Pax Pandemica? The Impact of COVID-19 on Non-state Actor Violence

Dawn Brancati[a,1]**, Johanna K Birnir**[b]**, and Qutaiba Idlbi**[c]

[a] Yale University; [b] University of Maryland; [c] Middle East Institute

Experts, and much research on natural disasters, expects the COVID-19 pandemic to have increased violence by non-state actors due to a reduction in state capacity following diminished economic growth. To shed light on this issue, we analyzed the relationship between the pandemic and violence initiated by the Islamic State of Iraq and Syria. In the period analyzed, we only find robust evidence of the pandemic being associated with increased violence in Iraq – where military spending was not cut despite declining growth, but where US and Iraqi active forces were significantly reduced to prevent the spread of disease among them. At the same time, lockdown measures (i.e., curfews and travel bans) prevalent in the pandemic had the opposite effect of significantly reducing and/or displacing violent events. These results not only help to resolve contradictory findings on disasters, but also offer novel insights into the effectiveness of common counterinsurgency tools.

COVID-19 | Intra-state violence | ISIS |

Calling for a global cease fire in the face of the COVID-19 pandemic, United Nations Secretary General António Guterres declared that "[t]he fury of the virus illustrates the folly of war."[1] Experts have widely feared, however, that such prognostications are overly optimistic, especially in the case of violence within states (Ottaway, 2020; Knights, 2020). Even if the pandemic dampens wars between states weakened by the crisis, these experts predict that the pandemic will intensify violence within states as non-state actors, such as the Islamic State of Iraq and Syria (ISIS), take advantage of the increased demands that the pandemic has placed on the financial and security resources of states to escalate attacks. As Mac Thornberry, the ranking member of the US House Armed Services Committee, prophesizes, "The world is not going to be any safer on the other side of COVID-19."[2]

These concerns are well-founded. Pandemics are a type of natural disaster[3] and there is considerable evidence that natural disasters can exacerbate large-scale intrastate violence by weakening the capacity of states to repress violence through reduced economic growth and military spending (Miguel et al., 2004; Nel and Righarts, 2008). Since disease outbreaks can substantially reduce economic growth, it is reasonable to expect the COVID-19 pandemic to have similar effects on violence as other natural disasters. However, while epidemiological disasters can have negative effects on growth, they are also different from other natural disasters in ways that do not clearly favor non-state actors.

Our goal is, thus, to evaluate the effect of the COVID-19 pandemic on non-state actor violence and to identify the potential mechanisms responsible for this effect. We examine existing arguments about the effect of natural disasters on state capacity, as well as our own arguments about the ways in which the pandemic is likely to have limited the capacity of non-states actors to conduct violence due to the prevalence of lockdown measures. Specifically, we argue that curfews and travel bans, by making it logistically more difficult for non-state actors to conduct attacks, are likely to not only reduce the overall number of attacks, but to also alter their location.

In our empirical analysis of these questions, we take a multi-pronged approach. To start, we conduct two separate statistical analyses using original geo-coded data on the pandemic and violence. The first looks broadly at the overall effect on the pandemic at the state-level in order to evaluate state-capacity arguments about natural disasters. We focus on ISIS in our analysis because it explicitly pledged to capitalize on the pandemic to increase attacks and has been the source of greatest international concern as a result. The second analysis examines the effect of curfews and travel bans at the governorate-level on the number of and location of ISIS attacks. We further probe their effect on the displacement of violence using geographic information system (GIS) mapping. Finally, to drill down on our quantitative findings, we conducted a qualitative analysis of the pandemic, drawing on semi-structured interviews that we conducted with government officials, policy experts, and locals.

In brief, in our state-level analysis, we only find evidence of an overall effect of the pandemic on ISIS-initiated violent events in Iraq, where the pandemic is associated with a greater number of attacks. Our qualitative analysis suggests that this increase in violence is most likely due to reduced military activity intended to limit the spread of disease among anti-ISIS forces, and not a decline in economic growth or diminished military spending. At the same time, our governorate-level quantitative analyses (statistical and GIS) reveal that curfews and internal travel bans are more generally associated with either a reduction in the number of ISIS-initiated violent events and/or the displacement of these events away from high population and non-base areas.

Taken together, these analyses suggest a more nuanced relationship between natural disasters, state capacity, and violence than the existing literature posits in terms of economic growth and security spending. It also highlights the importance of

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[1] António Guterres, "Transcript of the Secretary-General's Virtual Press Encounter on the Appeal for Global Ceasefire," United Nations, New York, 23 March 2020.

[2] "Dems Want to Cut Defense Budget Amid ISIS Threat," *The Boston Herald*, 21 May 2020.

[3] A pandemic is an "an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people" (Last et al., 2000). Natural disasters: "are naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis and volcanic activity), hydrological (avalanches and floods), climatological (extreme temperatures, drought and wildfires), meteorological (cyclones and storms/wave surges) or biological (disease epidemics and insect/animal plagues)." See: International Federation of Red Cross and Red Crescent Societies, $https://www.ifrc.org.$ Accessed 3 March 2021.

[1] Corresponding author E-mail: dawn.brancati@yale.edu

disaggregating the effects of natural disasters on conflict, as some aspects of disasters may exacerbate conflict while others may reduce it. The analysis has further implications for studies of intrastate conflict in general, offering novel evidence of the effects of two common counterinsurgency tools, curfews and travel bans, on the intensity and location of intrastate violence.

The Natural Disaster-Conflict Nexus

Natural disasters are argued to intensify various forms of intrastate conflict, ranging from small-scale violence against states, such as protests and riots, as well as large-scale conflicts, including civil wars, primarily through their negative effects on the economy. The specific ways in which the economic effects of natural disasters give rise to conflict depends on the type of violence. Competition for scarce resources is thought to be associated with communal conflict (Butler and Gates, 2012), while economic grievances are believed to be more commonly associated with small-scale protests, riots and strikes (Brancati, 2007; Hendrix and Salehyan, 2012). The primary way that the negative economic effects of natural disasters are believed to affect the type of large-scale, anti-government violence that is of interest in this study is by limiting the capacity of states to repress rebellion.

Natural disasters are argued to weaken the capacity of states to repress rebellion by reducing economic development and growth (Miguel et al., 2004; Bergholt and Lujala, 2012; Devitt and Tol, 2012; Nel and Righarts, 2008). A decline in economic development is hypothesized to reduce state capacity by diminishing government revenue and, thus, military spending. Reduced income also lowers the opportunity costs for individuals to join rebel groups (Miguel et al., 2004; Koubi et al., 2012). Weak state capacity, in turn, according to the literature, leads to violence because it prevents governments from repressing violent acts initiated by non-state actors (Fearon and Laitin, 2003; Wood and Wright, 2016).

