# LONGITUDINAL INDICATORS OF SERVICE PROVISION BY TERRORIST AND INSURGENT ORGANIZATIONS

Lindsay L. Heger, Danielle F. Jung, and William A. Wagstaff

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# LONGITUDINAL INDICATORS of **SERVICE PROVISION** by TERRORIST AND INSURGENT ORGANIZATIONS
## (TIOS 2.0)

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Cover Image: A woman walks past a wrecked car in west Beirut. Photo by Salah Malkawi/ Getty Images

## ABSTRACT

A growing body of literature points to the importance of service provision by violent groups. Much of the evidence relies on detailed, small-n examples of large, well-known, and influential terrorist groups (e.g., Hamas). Here, we introduce a new dataset on a more representative sample of terrorist and insurgent organizations' service provision: Terrorist and Insurgent Organizations' Service Provision (TIOS) across time (2.0). TIOS 2.0 data includes indicators of types and relative concentrations of services provided for approximately 400 organizations across more than four decades (1969–2013). This enables a unique view for researchers into the generalizability of and aggregate trends in services by groups and countries and across time. We demonstrate how these data can be aggregated to approach different research questions and how the data can be used to characterize the state  of service provision by non-state actors. We also show the relationship between TIOS 2.0 data and group lethality, a relationship documented many places in related literature.

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# I. INTRODUCTION

A growing body of literature points to the importance of service provision by violent non-state groups, as well as the relationship between state provision and conflict. Much of the evidence relies on detailed, small-n examples of well-known and influential cases. With a variety of cases and types of conflict, evidence is mounting that violent organizations are moving beyond violence toward the production of governance as well, and have been doing so for quite some time. Moreover, the legitimacy garnered through provision of services may allow many terrorist groups to endure. Mounting evidence of the role of service provision in conflict processes (both as a product and as a driver) motivated a more systematic measure of services provided by terrorist organizations across time. In this paper, we introduce a new dataset on terrorist and insurgent organizations' provision of social services. The data, Longitudinal Indicators of Service Provision by Terrorist and Insurgent Organizations (TIOS 2.0),[A] span approximately four decades and cover nearly 400 organizations. To the best of our knowledge, this represents the widest coverage across both time and groups for this type of data.

> *Mounting evidence of the role of service provision in conflict processes (both as a product and as a driver) motivated a more systematic measure of services provided by terrorist organizations across time.*

The major contribution of TIOS 2.0 is its longitudinal perspective. We were motivated to create this measure of service provision to integrate existing findings with the growing understanding of non-state actors and conflict dynamics. In earlier work, we found that terrorist groups that provided services (at any time) were better able to enter into stable negotiations. In a different analysis, we also found evidence that service provision is linked to very different violence profiles; service-providing terrorist groups use different violent tactics than non- providers. These findings are provocative,


*A damaged school in in Gaza City. AFP Photo/Mohammed Abed/Getty Images.*

but it became clear we needed time-series measures of social service provision to link with conflict data in order to better understand the relationship between services and conflict dynamics.

In addition to the longitudinal perspective, our data allow users to examine non-state service provision across an array of different dimensions. This possibility was previously unavailable for those trying to better understand governance in conflict zones. Service provision can be analyzed by sector (e.g., education, health), broken down by specific words or phrases (e.g., trash collection, orphanage), and aggregated for analysis by country or region. In short, TIOS 2.0 allows researchers to verify the ubiquity of many of the most innovative case-specific findings and discover new trends regarding the strategies of non-state actors across time and space.

The recent spate of literature on service provision has moved us toward a more substantive as well as generalizable understanding of non-state actors involved in conflict. We know, for instance, that groups that run for political office are simultaneously less likely to attack civilians. Some violent groups seek legitimacy and international support through service provision. Recent literature also highlights organizational structure and ecology as well. Indeed, the non-violent activities of violent groups are correlated with many important outcomes and give us greater understanding of the internal functions of terrorist organizations.

A    Accessible at http://oefresearch.org/datasets/tios.

