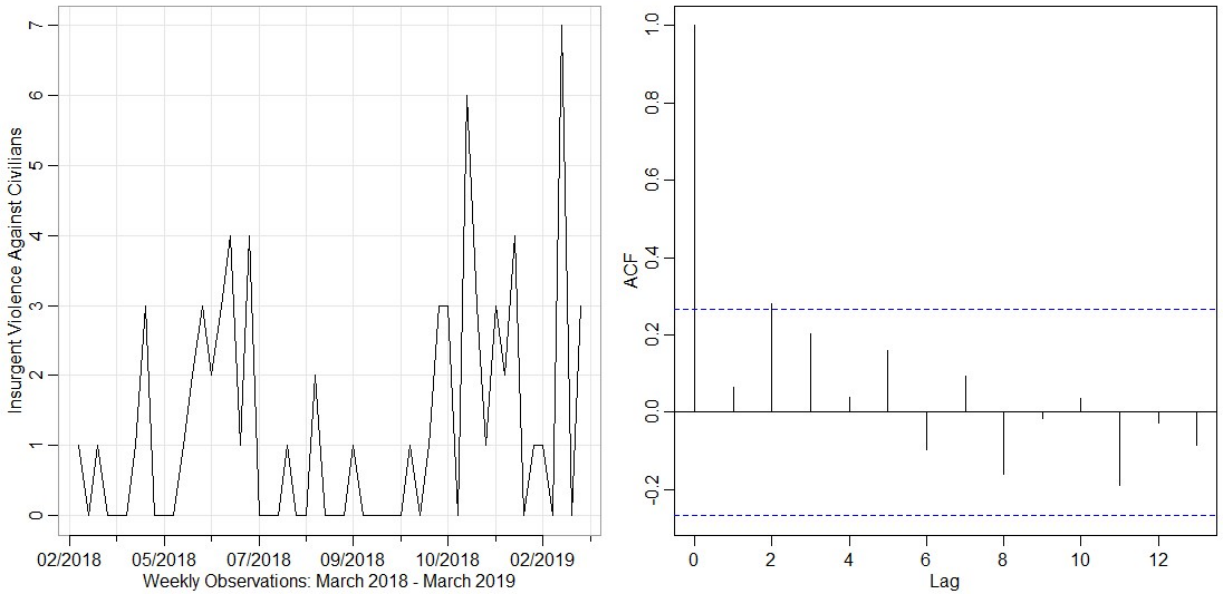


Figure A.5: Weekly Insg.→Civ. Violence, March 2019 – April 2020

A.5a: Post-Cyclone Time Series *A.5b: Post-Cyclone ACF*

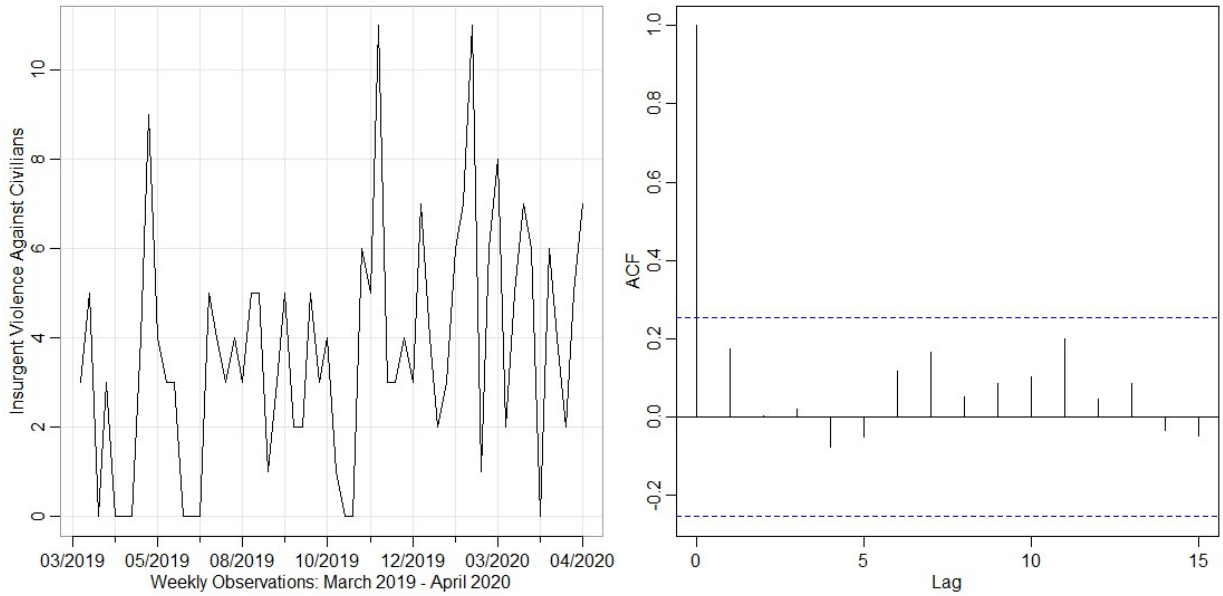
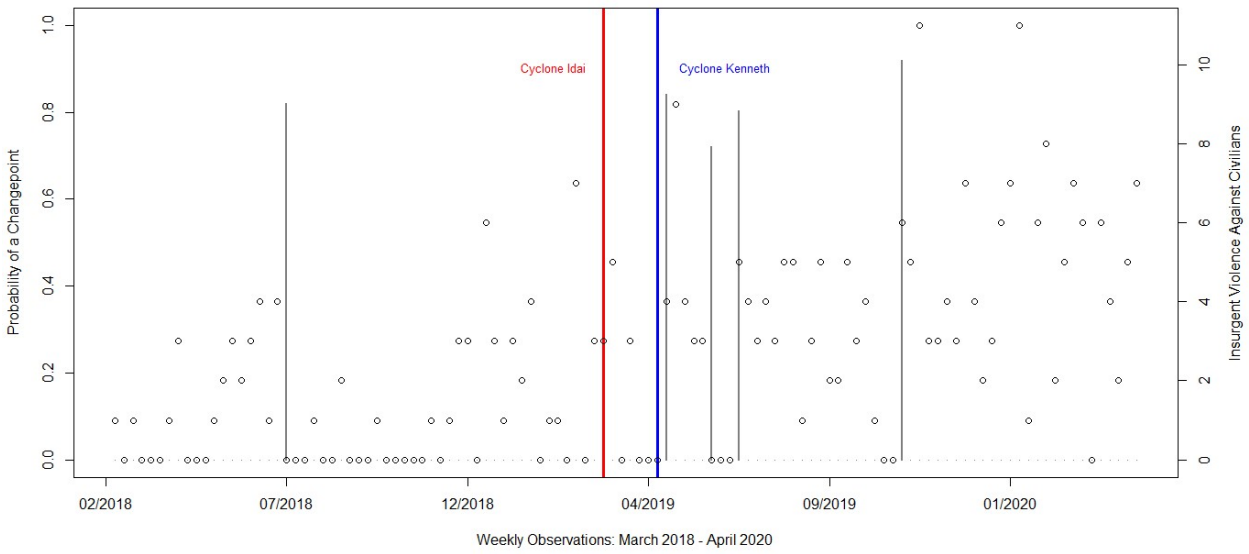


Figure A.6: Changepoint Probabilities Greater than 0.50 for Insurgent Violence, When Using a Changepoint Model for Non-Overdispersed Count Data



Summary Statistics

Table A.1: Summary Statistics

	Median	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Inurg.→Civ. Violence	2.000	2.561	2.545	0.000	11.000
Cyclone	1.000	0.526	0.502	0.000	1.000
Gov.→Insg. Violence	0.000	0.202	0.612	0.000	4.000
Gov.→Insg. Violence$_{t-1}$	0.000	0.204	0.615	0.000	4.000
Insg.→Gov. Violence	0.000	0.325	0.658	0.000	4.000
Insg.→Gov. Violence$_{t-1}$	0.000	0.327	0.661	0.000	4.000
Insg.→Gov. Violence$_{t-2}$	0.000	0.313	0.644	0.000	4.000
Gov.→Civ. Violence	0.000	0.105	0.361	0.000	2.000
Gov.→Civ. Violence$_{t-1}$	0.000	0.106	0.363	0.000	2.000
Ext. Insurg. Violence	0.000	0.719	1.865	0.000	10.00
Ext. Insurg. Violence$_{t-1}$	0.000	0.726	1.872	0.000	10.00
Ext. Insurg. Violence$_{t-2}$	0.000	0.732	1.879	0.000	10.00
Russian Support	0.000	0.272	0.447	0.000	1.00