Arguments about state capacity are typically tested in either one of two ways – either by statistically analyzing the relationship of the disasters themselves to violence or by testing the relationship of disasters to GDP per capita (or GDP per capita growth) and the latter, in turn, to violence. These analyses have produced mixed results with the conclusions varying depending on the type of disaster analyzed, as well as the data, measures, and methods employed (Miguel et al., 2004; Miguel and Satyanath, 2011; Ciccone, 2011; Devitt and Tol, 2012; Bergholt and Lujala, 2012; Koubi et al., 2012).[4]

Although the literature on natural disasters is far from conclusive, its implications for epidemiological disasters, and the COVID-19 pandemic in particular, are clear. Like other natural disasters, the COVID-19 pandemic has reduced economic growth. Most developed economies recorded negative growth in 2020, the first year of the COVID-19 pandemic, due primarily to the lockdown measures used to contain the virus's spread.[5] Much of the literature on natural disasters, therefore, predicts that the COVID-19 pandemic would result in decreased state capacity and a concomitant increase in intrastate violence.

The Pandemic-Conflict Nexus

The effect of the COVID-19 pandemic on intrastate conflict is more complex. The same lockdown measures that have arguably reduced the capacity of states to repress non-state actors, have also potentially undermined the capacity of non-state actors to engage in violence. These lockdown measures include curfews, which limit the number, time, and reasons that people may gather in public and privates spaces, as well as travel restrictions, which restrict the movement of people within and among states. These measures are utilized in other types of natural disasters, but they are more prevalent, less localized, and longer-lasting in epidemiological disasters. Every state in the world imposed lockdown measures at some point during the COVID-19 pandemic.[6]

These restrictions can undermine the fighting capacity of non-state actors by straining them economically, much the same way that they can undermine the capacity of states to wage counterinsurgencies against non-state actors. Curfews and travel restrictions can impede the operation of groups' legal and illegal businesses, which can range from the selling of natural resources, such as oil, gas and minerals, to real estate, car dealerships, and even fish farms (Kenner, 2019). They can also reduce the amount of money non-state actors receive from donations, collect from taxes, and extort from individuals. Travel restrictions can make it especially difficult for non-state actors to smuggle goods, including weapons, as well as fighters across borders. The extent to which these restrictions strain the resources of non-state actors depends substantially on how well the restrictions are enforced, with more stringent restrictions having a greater effect.

These lockdown measures can also have distinct effects on non-state actors by making it logistically more difficult for non-state actors to engage in violence. Unlike the financial repercussions of these restrictions, the logistical impact of these measures ought to be immediate and short-lived, lasting only so long as they are in place. Curfews can make it more difficult for fighters to hide their movements and lead them to restrict their activities to nightfall, or divert them to less populated areas where curfews leave them less exposed. At the same time, internal travel restrictions, which prohibit people from moving around within countries, can make it more difficult for non-state actors to conduct attacks outside their base areas. As in the case of curfews, if limitations in movements reduce the number of attractive targets available to non-state actors, internal travel restrictions can also reduce the overall level of violence in states.

Data and Measures

In our empirical analysis, we focus on a single non-state in order to test the effect of the COVID-19 pandemic on violence in a very fine-grained way. We focus on ISIS because it explicitly pledged to escalate attacks in the wake of the pandemic, calling COVID-19 a "soldier of Allah," and provoked the most international concern for this reason.[7] According

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[4] The only study that we are aware of that analyzes the effect of epidemiological disasters on intrastate violence analyzes epidemics together with insect manifestations as an "other" category in a study of all natural disasters, and does not find a statistically significant relationship between them and conflict (Nel and Righarts, 2008).

[5] "Pandemic, Recession: The Global Economy in Crisis," The World Bank, June 2020.

[6] See: International Air Transport Association, https://www.iatatravelcentre.com/world.php. Date Accessed 21 May 2021.

[7] Rosemary DiCarlo, "Remarks by United Nations Under–Secretary–General for Political and Peace-

to the UN High Commissioner for Human Rights, Michelle Bachelet, when it comes to ISIS, COVID-19 is "a ticking time-bomb."[8] ISIS can also teach us a lot about the likely effect of the pandemic on other groups. While all non-state actors are different, all of them, regardless of their goals, strategies, and structures, ought to be harmed financially and logistically by government-imposed lockdown measures, albeit to varying degrees based on these differences and the stringency of the measures.

We further focus our analysis on the three countries in which ISIS has the largest presence on the ground – Egypt, Iraq and Syria. Importantly, these states provide significant variation in their exposure to the pandemic, levels of development, and regime structure. Our quantitative analysis of these countries tracks the number of ISIS attacks that occurred over a 78-week period between 31 December 2018 and 28 June 2020. The data is such that for every week in 2020 observed under COVID-19, the same week in 2019 is observed not under COVID-19. In other analyses, we explore the overall effect of the pandemic on ISIS in any country in which ISIS, or its affiliates, has a presence, however small. In these analyses, we do not find any robust, statistically significant relationships between the pandemic overall and ISIS attacks (See Appendix).[9]

The data on the intensity of ISIS attacks in these countries is derived from the Armed Conflict Location and Event Data (ACLED) Project, which provides daily counts of violent events based on a range of local, regional, and national sources (e.g., government and military agencies, international organizations, research consultancy groups, local civilians, and news media) (2020).[10,11] To identify the initiator of the violence (not indicated in ACLED), we handcoded the events (with a very high rate of intercoder-reliability) based on the notes describing the violent events in ACLED as to whether ISIS was the initiator of the act, likely the initiator of the act, recipient of the act, or whether it was unclear if ISIS was the initiator or not.[12] The data on the pandemic are based on a multitude of local news sources and reports (See Codebook). Using these data, we constructed the following measures.

Dependent Variables

ISIS-initiated Violent Events: is the number of violent events reported to have been committed by ISIS, or reported to have likely been committed by ISIS, each week. In the analysis, there are 1,512 events in which ISIS was reported to have been the initiator of the violence; 198 events in which the initiator was likely to have been ISIS; and 187 events involving ISIS for which it was unclear whether ISIS was the initiator or not.[13] We measured separately the number of events in which the identity of the actor is unknown since these events may include some ISIS attacks. The results for events where the initiator is not clear or unknown are available in the supplementary appendix.[14]

Deadly ISIS-initiated Violent Events: is the number of violent events initiated by ISIS or likely initiated by ISIS involving at least one fatality. We measure deadly events separately based on information in the ACLED dataset on fatalities to gauge the severity of the attacks, and because events involving fatalities are less likely to suffer from underreporting bias (Cubukcu and Forst, 2018).