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*Residents of a Syrian refugee camp gather to collect aid food. RAMI AL-SAYED/AFP/Gety Images*

In addition to the academic interest in non-state service provision, numerous practitioner communities are engaged in "out-providing" violent non-state groups in order to win legitimacy in contested spaces. In line with current research, we view non-state groups' participation in social-services provision as one of the most important contributing elements of governance. In conflict zones where services are routinely cut off and entire populations are left without access to basic public goods and services, non-state organizations are often the lifeline for communities. For instance, Jabhat al Nusra in Syria has been widely credited for their efforts to alleviate the food shortages caused by the conflict there. Without the ability to track across time and space the major activities (beyond violence) of important non-state actors, we risk characterizing wartime experiences inaccurately and drawing incomplete battle assessments. We hope the TIOS 2.0 data will be of use to the academic and policy communities focused on conflict dynamics and governance. We note that we are far from the first to think about measuring service provision by violent groups over time (e.g., Minorities

at Risk Organizational Behavior (MAROB) by Wilkenfeld, Asal, and Pate). Indeed, we hope that having multiple measures will enhance our collective understanding of conflict governance, and we believe our data is a significant step forward in being able to uncover the dynamics that profoundly shape battle zones.

Our goals here are to describe TIOS 2.0 and service-provision trends between 1970 and 2010, provide some basic evidence of data validity and a sense of how the data might be used, and highlight potential issues. Our larger goal is to understand the relationships between service provision, governance by non-state actors, and conflict dynamics. In this paper, for example, we present evidence connecting service provision to lethality.[B] We also intend for these data to be compatible with other conflict and governance measures common to the scholarly and practitioner communities. As such, TIOS is disaggregated in such a way as to maximize utility and comparability.[C]

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B   In other work, the data are used to look at substitutability and complementarity (see Wagstaff and Jung 2017, cited in endnote 10); in future work we plan to look at duration more closely. We note that in this paper, we focus on describing the data for others rather than testing new theories.

C   Of course, because of differences in samples and coverage, there will be non-perfect overlap. We hope to update the data in the future to address these concerns.

# II. DATA COLLECTION AND VARIABLE CREATION PROCESS

## Sample and Data Collection Process

We use the sample of groups detailed in Cronin. For each of the approximately 400 groups, we pulled all English-language print news coverage available on LexisNexis. For each group in our sample, we searched within these stories, by year, from 1969–2013 (inclusive) for words and phrases that correlate with service provision.[D] The underlying motivating assumption is, as in Heger and Jung, that *service-providing groups will have, on average, more stories mentioning service provision compared with groups that provide fewer or no services*. Our unit of observation is the organization-year. Our data include 403 terrorist organizations and 6,660 organization-years. Figure 1 shows how the number of groups in the sample varies across time coverage.

## Measuring Service Provision

**Figure 1:** Change in the number of groups in the sample over time
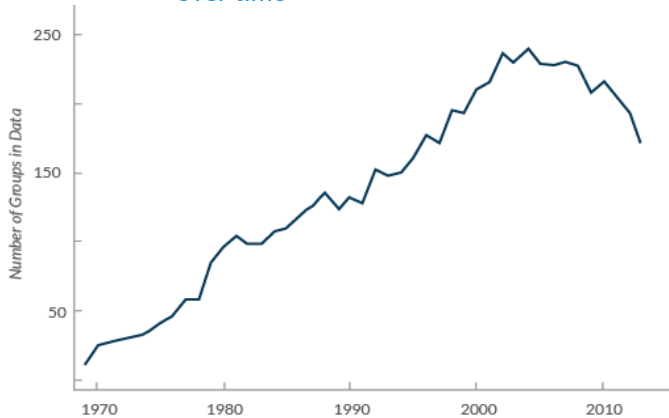


For each group-year, we look through the article text for mentions of key service-provision words. The words are based on the types of services prior research has demonstrated are most likely to be provided as well as our analysis of multiple stories in which we identified those words most commonly attributed to non-state actors (versus contextual references or attributions

to another party).[E] This is the simplest possible assumption and using the group's news coverage is an (imperfect) indicator of service provision, but it allows us indicators for total provision of services as well as subcategories of service provision (e.g., infrastructure, health, education, financial) by group-year. As with our initial assumption, we assume news coverage of groups that provide subcategory services will be more likely to use those terms in the group-year news coverage than will the coverage of groups that provide fewer services or do not provide those services. As a simple example, coverage of a group that provides educational services will be more likely to use terms like "school" and "teacher" than coverage of groups that do not provide educational services.