Robustness Models

Table A.2: PAR(p) Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado, Using a Cyclone Window that extends only after Cyclone Kenneth

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone Kenneth	0.679***	0.641***	0.626***	0.650***
	(0.181)	(0.201)	(0.209)	(0.237)
Gov.→Insg. Violence	0.169	0.245**	0.236*	0.223*
	(0.125)	(0.115)	(0.127)	(0.136)
Gov.→Insg. Violence$_{t-1}$	−0.608	−0.507**	−0.504**	−0.599**
	(0.280)	(0.236)	(0.243)	(0.231)
Insg.→Gov. Violence	.	0.005	−0.025	−0.121
		(0.138)	(0.149)	(0.163)
Insg.→Gov. Violence$_{t-1}$	.	0.235*	0.251*	0.311**
		(0.131)	(0.134)	(0.131)
Insg.→Gov. Violence$_{t-2}$	.	−0.264	−0.332	−0.427*
		(0.207)	(0.256)	(0.260)
Gov.→Civ. Violence	.	.	−0.176	−0.424
			(0.285)	(0.305)
Gov.→Civ. Violence$_{t-1}$	.	.	0.284	0.253
			(0.220)	(0.237)
Ext. Insg. Violence	.	.	.	−0.028
				(0.055)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.049
				(0.050)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.112*
				(0.067)
Russian Support	.	.	.	0.486
				(0.300)
ρ_1	0.284***	0.259***	0.273***	0.243***
	(0.081)	(0.084)	(0.083)	(0.092)
ρ_2	0.063	0.066	0.070	0.078
	(0.109)	(0.101)	(0.103)	(0.100)
Intercept	0.771***	0.745***	0.760***	0.712***
	(0.166)	(0.167)	(0.171)	(0.171)
Log Likelihood	-217.581	-214.943	-214.072	-209.767
AIC	445.163	445.885	448.144	447.535
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	14.034 (0.0001)	10.633 (0.005)	11.869 (0.003)	7.990 (0.018)
d.f.	107	103	101	97

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly data for 03/2018-04/2020.

Table A.3: PAR(p) Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado, Separately Controlling for the Immediate One Month Aftermath of Cyclones Idai and Kenneth

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	0.700***	0.671***	0.656 ***	0.650**
	(0.191)	(0.218)	(0.226)	(0.291)
Immediate Cyclone Aftermath	−0.478	−0.480	−0.449	−0.357
	(0.388)	(0.372)	(0.383)	(0.495)
Gov.→Insg. Violence	0.164	0.239**	0.226*	0.229*
	(0.127)	(0.115)	(0.127)	(0.134)
Gov.→Insg. Violence$_{t-1}$	−0.619	−0.518**	−0.504**	−0.606**
	(0.291)	(0.242)	(0.247)	(0.239)
Insg.→Gov. Violence	.	−0.009	−0.037	−0.118
		(0.142)	(0.153)	(0.170)
Insg.→Gov. Violence$_{t-1}$	.	0.236*	0.252*	0.317**
		(0.131)	(0.134)	(0.131)
Insg.→Gov. Violence$_{t-2}$	.	−0.289	−0.359	−0.447*
		(0.211)	(0.260)	(0.272)
Gov.→Civ. Violence	.	.	−0.177	−0.419
			(0.289)	(0.310)
Gov.→Civ. Violence$_{t-1}$	.	.	0.287	0.253
			(0.224)	(0.243)
Ext. Insg. Violence	.	.	.	−0.027
				(0.058)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.049
				(0.051)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.109
				(0.067)
Russian Support	.	.	.	0.487
				(0.326)
ρ_1	0.292***	0.263***	0.275***	0.249***
	(0.080)	(0.083)	(0.082)	(0.093)
ρ_2	0.065	0.070	0.074	0.080
	(0.111)	(0.099)	(0.101)	(0.099)
Intercept	0.776***	0.755***	0.769***	0.711***
	(0.172)	(0.171)	(0.175)	(0.178)
Log Likelihood	-218.085	-215.315	-214.472	-210.437
AIC	448.190	448.631	450.945	450.874
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	15.569 (0.0004)	11.524 (0.003)	12.540 (0.002)	8.567 (0.014)
d.f.	106	102	100	96

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly data for 03/2018-04/2020.