Independent Variables

COVID-19 Era (lag): identifies the start and end date of the COVID-19 pandemic in either Egypt, Iraq, or Syria based on the number of reported deaths from COVID-19 in a state per week. We follow the convention in the literature by using the pandemic as a proxy for state capacity.[15] Using multiple news sources, a week is coded 1 if it coincides with or occurs after the first reported death in a country, and 0 if it occurs before the first reported death in a country, or if it occurs after the first reported death in a country but there are no reported deaths in this week and six weeks afterwards.

US COVID-19 Era (lag): identifies the start and end date of the COVID-19 pandemic in the US based on news sources using the same coding procedures as above. The onset of the COVID-19 pandemic in these countries is exogenous to the number of ISIS-initiated violent events although the severity and longevity of the pandemic is not necessarily exogenous to them.

COVID-19 Cumulative Deaths (lag): is the cumulative number of reported deaths from COVID-19 per week in Egypt, Iraq, and Syria. We expect state capacity to be positively correlated with the number of COVID-related deaths in a state, with a higher death toll indicative of less state capacity. The figures are based on the World Health Organization's (WHO) Coronavirus Disease (COVID-19) Situation Reports.[16] *US COVID-19 Cumulative Deaths (lag)*: is the cumulative number of reported deaths from COVID-19 per week in the United States based on these WHO reports.[17]

We also measure state capacity in terms of the number

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building Affairs Rosemary DiCarlo, Impact of COVID–19 on Conflict Dynamics and Mediation," Antalya Diplomatic Forum, 19 May 2020; Qassim Abdul-Zahra, Bassem Mroue and Samya Kullab, "ISIS Extremists Step Up as Iraq, Syria, Grapple with Coronavirus," *The Associated Press*, 4 March 2020; "Islamic State Seeks Comeback Under Cover of Coronavirus" *Al-Monitor*, 9 April 2020; "ISIS Attacks on Civilians on the Rise During Coronavirus Pandemic, Accuses UN," *Al Arabiya*, 8 May 2020; Jason M. Blazakis, "Is the Threat from ISIS Really More Significant Because of COVID-19," *The Hill*, 13 May 2020; "ISIS Exploits COVID-19 with Little Success, US Troop Deployments to Iraq on Track Despite Pandemic," *Military Times*, 8 May 2020; Louisa Loveluck and Mustafa Salim, "ISIS Exploits Iraq's Coronavirus Lockdown to Step Up Attacks," *The Washington Post*, 8 May 2020; "ISIS Seeks to Exploit Pandemic to Mount Resurgence in Iraq and Syria," *CNN*, 18 June 2020.

[8] Qassim Abdul-Zahra, Bassem Mroue and Samya Kullab, "ISIS Extremists Step Up as Iraq, Syria, Grapple with Coronavirus," *The Associated Press*, 4 March 2020.

[9] The attacks in these twenty-two countries comprise approximately one-third as many attacks as in Egypt, Iraq and Syria. The analyses suggest a potential increase in the total number of attacks, but not deadly attacks, in only one country – Niger – where there was less than two attacks on average per week.

[10] The violent event types for our subset of data include: battles, explosions/remote violence, strategic developments and violence against civilians. We dropped from these data the following sub-event types because they are non-violent events: agreements (e.g., troop surrenders), arrests, disrupted weapons use (e.g., seizures of weapons and the defusing of detonation devices prior to explosion), change to group/activity (e.g., movement of forces), and the discovery of mass graves.

[11] Given these sources' diversity, we do not think the reporting bias, typical of news-based count data (von Borzyskowski and Wahman, 2019), is an issue. We do not think reporting bias due to the pandemic is an issue either, because we would expect greater attention to ISIS attacks around the pandemic in all countries, but we only observe a change in attacks in Iraq.

[12] Two coders independently coded the events, with a third expert coder resolving discrepancies between the two. The intercoder reliability was high (95.86%).

[13] Our counts are consistent with the Significant Action (SIGACT) dataset for Iraq (Knights and Almeida, 2020).

[14] We believe that any measurement error due to the misattribution or lack of attribution of violent events to ISIS is not likely to vary systematically as a result of COVID-19 and not likely, therefore, to affect our results.

[15] We do not include GDP per capita, GDP growth, or military spending as measures of state capacity in our analysis as they are measured on a yearly basis, and are not available or reliable in the case of Syria.

[16] We recognize these figures are underestimates of the number of deaths due to the lack of testing and democratic freedoms in states, but they are the best available data. For this reason, we also include in the analysis a variable for the number of weeks that have passed since the first COVID-19 death in a country.

[17] We cross-validated the WHO figures with data from the Center for Disease Control (CDC), which are systematically higher and periodically revised as new information becomes available. We use the WHO data because we want the death rate to reflect the information available at the time of the violent events.

of attacks against ISIS. *Anti-ISIS Initiated Violent Events (lag)*: is the number of violent events per week perpetrated against ISIS using the same ACLED data as above. Within the analysis period, we expect state capacity to be greater, the more anti-ISIS attacks are conducted.[18] We consider any act, regardless of the identity of the actor, perpetrated against ISIS as an anti-ISIS initiated violent event. There are 905 anti-ISIS initiated violent events in the analysis.[19]

We measure the lockdown measures associated with the pandemic using individual measures for curfews and travel restrictions. *Curfews (lag)*: is a dichotomous measure of any official government-imposed restrictions limiting the movements of persons within a state. It is coded 1 if an official curfew is imposed in a governorate in a given week, and 0 otherwise. This measure is not limited to curfews imposed as a result of COVID-19. Since some curfews prior to COVID-19 were imposed due to ISIS, we created separate measures for ISIS and non-ISIS related curfews. To code these measures, we used local newspaper reports, as well as the UN's COVID-19 Situation Reports for Iraq and the COVID-19 Updates for Syria.

In order to determine if curfews not only reduce the number of attacks, but also displace them away from more populous areas, we measure the population of each governorate.[20] In our GIS analysis, we disaggregate the data further, coding the location of events within the governorate (e.g., the capital, other urban centers, and rural areas). We follow state administrative law in defining rural areas as those having less than 10,000 inhabitants, and urban areas as population centers exceeding 10,000 people.