> *For each group in our sample, we searched within these stories, by year, from 1969-2013 for words and phrases than correlate with service provision.*

We use text analysis of this news coverage to create counts of the mentions of key service words. We then use these counts to create our measures of service provision. Each file (containing all news reports in a single calendar year that mention the group) was analyzed for each of the search terms. We create two total provision measures, one dichotomous and one continuous. The continuous variable contains a log of mentions of all service-provision indicator words in the news coverage. The dichotomous measure reports if there were any mentions.[F] We also create indicators of provision of a service in a subcategory using a similar construction method. Specifically, we break the aggregate measure down into service-provision subcategories: religion (or religiously associated services), infrastructure, health, education, finance, security, and social services. The codebook describes which keywords were used in the search.

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D    Please see the codebook for a list of these service-provision search terms; we note that these are refined from those included in Lindsay L. Heger and Danielle F. Jung, "Negotiating with Rebels: The Effect of Rebel Service Provision on Conflict Negotiations," *Journal of Conflict Resolution* 61, no. 6 (2017): 1203–1229.

E    See the codebook for a full list of the service-provision search terms.

F    This also holds for a range of thresholds including 10 and 100.

## Coverage Issues and Drawbacks to the Measure

For those who might use these data or the findings that follow from it, we offer a note of caution about the measure. First, the sample of articles we have access to is sensitive to being English-language coverage primarily from Western news sources, including their regional press bureaus. The coverage is most complete after 1980 and spottier before. Because coverage bias might affect the results of many different types of analytical endeavors, we include three relevant controls that will allow for more and less sensitivity to coverage. First, we include a control for the number of articles collected for every group-year observation. Second, we include a measure of the number of sentences produced at the group-year level. Finally, we include a variable that tracks the number of words per group-year.

Similarly, small terrorist groups might be less likely to be mentioned in major press articles, particularly early in their lifetimes. We expect that efforts to generate a more accurate normalized measure will be ongoing, but based on earlier work at the group level we suspect these aggregate counts (and logs) will likely correlate.[G]

As mentioned, we confine the group list to terrorist groups identified by Cronin. We believe theories of provision should be similar across terrorist, rebel, and insurgent groups, but do urge caution at this early stage. While we hope to extend the data to include these other types of groups, and for compatibility with other datasets, we do want to highlight this current limitation and that these data are best used by those who study terrorist organizations at present.

We devoted much time to working through potential attribution bias; specifically, the concern that mentions of a service in a terrorist group's news coverage would actually be a service provided by the *state*, or be mentioned as something the group does *not* provide. Extensive random back-checks indicate that this is not significant and does not bias the measure in any way we can determine. However, we note that a good number of the stories we read as part of the attribution-checking did include references to services that were not attributable to any one side in a conflict. Rather, they were included as part of the contextual descriptions within the narrative.[H] Unfortunately, there is no way to systematically eliminate these instances. Because these examples appear to be in no way biased, we do not feel this is an insurmountable obstacle. This noise does, however, present obstacles to particular types of data analysis (e.g., single-group analysis or small-n comparisons) which we describe in more detail below.

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G   Additional extensions will work to expand the coverage as well as pick up colloquial terms for the groups.

H   We suspect that because most of our groups are engaged in ongoing conflicts, this is most likely the case with mentions of security-related words being used to describe the battle theatre.

# III. DESCRIBING THE DATA

One of the most beneficial features of our data is its relative flexibility. Because it was collected using specific service-related words and phrases, the data are applicable for a wide variety of analyses including sector-specific research, actor analyses, and even country or regional comparisons. In this section we highlight the trends across what we believe are the data's primary analytical areas.