Table A.4: PAR(p) Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado, Using Only ρ_1

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	0.619***	0.549***	0.720***	0.513**
	(0.166)	(0.193)	(0.170)	(0.227)
Gov.→Insg. Violence	0.167	0.246**	0.542*	0.207
	(0.126)	(0.116)	(0.125)	(0.138)
Gov.→Insg. Violence$_{t-1}$	−0.567**	−0.490**	−0.491**	−0.596**
	(0.307)	(0.243)	(0.248)	(0.241)
Insg.→Gov. Violence	.	0.043	0.015	−0.056
		(0.130)	(0.138)	(0.154)
Insg.→Gov. Violence$_{t-1}$	.	0.251**	0.263**	0.306**
		(0.121)	(0.215)	(0.125)
Insg.→Gov. Violence$_{t-2}$	.	−0.194	−0.263	−0.390*
		(0.181)	(0.215)	(0.238)
Gov.→Civ. Violence	.	.	−0.148	−0.394
			(0.267)	(0.286)
Gov.→Civ. Violence$_{t-1}$	.	.	0.299	0.251
			(0.203)	(0.224)
Ext. Insg. Violence	.	.	.	−0.004
				(0.051)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.055
				(0.050)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.095
				(0.061)
Russian Support	.	.	.	0.550*
				(0.297)
ρ_1	0.310***	0.284***	0.297***	0.281***
	(0.077)	(0.081)	(0.079)	(0.089)
Intercept	0.742***	0.708***	0.720***	0.665***
	(0.166)	(0.169)	(0.174)	(0.172)
Log Likelihood	-223.196	-217.224	-216.193	-211.557
AIC	454.393	448.448	450.386	449.115
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	16.201 (0.0001)	11.512 (0.001)	12.826 (0.0003)	8.809 (0.003)
d.f.	108	104	102	98

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly data for 03/2018-04/2020.

Table A.5: PAR(p) Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado with ρ_3

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	0.531***	0.500**	0.494**	0.496*
	(0.184)	(0.215)	(0.232)	(0.259)
Gov.→Insg. Violence	0.191	0.284**	0.328**	0.260
	(0.127)	(0.124)	(0.158)	(0.160)
Gov.→Insg. Violence$_{t-1}$	−0.661*	−0.458*	−0.437*	−0.606**
	(0.345)	(0.265)	(0.262)	(0.266)
Insg.→Gov. Violence	.	0.035	−0.011	−0.099
		(0.156)	(0.173)	(0.187)
Insg.→Gov. Violence$_{t-1}$	.	0.298**	0.362**	0.353**
		(0.144)	(0.178)	(0.154)
Insg.→Gov. Violence$_{t-2}$	.	−0.336	−0.676	−0.605
		(0.297)	(0.560)	(0.576)
Gov.→Civ. Violence	.	.	−0.108	−0.418
			(0.337)	(0.352)
Gov.→Civ. Violence$_{t-1}$	.	.	0.475	0.320
			(0.307)	(0.282)
Ext. Insg. Violence	.	.	.	−0.026
				(0.073)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.051
				(0.070)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.107
				(0.78)
Russian Support	.	.	.	0.661
				(0.480)
ρ_1	0.264***	0.248***	0.251***	0.251***
	(0.087)	(0.088)	(0.084)	(0.091)
ρ_2	0.048	0.057	0.073	0.069
	(0.107)	(0.099)	(0.091)	(0.100)
ρ_3	0.106	0.114	0.143	0.081
	(0.104)	(0.100)	(0.100)	(0.135)
Intercept	0.790***	0.744***	0.709***	0.685***
	(0.173)	(0.193)	(0.227)	(0.200)
Log Likelihood	-218.008	-215.616	-214.251	-210.39
AIC	448.015	449.231	450.501	450.780
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	15.119 (0.002)	13.481 (0.004)	18.331 (0.0004)	9.533 (0.023)
d.f.	106	102	100	96

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly data for 03/2018-04/2020.