Internal Travel Bans (lag): is a dichotomous measure of government-imposed restrictions on travel among governorates. It is coded 1 if there is an official ban on land and/or air travel for people and/or cargo/goods in a given week for any governorate, and 0 otherwise. These bans are not limited to the pandemic. Since some bans prior to COVID-19 were imposed due to ISIS, we created separate measures for ISIS and non-ISIS related bans. We collected these data using local newspaper reports and the UN's COVID-19 Situation Reports for Iraq. In order to determine if these bans not only reduce the number of attacks, but also cause them to be more concentrated, we create an indicator for base, which is coded 1 if a governorate has the most active ISIS cells, and 0 otherwise.

Control Variables

Ramadan (no lag): is a measure denoting the holy month of Ramadan, coded 1 if any part of a week falls within the month of Ramadan for any Islamic community in a country, and 0 otherwise. ISIS leaders consider Ramadan a "month of victories" and have previously called upon its soldiers to "make it, with God's permission, a month of pain for infidels everywhere" (Hubbard, 2016). If ISIS's pledge is not mere

rhetoric, and if anti-ISIS forces do not successfully pre-empt a Ramadan surge, Ramadan should be associated with a higher number of ISIS-initiated violent events.

Oil Price (lag): is the price of oil (dollars per barrel) in a given week according to the US Energy and Information Administration's Weekly Cushing (OK WTI Spot Price FOB) data. Oil prices are likely to significantly affect the state capacity of Iraq, which is dependent on oil for 90% of its revenue (but not that of Egypt or Syria) and, therefore, potentially associated with an increase in ISIS-initiated violent events in Iraq. Oil prices dropped substantially around the start of the pandemic for reasons independent of the pandemic, but subsequently recovered. The demand for oil also dropped significantly as a result of the pandemic, reducing oil revenue.

Descriptives

We begin by examining visually trends in the number of ISIS-initiated violent events per week in Egypt, Iraq, and Syria prior to and after the first reported death from COVID-19 in these countries. Figure 1 depicts these results.[21] The bars represent the number of events reported to have been initiated by ISIS or likely to have been initiated by ISIS each week. The color of the bars indicates the percentage of events in a given week that resulted in at least one fatality. Darker colors indicate a higher percentage of events resulting in fatalities. The red line depicts the number of violent events perpetrated against ISIS in the previous week.

As is apparent from the graphs, the frequency of ISIS-initiated violent events is highest in Iraq followed by Syria and Egypt. The difference in the number of events prior to and after the first reported death from COVID-19 is most apparent in Iraq. In Iraq, immediately after the first reported death, there was a decrease in the frequency of ISIS-initiated violent events, followed by a sharp increase to levels higher than any previous week in the analysis period. These events are noticeably less deadly. In Syria, there was an increase in the number of ISIS-initiated violent events, as well as the deadliness of these events, after the first death from COVID-19 compared to a lull in violence immediately prior to the first death, but not compared to the period outside this lull. In Egypt, there was no discernible pattern.

The pattern in deaths from COVID-19 in each country is notably different than the pattern in ISIS-initiated violent events. Iraq has the highest level of ISIS-initiated violence and the highest number of reported deaths from COVID-19, followed by Egypt and Syria. However, the cumulative number of reported deaths from COVID-19 increased monotonically in this period for all three countries, while the number of ISIS-initiated violent events did not.

In Iraq and Egypt, the frequency of ISIS-initiated violent events following the first death from COVID-19 appears to be related to the frequency of anti-ISIS violent events. In Iraq and Egypt, increases in ISIS-initiated violent events after the first COVID-19 death coincided with increases in anti-ISIS initiated violence, while declines in ISIS-initiated violence coincided with declines in anti-ISIS initiated violence. In Syria, the level of anti-ISIS initiated violence does not appear to fluctuate in any obvious ways related to the level of ISIS-initiated violence. In all three states, however, prior to the first

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[18] The number of Anti-ISIS attacks could also be viewed as an indication of ISIS's strength, in that no attacks would be needed were ISIS decimated.

[19] This measure does not account for non-violent actions initiated against ISIS, such as raids or weapons seizures. We do not measure anti-ISIS troop numbers because they generally cannot be separated out from the total number of military forces in states, and only vary at the year-level. We do not measure the number of ISIS fighters in countries because they are unreliable due to ISIS's elaborate tunnel system limiting the utility of satellite images to detect forces, sleeper cells, and the lack of an enforced border between Syria and Iraq (Rempfer, 2019; Jeffrey, 2019). Attacks themselves are typically used as a proxy for non-state actors' strength (Overgaard, 1994). Estimates of ISIS's financial resources are similarly unreliable and not included.

[20] The data are based on: Thomas Brinkhoff, *City Population*, http:// www.citypopulation.de. Date accessed: 1 January 2021.

[21] All figures in the paper were produced with ggplot2 (Wickham, 2016)

Fig. 1. Frequency of ISIS-initiated Violent Events

death from COVID-19, short-term changes in ISIS-initiated violence do not appear strongly related to short-term changes in anti-ISIS initiated violent events.

The Results

In order to distinguish the effect of the pandemic from factors that coincided with it, and to identify the specific pathways through which COVID-19 is potentially related to ISIS-initiated violence, we analyze the data statistically using negative binomial count models since the sample mean and variance are not equal. We include fixed effects for states, given variation in the strength of ISIS across countries, and we include interactions between state indicators and certain variables to identify differences in the effect of COVID-19 across countries. We use Wald Tests to assess the significance of the interaction effects (i.e., whether we can reject the null hypothesis that the coefficients for the main effects and interaction terms in a given model are simultaneously equal to zero) (Ramanathan, 2002, 156).[22] Additional models and tests, including those mentioned in the text but not depicted in the tables, are available in the appendix.

State-level Regression Results

Our first set of models examines the relationship between the indicator variables for the COVID-19 pandemic, as well as the number of deaths associated with it, and ISIS-initiated violent events per week. The unit of analysis is the state-week since all of the measures in this analysis vary at the state level. We use random effects for year-months because we expect the dispersion to vary across year-months for unidentified reasons. Table 1 depicts the results of this analysis.

According to Model 1 and Model 2, neither the variable for the COVID-19 era, nor the cumulative number of deaths associated with it, are significantly related to the number of ISIS-initiated violent events. The results are also not significant if we analyze only deadly events (not shown). If we substitute an indicator for the number of weeks that have passed since the first death from COVID-19 in these countries for either of these variables, it is also not significant (not shown). If we drop the US variables or the anti-ISIS forces variable (due to potential collinearity) from these models, or any subsequent ones, these COVID-19 measures are still insignificant.