**Table 1:** Service subcategory descriptive statistics

| Service Type | Mean (N=6,600) |
|---|---|
| Religion (mean) | 4.30 |
| Infrastructure (mean) | 0.32 |
| Health (mean) | 7.22 |
| Education (mean) | 32.51 |
| Finance (mean) | 2.19 |
| Security (mean) | 4,061.20 |
| Social (mean) | 2,116.95 |
| Total | 6,505.25 |

To begin, Table 1 shows the mean of mean mentions; in other words, we take the average of all group-year averages by service sector. From this we draw a few lessons. First, as one would expect, security words are mentioned most often. Because our groups are frequently (although not always) engaged in active and sometimes lengthy conflicts, we expect that a significant number are patrolling the areas under their control, providing security services, and adjudicating security disputes. Security is followed in rank—but at nearly half the frequency—by social services. Education and health follow next. Infrastructure is last. We suspect that the scale and budget of infrastructure projects puts many of them outside the scope of ability of most violent non-state groups. Those with access to significant resources and/or political power might be capable, but the vast majority simply cannot build bridges, dams, or water treatment plants. In what follows, we will begin to break these relationships down a bit more to provide some nuance. As one would very much expect, these profiles

are not consistent over time, or within or across groups.

## Trends in Service Provision

As Figure 1 highlights, it is important to note that the number of groups (the denominator) has changed over time. New conflicts give rise to new groups and some groups enter and exit the sample multiple times. Figure 2 displays total provision of services over time. The y-axis is the log of service mentions. The line tracks fairly well to the number of groups from Figure 1.

The Jewish Defense League (JDL) has the largest number of observations, with 45 spanning every year in the sample. There are 11 different terrorist organizations in the dataset in 1969. Note the continual upward trend, which suggests a steady uptick over time in the level of services non-state actors provided over the last four decades. This is consistent with research showing that the role and number of non-state actors has steadily grown in recent decades**.**

**Figure 2:** Service-provision coverage over time
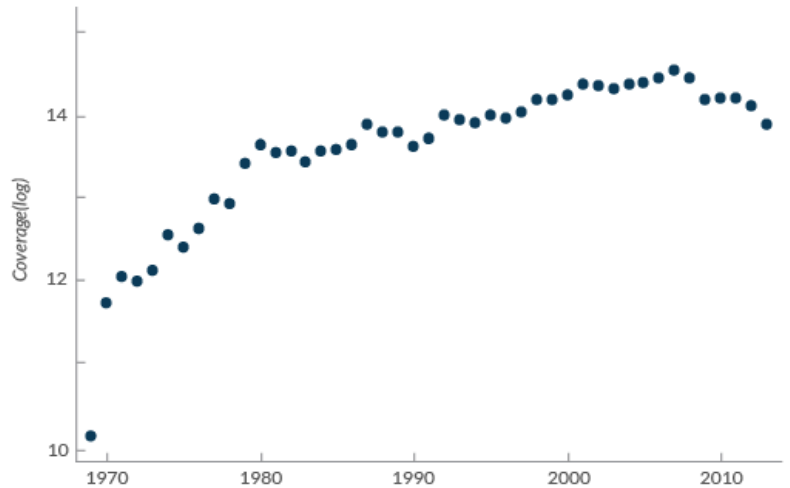


This upward trend is noteworthy for several additional reasons. First, it suggests non-state actors increasingly view service provision as a valuable tool in their non-violent repertoire. This could be the result of several different processes. Groups may be seeking to imitate other organizations they see using service provision successfully to enlarge their constituencies. For some organizations, Wagstaff and Jung argue providing

services may be a form of social currency used to increase their pool of non-member supporters (or even the number of members). This may be particularly true for groups with active political parties (e.g., the IRA and Sinn Fein, Hamas, and Hezbollah) where providing social services is a necessary part of competition in democratic elections. Alternatively, it may be that non-state actors have been able to increase their resource bases via state sponsorship, accumulation of wealth, private donors, or resource acquisition and are using those "additional" funds to provide services. Then, for any number of reasons—increased legitimacy, international recognition, increased supporters—groups may be devoting more resources to providing services.

Another possibility lies in the failures of some democratic transitions over this time period. As waves of democratization took hold in much of the developing world, subsequent transitions were often met with resistance and bloody conflict. Many of the resulting governments had lackluster human rights records and were unable to provide substantial public goods and services. Thus, the upward trend may reflect more non-state actors emerging with explicit mandates to provide services in the wake of a failed or failing government. In this capacity, non-state actors are filling a governance void where states have found themselves incapable of providing for their populations or unwilling to do so. For these groups, violence may be a secondary strategy, or at least not a primary priority.