Table A.6: PAR(p) Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado, Controlling for First Islamic State Interaction in Time Series

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	0.866***	0.781**	0.800**	0.753**
	(0.282)	(0.314)	(0.312)	(0.353)
Gov.→Insg. Violence	0.114	0.193	0.168	0.146
	(0.146)	(0.148)	(0.165)	(0.199)
Gov.→Insg. Violence$_{t-1}$	−0.435*	−0.409*	−0.398*	−0.522**
	(0.257)	(0.234)	(0.229)	(0.259)
Insg.→Gov. Violence	.	0.043	−0.014	−0.061
		(0.135)	(0.144)	(0.174)
Insg.→Gov. Violence$_{t-1}$	.	0.244*	0.252*	0.307**
		(0.130)	(0.134)	(0.147)
Insg.→Gov. Violence$_{t-2}$	.	−0.173	−0.243	−0.409
		(0.200)	(0.251)	(0.291)
Gov.→Civ. Violence	.	.	−0.139	−0.406
			(0.275)	(0.315)
Gov.→Civ. Violence$_{t-1}$	.	.	0.337	0.299
			(0.219)	(0.251)
Ext. Insg. Violence	.	.	.	−0.007
				(0.055)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.060
				(0.053)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.091
				(0.065)
Russian Support	.	.	.	0.571*
				(0.311)
IS Support	−0.603*	−0.605	−0.640*	−0.611
	(0.319)	(0.369)	(0.353)	(0.462)
ρ_1	0.230**	0.223**	0.230**	0.230**
	(0.106)	(0.082)	(0.105)	(0.106)
ρ_2	0.097	0.082	0.083	0.088
	(0.094)	(0.091)	(0.093)	(0.096)
Intercept	1.077***	1.064***	1.083***	1.022***
	(0.167)	(0.178)	(0.174)	(0.224)
Log Likelihood	-218.514	-215.667	-214.626	-210.272
AIC	449.028	449.533	450.251	450.543
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	6.544	5.467	5.492	5.769
	(0.038)	(0.065)	(0.064)	(0.055)
d.f.	106	102	100	96

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly data for 03/2018-04/2020.

Table A.7: Poisson Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	1.085***	0.986***	0.963***	0.773***
	(0.139)	(0.151)	(0.153)	(0.172)
Gov.→Insg. Violence	0.030	0.051	0.017	−0.029
	(0.090)	(0.092)	(0.096)	(0.099)
Gov.→Insg. Violence$_{t-1}$	−0.187	−0.186*	−0.158	−0.246**
	(0.108)	(0.109)	(0.110)	(0.114)
Insg.→Gov. Violence	.	0.061	−0.053	0.009
		(0.078)	(0.079)	(0.084)
Insg.→Gov. Violence$_{t-1}$	.	0.168**	0.167**	0.180**
		(0.076)	(0.075)	(0.079)
Insg.→Gov. Violence$_{t-2}$	.	−0.085	−0.100	−0.172*
		(0.091)	(0.093)	(0.097)
Gov.→Civ. Violence	.	.	−0.119	−0.297*
			(0.151)	(0.160)
Gov.→Civ. Violence$_{t-1}$	.	.	0.304**	0.239*
			(0.131)	(0.142)
Ext. Insg. Violence	.	.	.	−0.006
				(0.031)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.034
				(0.029)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.048
				(0.032)
Russian Support	.	.	.	0.539***
				(0.163)
Intercept	0.265***	0.265**	0.261***	0.294***
	(0.122)	(0.123)	(0.123)	(0.125)
Log Likelihood	-240.222	-235.754	-233.242	-225.600
AIC	488.44	485.51	484.48	477.20
d.f.	109	105	103	99

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. Weekly data for 03/2018-04/2020.