In contrast, the interaction effects in Models 3-5 indicate that in Iraq, the variables for COVID-19 era and the cumulative number of COVID-19 deaths are significantly associated with an increase in the number of ISIS-initiated violent events, including only deadly events, in Iraq. Wald tests indicate that the interaction effects are significant at the $p \leq 0.01$ level. If we analyze instead an interaction effect for the number of weeks that have passed since the first death from COVID-19 and the indicator for Iraq, it too is significant (not shown). In separate models available in the appendix, we do not observe statistically significant increases in violence for the pandemic in Egypt and Syria.

Across models, the number of anti-ISIS violent events in a given week is weakly associated with a higher number of
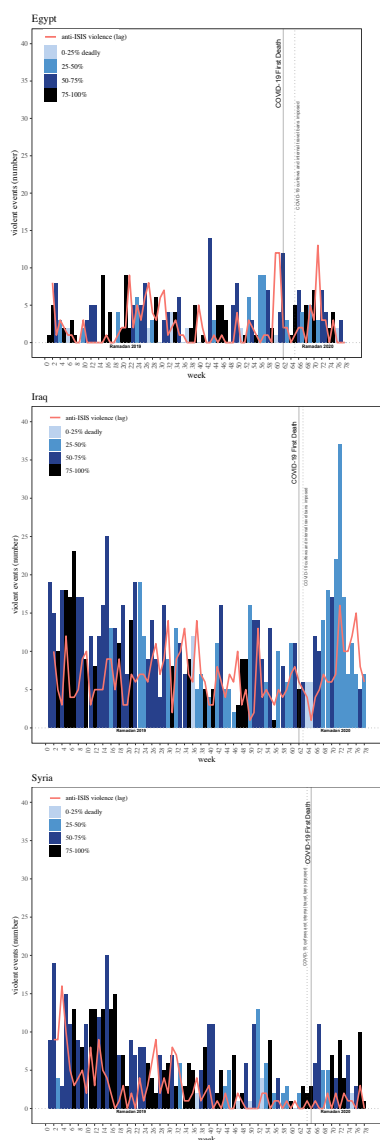
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[22] In interaction effects with non-continuous outcome variables, as in these models, it is possible for a variable with an insignificant coefficient to have a significant effect on another variable for certain relevant values of the modifying variable (Thomas Brambor and Golder, 2006). Marginal effects are provided in the appendix.

Table 1. Relationship of COVID-19 to ISIS-initiated Violent Events

	Model 1	Model 2	Model 3	Model 4	Model 5
	all events	all events	all events	all events	deadly events
COVID-19 Era	0.33		0.30		-0.003
	(0.45)		(0.46)		(0.47)
COVID-19 Cumulative Deaths		-0.0001		-0.0002	
		(0.0003)		(0.0003)	
COVID-19 Era*Iraq			0.21		-0.17
			(0.17)		(0.21)
COVID-19 Cumulative Deaths*Iraq				0.0003	
				(0.0005)	
US COVID-19 Era	-0.54		-0.64		-0.45
	(0.48)		(0.48)		(0.49)
US COVID-19 Cumulative Deaths		-2.61e-06		-3.23e-06	
		(2.61e-06)		(2.72e-06)	
Anti-ISIS Forces	0.02	0.02*	0.02	0.02*	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Oil Price	-0.003	-0.0004	-0.008	-0.005	-0.01
	(0.008)	(0.006)	(0.008)	(0.005)	(0.01)
Oil Price*Iraq	-0.007	-0.007			
	(0.005)	(0.005)			
Ramadan	0.36**	0.38**	0.36**	0.37**	0.28
	(0.14)	(0.14)	(0.14)	(0.14)	(0.16)
Iraq	0.85**	0.86**	0.44**	0.47**	0.36**
	(0.26)	(0.26)	(0.10)	(0.09)	(0.11)
Egypt	-0.52**	-0.51**	-0.52**	-0.50**	-0.60**
	(0.10)	(0.11)	(0.10)	(0.11)	(0.12)
Constant	1.98**	1.81**	2.22**	2.00**	2.50**
	(0.50)	(0.37)	(0.48)	(0.34)	(0.61)
Observations	231	231	231	231	231
Number of Months	18	18	18	18	18

Note: The dependent variables are ISIS-initiated violent events (Models 1-4) and deadly ISIS-initiated violent events (Model 5). ** $p \leq 0.01$, * $p \leq 0.05$.

Table 2. Relationship of Curfews and Travel Bans to ISIS-initiated Violent Events

	Model 6	Model 7	Model 8	Model 9
	all events	all events	all events	all events
COVID-19 Era	0.58	0.61	0.46	0.53
	(0.41)	(0.41)	(0.41)	(0.41)
US COVID-19 Era	-0.79	-0.90*	-0.89*	-1.00*
	(0.41)	(0.42)	(0.42)	(0.42)
Anti-ISIS Forces	0.02	0.01	0.01	0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Oil Price	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
ISIS Curfews	1.61**	10.11**		
	(0.41)	(2.00)		
Non-ISIS Curfews	-0.18	0.32		
	(0.18)	(0.24)		
Non-ISIS Curfews*population		-2.36e-07**		
		(9.12e-08)		
ISIS Curfews*population		-9.66e-06**		
		(2.33e-06)		
ISIS Internal Travel Bans			6.16**	5.01**
			(0.94)	(0.96)
Non-ISIS Internal Travel Bans			0.13	0.08
			(0.18)	(0.19)
Non-ISIS Internal Travel Bans*Base				0.25
				(0.17)
Population		-3.16e-07**		
		(7.48e-08)		
Base				1.30**
				(0.33)
Ramadan	0.37**	0.38**	0.36**	0.36**
	(0.09)	(0.09)	(0.09)	(0.09)
Iraq	-0.01	0.54	0.05	0.56
	(0.34)	(0.34)	(0.32)	(0.30)
Egypt	-1.91**	-5.67**	-5.99**	-5.27**
	(0.57)	(0.94)	(0.90)	(0.89)
Constant	1.58**	1.90**	1.44**	0.60
	(0.41)	(0.41)	(0.40)	(0.41)
Observations	4543	4543	4543	4543
Number of Governorate Weeks	59	59	59	59

Note: The interaction terms for ISIS travel bans*base is dropped from Model 9. ** $p \le 0.01$, * $p \le 0.05$.