Table A.8: Negative Binomial Models of Weekly Insurgent Violence Against Civilians in Cabo Delgado

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	1.078**	0.986***	0.956***	0.773***
	(0.191)	(0.208)	(0.208)	(0.222)
Gov.→Insg. Violence	-0.022	0.037	0.017	−0.036
	(0.146)	(0.145)	(0.145)	(0.140)
Gov.→Insg. Violence$_{t-1}$	−0.168	−0.184	−0.162	−0.248
	(0.157)	(0.156)	(0.145)	(0.152)
Insg.→Gov. Violence	.	0.081	0.076	0.026
		(0.129)	(0.127)	(0.123)
Insg.→Gov. Violence$_{t-1}$	.	0.162	0.160	0.161
		(0.131)	(0.128)	(0.124)
Insg.→Gov. Violence$_{t-2}$	.	−0.107	−0.104	−0.157
		(0.141)	(0.139)	(0.136)
Gov.→Civ. Violence	.	.	−0.121	−0.301
			(0.234)	(0.233)
Gov.→Civ. Violence$_{t-1}$	.	.	0.312	0.252
			(0.221)	(0.218)
Ext. Insg. Violence	.	.	.	−0.007
				(0.044)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.031
				(0.043)
Ext. Insg. Violence$_{t-2}$	.	.	.	−0.052
				(0.046)
Russian Support	.	.	.	0.531**
				(0.240)
Intercept	0.267*	0.270*	0.261*	0.299**
	(0.154)	(0.154)	(0.153)	(0.150)
θ	2.143	2.359	2.517	3.240
	(0.674)	(0.779)	(0.865)	(1.320)
Log Likelihood	-225.222	-222.919	-221.906	-218.732
AIC	466.44	461.84	463.81	465.46
d.f.	109	105	103	99

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. Weekly data for 03/2018-04/2020.

Table A.9: PAR(p) Models of Monthly Insurgent Violence Against Civilians in Cabo Delgado

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	1.353***	1.057***	1.185**	3.175**
	(0.405)	(0.430)	(0.451)	(1.298)
Gov.→Insg. Violence	−0.151	−0.198*	−0.152	−0.695**
	(0.136)	(0.120)	(0.100)	(0.863)
Gov.→Insg. Violence$_{t-1}$	0.100**	0.083*	0.985*	0.271*
	(0.047)	(0.052)	(0.049)	(0.146)
Insg.→Gov. Violence	.	−0.056	−0.028	−0.352
		(0.067)	(0.055)	(0.233)
Insg.→Gov. Violence$_{t-1}$	.	0.129**	0.069	0.778*
		(0.060)	(0.057)	(0.468)
Insg.→Gov. Violence$_{t-2}$	.	0.106	0.024	0.164
		(0.068)	(0.075)	(0.411)
Gov.→Civ. Violence	.	.	0.143	0.101
			(0.097)	(0.430)
Gov.→Civ. Violence$_{t-1}$	.	.	0.135	0.367
			(0.095)	(0.450)
Ext. Insg. Violence	.	.	.	−0.312*
				(0.170)
Ext. Insg. Violence$_{t-1}$	.	.	.	0.279
				(0.197)
Ext. Insg. Violence$_{t-2}$	.	.	.	0.432**
				(0.170)
Russian Support	.	.	.	−4.385**
				(1.985)
ρ_1	0.095	0.021	-0.006	0.106
	(0.116)	(0.115)	(0.115)	(0.102)
ρ_2	0.251**	0.244	0.164	0.376***
	(0.120)	(0.181)	(0.128)	(0.139)
Intercept	1.455***	1.512***	1.328***	-0.450
	(0.388)	(0.434)	(0.446)	(1.320)
Log Likelihood	-72.371	-64.607	-62.494	-47.786
AIC	154.742	145.213	144.989	123.572
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	3.897 (0.142)	1.279 (0.528)	1.095 (0.578)	6.629 (0.038)
d.f.	19	15	13	9

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Monthly data for 03/2018-04/2020.