ISIS-initiated violent events in the following week, in contrast to state capacity arguments. The latter effect may be due to a high number of anti-ISIS violent events in a given week in response to earlier increased ISIS activity. Ramadan is significantly associated with a higher number of ISIS-initiated violent events, but not with deadly events. Finally, the interaction effects for oil and Iraq in Model 1 and Model 2 are also significant, according to Wald tests ($p \le 0.01$), with higher oil prices reducing the number of ISIS attacks.

Governorate-level Regression Results

To examine the effects of curfews and travel bans, which vary across subunits of states, we conduct a separate analysis of the number of ISIS-initiated violent events that occur within governorates. Table 2 depicts the results of this analysis. The results are for the dichotomous measures of curfews and travel bans, which distinguish between restrictions imposed for reasons related and unrelated to ISIS. The governorate-level analyses use random effects for year-weeks per governorate. We analyze all curfews and travel bans in the supplementary appendix. The mitigation strategies for curfews and internal

travel bans are collinear so we analyze them in separate models.

Model 6, Table 2 indicates that curfews imposed for reasons unrelated to ISIS reduce the number of ISIS-initiated violent events in the analysis period relative to no curfews. Those imposed due to ISIS are unsurprisingly associated with a higher number of attacks relative to no curfews. Wald tests indicate that the variables for non-ISIS and ISIS-related curfews are jointly significant. Model 7 examines the interaction between curfews and the population of the governorates. According to this model, as expected, the greater the population of the governorate, the more curfews reduce the number of ISIS-initiated violent events. A Wald test indicates that the interaction effect is significant at the $p \le 0.01$ level.

Model 8 indicates that, in contrast to expectations, travel bans imposed for reasons unrelated to ISIS are associated with an increase in the number of ISIS-initiated violent events relative to no travel bans, although to a lesser degree than those imposed for reasons unrelated to ISIS. A Wald test indicates that the indicators for non-ISIS and ISIS-related bans in this model are jointly significant. Model 9 analyzes whether ISIS's attacks are more confined to ISIS's base areas

when travel bans are in place. According to the model, the number of attacks in ISIS's base areas is greater when non-ISIS related bans are in place than when they are not, as expected. Wald tests indicate that the interaction effect is significant at the p≤0.01 level.[23]

GIS mapping

To further explore quantitatively the extent to which curfews and travel bans reduce as well as displace violence, we track the number and location of ISIS-attacks within and across governorates of Iraq using GIS.[24] Since space does not allow an analysis of all three countries, we focus on Iraq – the one state for which there has been a significant increase in ISIS-initiated violence. Similar analyses available in the appendix for Egypt and Syria yield consistent results. We expect internal travel bans to limit ISIS's reach outside its bases in western and northern Iraq, and for curfews to have a greater reductive effect in high population density areas.

Examining first the effect of travel bans, the heatmaps in Figure 2 illustrate the difference by governorate in the number of ISIS-initiated violent events in 2020, when travel bans were in place (9 March to 28 June), with a comparable period in 2019, when travel bans were not in place (11 March to 30 June).[25] The darker (and redder) the color and the higher the governorate, the greater the number of events.

As Figure 2 shows, in 2019 without travel bans in place, there were more ISIS-initiated violent events over a larger area of Iraq, especially in Al-Anbar in the East and in Salah ad Din in the North, as expected, than in the same period in 2020 with travel bans in place. In 2020, the number of events were more concentrated in the eastern governorate of Diyala, with the number of violent events in the West and North lower.

Figure 3 depicts the same information in a bar plot but adds a Chi-square test of the difference in event distribution across governorates during the period when travel bans were in effect ("travelban" bar), and the comparison period in the prior year when there were no travel bans ("no travelban" bar). The left scale is a raw count of the number of events. The difference in the number of events perpetrated in each governorate in the two periods examined is highly statistically significant (p≤ 0.0005).

Fig. 2. Internal Travel Bans Relationship to ISIS-initiated Violent Events
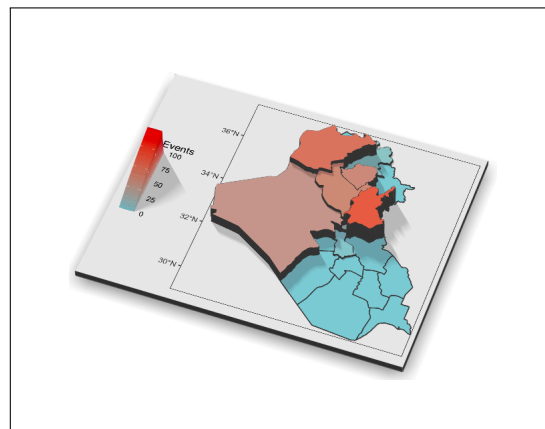
No Internal Travel Ban Note: Figure depicts number of ISIS-initiated violent events by governorate, 11 March-30 June 2019.
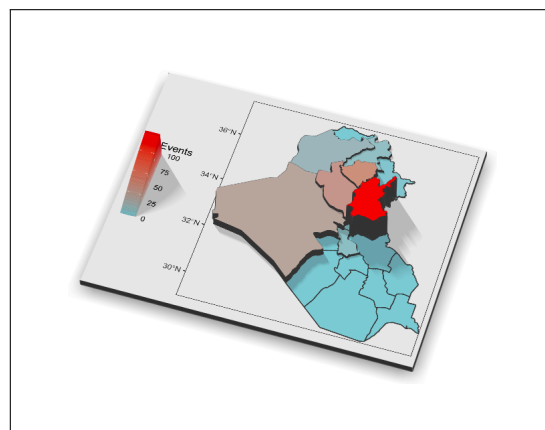

Travel Bans in Some or All Governorates Note: Figure depicts number of ISIS-initiated violent events by governorate, 9 March-28 June 2020.

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[23]We do two different Wald tests: one that includes the interaction term for non-ISIS internal travel bans and base, and one that does not. Both conclude that the interaction effect is significant.

[24]The 3D figures were constructed using Rayshader (Morgan-Wall, 2020). The density contours were created using "stat density 2d" in ggplot2.