Table A.10: Baseline Cyclone Specifications for Insurgent Violence Against Civilians in Cabo Delgado

	Main Model	**Cyclone Kenneth Model**	**Immediate 1-month Aftermath Model**	**Model Using Only ρ_1**	**Model Adding ρ_3**	**Model with IS Control**	**Poisson Model**	**NegBin Model**	**Monthly Model**
Cyclone	0.369*	.	0.502**	0.443**	0.319	0.709**	1.068***	1.068***	1.056***
	(0.221)		(0.244)	(0.196)	(0.241)	(0.290)	(0.138)	(0.189)	(0.358)
Cyclone Kenneth	.	0.514**		.	.	.	.	.	.
		(0.230)							
Immediate Aftermath	.	.	-0.434	.	.	.	.	.	.
			(0.424)						
IS Support	.	.	.	.	.	-0.586**	.	.	.
						(0.283)			
ρ_1	0.382***	0.381***	0.383***	0.392***	0.386***	0.278***	.	.	0.031
	(0.072)	(0.067)	(0.068)	(0.056)	(0.067)	(0.1020			(0.101)
ρ_2	0.134	0.108	0.113	.	0.096	0.149	.	.	0.215***
	(0.134)	(0.135)	(0.136)		(0.152)	(0.114)			(0.079)
ρ_3	.	.	.	.	0.083	.	.	.	.
					(0.157)				
Intercept	0.995***	0.922***	0.954***	0.904***	1.065***	1.177***	0.245**	0.245	1.740***
	(0.239)	(0.235)	(0.243)	(0.203)	(0.277)	(0.158)	(0.120)	(0.153)	(0.336)
θ	.	.	.	.	.	.	.	2.096	.
								(0.644)	
Log-like	-226.330	-225.347	-225.713	-226.982	-223.481	-225.138	-242.958	-227.004	-80.939
AIC	458.659	456.694	459.428	457.946	454.964	458.276	489.92	460.01	167.878
$\chi^2_{df=p}$, H_0: Poisson (p-value)	50.116 (0.000)	49.039 (0.000)	50.396 (0.000)	48.368 (0.000)	51.908 (0.000)	16.057 (0.000)	.	.	6.739 (0.034)
d.f.	110	110	109	111	109	109	112	112	22

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly or monthly data for 03/2018-04/2020.

Table A.11: PAR(p) Models of Weekly Insurgent Violence Against Civilians in Somalia

	Model 1	**Model 2**	**Model 3**	**Model 4**
Cyclone	-0.097	-0.139	-0.391	-0.701
	(0.409)	(0.438)	(0.476)	(0.665)
Gov.→Insg. Violence	-0.479^{***}	-0.465^{**}	-0.403^{**}	-0.421^{**}
	(0.178)	(0.188)	(0.182)	(0.178)
Gov.→Insg. Violence$_{t-1}$	0.359^{**}	0.369^{**}	0.323^{**}	0.295^{*}
	(0.105)	(0.109)	(0.133)	(0.165)
Insg.→Gov. Violence	.	0.054	0.114	0.073
		(0.191)	(0.193)	(0.184)
Gov.→Civ. Violence	.	.	-4.477	-2.932
			(8.864)	(3.851)
Gov.→Civ. Violence$_{t-1}$	.	.	-1.484	-1.423^{*}
			(0.826)	(0.868)
Ext. Insg. Violence	.	.	.	-0.001
				(0.011)
Russian Support	.	.	.	0.477
				(0.563)
ρ_1	0.212	0.211	0.201	0.187
	(0.168)	(0.166)	(0.141)	(0.150)
Intercept	-0.177	-0.242	-0.028	0.103
	(0.373)	(0.436)	(0.428)	(0.485)
Log Likelihood	-115.312	-115.272	-111.625	-111.295
AIC	238.625	240.545	237.251	250.589
$\chi^2_{df=p}$, H_0: Poisson Model (p-value)	1.542 (0.214)	1.542 (0.214)	1.917 (0.166)	1.421 (0.233)
d.f.	108	107	105	103

Note: *p<0.1; **p<0.05; ***p<0.01. Standard errors in parentheses. ρ_i denotes the autoregressive lag coefficient at lag i. Weekly data for 03/2018-04/2020.

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