[25]Geo-referencing of events used in this paper is ACLED's georeferencing, which is provided at multiple levels including the region, province, county, district, and latitude and longitude coordinates. In addition, each georeference is assigned a 3-point precision level in the ACLED data. Importantly, while the validity of the ACLED georeferences used in this paper is high, their reliability should not be interpreted literally. Specifically, coordinates reference not a point but a town where such information is available (precision level 1), or a town in a region if the activity took place in a small part of a region (precision level 2). For more uncertain areas (precision level 3), the coordinates of "the closest natural location noted in reporting ... is chosen", according to the 2019 codebook (p.28). Out of 894 events used in our analysis of Iraq for this paper, 861 are assigned ACLED precision level of 1 or 2 and 33 events a precision level of 3. Consequently, we have substantial faith in the validity of the geocodes, especially for the maps where we aggregate the count to the governorate, but emphasize that the reliability of point coordinates should not be interpreted literally.

Brancati *et al.*

Fig. 3. Testing Internal Travel Bans Relationship to ISIS-initiated Violent Events
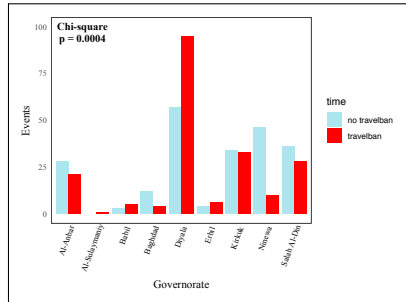
Note: Figure depicts number of ISIS-initiated violent events by governorate, 11 March-30 June 2019 (left, blue columns) and March 9-June 28 2020 (right, red columns).

Figure 4 compares the number of ISIS-initiated violent events perpetrated in the first 16 weeks after curfews were established in all governorates in Iraq in 2020 (beginning the week of March 11th) with the same 16-week period in 2019 without curfews. The figures show the locations of individual events (dots) and overlay the dots with density contours to indicate changes in the number of events.

Figure 4 suggests that when curfews were in place, the number of attacks in large population centers including Baghdad – the most populous governorate and capital of Iraq, and in Mosul the second largest city in Iraq and the capital of the governorate of Nineveh – was substantially lower than when no curfews were in place, as expected. In contrast, the number of events declined less or even increased in rural areas, especially in some of the more sparsely populated governorates, such as Diyala and Salah Al-Din.

Figure 5 tests the idea that curfews differentially affected the number of attacks in urban and rural areas across Iraq. The figure shows the number of events by location (governorate capital, other urban centers, and rural areas) after curfews were instituted in 2020 ("curfews" bar) and in the same 16-week period in 2019 when there were no curfews ("no curfews" bar) in place. The left scale counts the number of attacks. As is clear from the figure, the difference in the number of events perpetrated in these three types of areas, in these two time periods, according to the reported Chi-square test, is statistically significant ($p \leq 0.0125$).

A Deeper Look at the Pandemic and ISIS

The quantitative analysis suggests that the pandemic has only limited the capacity of anti-ISIS forces to combat ISIS in Iraq, while the mitigation strategies used to prevent the spread of COVID-19 among the general population have hampered the ability of ISIS to conduct its activities more generally, affecting both the location and number of overall attacks. Herein, we explore why the overall effect of the pandemic is seemingly limited to Iraq. In addition, we consider how the mitigation strategies related to the pandemic have presented a challenge for ISIS in Iraq, as well as Egypt and Syria. Our qualitative analysis suggests that the overall effect of the pandemic is limited to Iraq because no state reduced their military spending to combat ISIS as a result of the financial strain that the pandemic placed on them, but in Iraq, US and Iraqi forces reduced their activities in order to halt the spread

**Fig. 4.** Curfews Relationship to ISIS-initiated Violent Events
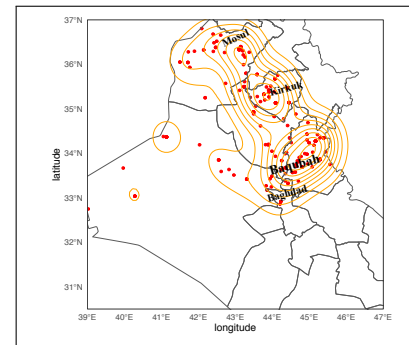
No Curfews   Note: Figure depicts location and density of ISIS-initiated violent events, 11 March-30 June 2019.
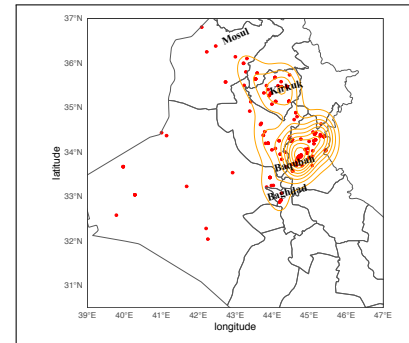
Curfews   Note: Figure depicts location and density of ISIS-initiated violent events, 9 March-28 June 2020.

Fig. 5. Testing Curfews Relationship to ISIS-initiated Violent Events in Urban and Rural Locations
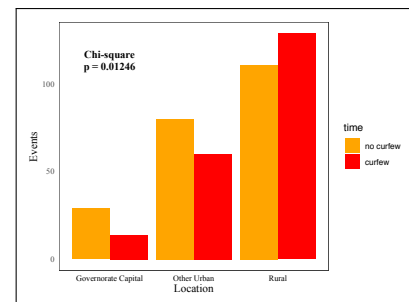
Note: Figure depicts number of ISIS-initiated violent events by location type (governorate capital, other urban, and rural), with events 11 March-30 June 2019 (left, orange column) and 9 March-28 June 2020 (right, red column).

of COVID-19 among their forces.

The primary forces actively engaged in the battle against ISIS in Egypt, Iraq, and Syria are the United States and the respective governments of these three states. These states, due in large part to the pandemic, experienced significant reductions in their economic growth the first year of the pandemic (i.e., 2% Egypt; 3.5% US; and 10% Iraq) (World Bank, 2020).[26] At the same time, they all increased their expenditures to support public health and/or provide economic relief to their populations. While Egypt, Iraq, and Syria received foreign aid to alleviate the financial burdens of the pandemic, the aid has fallen far short of their financial needs.

Yet, despite this, none of these states are known to have reduced their military spending on combating ISIS as a result of the pandemic.[27] In the US, some progressive politicians in the House of Representatives demanded cuts in defense spending as a result of the pandemic, but their calls were not heeded (DeBonis, 2020). In Iraq, local governments had difficulties paying their employees on time, but cuts and delays in payment have reportedly not extended, thus far, to the country's security forces. In Egypt, not only did the government not cut military spending, but it reportedly distributed a disproportionate amount of COVID-19 relief aid to military-owned businesses (Whitehouse, 2020).

Although the pandemic has apparently not affected the military spending of these anti-ISIS forces, the US and Iraqi governments did reduce their activities in Iraq, and in Syria to a lesser extent, in order to prevent the spread of COVID-19 among their forces.[28] According to Brett McGurk, former US Special Presidential Envoy for the Global Coalition to Counter ISIS, "The main impact [of the pandemic] I can see is what appears to be a significant reduction in operations and effectiveness by the US-led coalition."[29] US forces stopped accompanying Iraqi units and Syrian Democratic Forces on raids and recalled hundreds of trainers no longer needed since Iraq reduced its personnel.

Given the US's much larger military presence in Iraq than in Syria, this ought to have had a much bigger effect on the former than the latter. In Iraq, the US also moved up its plans to shut military bases and at one point, even stopped bringing new troops into the country (Watson, 2020). The US's intelligence gathering functions were not initially affected in Iraq or Syria and, according to Lieutenant General Pat White, the Commanding General of Operation Inherent Resolve, the US promised to renew missions with its local partners for high-value ISIS targets (Haltiwanger, 2020). However, in April 2021, for reasons unrelated to the pandemic, the US announced plans to withdraw all combat troops from Iraq, leaving only those training and advising Iraqi forces.

The Iraqi government also undertook measures to prevent COVID's spread among its troops that likely reduced the government's ability to combat ISIS. Early in the pandemic, the government sub-divided its military units into small cell-like groups and halved the number of military personnel on duty (Hodge, 2020). It also diverted some of its security forces to enforce curfews and travel bans imposed on the populace

to contain the disease (Loveluck and Salim, 2020). The Syrian government stopped conscripting reserves for a time to prevent COVID-19 from spreading among its troops, but it is not known to have changed its tactics otherwise. Egypt is not known to have taken any similar measures.

ISIS also changed its tactics to mitigate the disease's spread, but these changes were more modest and unlikely to have affected its activities by as much. ISIS urged its members to take precautions, including washing hands and avoiding travel to Europe (Haltiwanger, 2020), but it has no need for the same kinds of social distancing precautions government forces undertook, because ISIS operates in small cell-like units and in remote areas. ISIS fighters, as Michael Knights relates, are "the ultimate doomsday preppers ... they "have been social distancing for years" (Hodge, 2020).

At the same time, the mitigation strategies that Egypt, Iraq and Syria adopted to prevent the spread of COVID-19 among their general populations, seem to have hampered ISIS's ability to conduct attacks. The curfews, and to a lesser degree the travel bans since they excluded cargo, likely strained ISIS's financial resources to some extent. ISIS relies on a multitude of sources to finance its activities, all of which ought to have been affected by these restrictions, including the sale of drugs and other contraband, extortion, donations, as well as profits from its legal businesses. ISIS, however, has large financial reserves, estimated to be in the hundreds of millions (Kenner, 2019), so, in the short-term, these restrictions were unlikely to have severely harmed ISIS's ability to conduct attacks. Elements outside Iraq, which have less access to local resources and are more dependent on donations and cash transfers from cells in Iraq, are likely to have been more adversely affected.[30]

These restrictions have likely presented more of a logistical challenge to ISIS, however. While the travel bans made it more difficult for fighters to move between governorates, the curfews, according to Lieutenant General White, "constrained the ability of an adversary [ISIS] to move above ground" (De-Petris, 2020). The pandemic-related restrictions imposed in Egypt likely posed the least challenge to ISIS. Egypt already had curfews and travel bans in place in Northern Sinai, to hem in ISIS where it is most active, and these measures were strictly enforced. As a result of the pandemic, the Egyptian government imposed curfews and travel bans on the rest of Egypt, but since ISIS is not very active outside Northern Sinai, these new curfews are unlikely to have had much of an additional effect.

The restrictions imposed in Iraq and Syria likely had a far greater effect. Iraq and Syria did not have restrictions in place limiting ISIS's movements at the outbreak of the pandemic, and ISIS is not as geographically isolated in these countries as it is in Egypt. However, these restrictions were not strictly enforced, likely making them less effective than the pre-existing restrictions in the Northern Sinai, but more effective than the new pandemic-related ones throughout Egypt.[31] In one instance in Iraq, upwards of half a million Shiite Muslims ignored state-imposed curfews in order to honor a martyred shrine of an imam in northern Baghdad. Health experts cite the high number of cases in these countries despite strict lockdown measures as evidence of low compliance with these measures (Hannah, 2020).

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[26] Date for Syria are not available.

[27] On Syria, see: William Christou and Karam Shaar, "2021 Budget Reveals the Depth of Syria's Economic Woes," 1 December 2020.

[28] Despite these precautions, there have been outbreaks of COVID-19 among US forces in Iraq and Syria (Steinhauer and Gibbons-Neff, 2020).

[29] Author, Personal Interview, 25 August, 2020.

[30] Author, Personal Interview with Former Translator with the U.S. Army in Iraq, 17 and 22 December 2020.

[31] Author, Personal Interviews with Local Residents, 13 July 2020.

Conclusion

Despite fears that the COVID-19 pandemic would lead to a pronounced increase in attacks by ISIS in the Middle East and North Africa, we only find evidence of a potential increase in violence in one state, Iraq. We conjecture that this effect is most likely due to US and Iraqi forces curtailing their activities in Iraq in order to prevent the spread of disease among them. The US also curtailed its activities in Syria, but this likely had less of an effect since the US's presence in Syria was already very small. Less pernicious disease outbreaks ought to have even more modest effects on state capacity.

These findings have important implications for the literature on natural disasters more generally. They suggest a possible reason why a decline in economic growth following natural disasters does not lead to an increase in large-scale violence, as often hypothesized – the reluctance of states, even in the face of severe crises, to make cuts in military spending that can jeopardize their national security. Neither the US – a strong democracy with an equally strong economy, nor Iraq – a fledgling democracy with a weak economy, nor Egypt and Syria – strict authoritarian states with underdeveloped economies - reduced their military spending despite dwindling growth as a result of the pandemic. With infections on the decline and vaccines being distributed in all three countries, this is unlikely to change in the near future.

Our analysis has further implications for counterinsurgency strategies more generally. Governments commonly use curfews and travel bans outside of pandemics to control instability and fight insurgencies (Aksoy et al., 2019). Yet, their impact on intrastate conflict has not previously been analyzed statistically. The exogenous nature of the pandemic provided us with a unique opportunity to identify their causal effect on violence. Our analysis shows that government-imposed curfews and internal travel bans not only reduce, but also displace violent events. In other contexts, where curfews and bans are stronger and more strictly enforced, their peace-inducing effects are likely to be even greater.

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