Returning to Figure 2, from 2000 onward there are two notable patterns. First, observations from 2000–2007 do not fit a linear trend. Groups appear in this time period to be uniquely good at or at least prolific with providing services. This post-9/11 time period correlates with a number of the world's most significant acts of terrorism, a fact indicating that service provision and large-scale urban conflict may go hand in hand. However, the second notable trend in this time period is that after 2007, service provision decreases. Figure 3 "zooms in" to the post-2000 time period trends to highlight this shift in the functional form of this relationship.

**Figure 3:** Service-provision coverage over time; 2001–2013
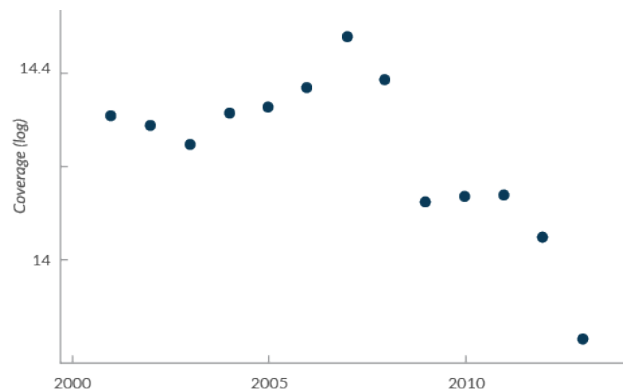


The downward trend in service provision during the latter time period may indicate that the efforts of coalitions and individual governments to displace non-state actors' efforts to provide services during conflict were working. It may also indicate governmental efforts to address the needs of populations which were previously un(der)served.

## Group, Sector, and Country Trends Over Time

Figure 4 displays the service-provision indicators for al-Qaeda, a group that the data indicate is one of the most active service providers. From 1990 onward, al-Qaeda increased their total provision of services. The most variation appears immediately surrounding the 9/11 conflict period when al-Qaeda was actively fighting the US and coalition forces. The dynamic nature of this period may be the result of battlefield demands on the group; as conflict-related demands taxed the group unpredictably, resources directed toward providing services were similarly variable.

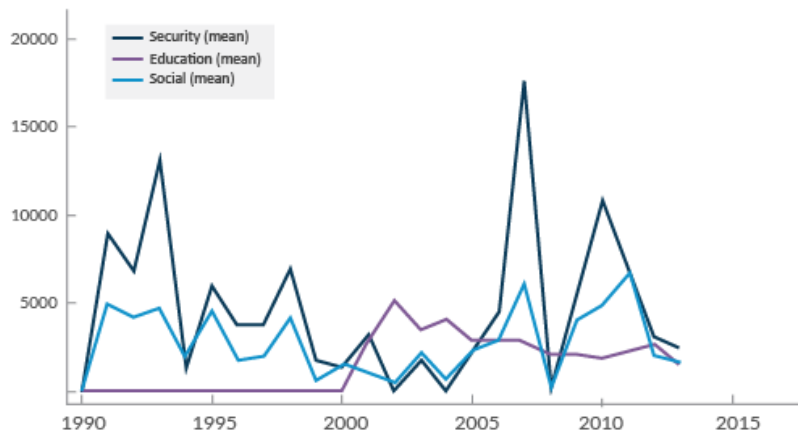**Figure 4:** Al-Qaeda's service provision, by year
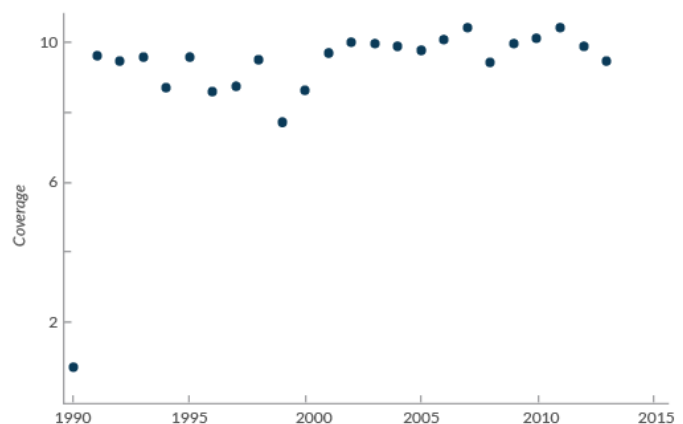
In addition to viewing group-level behavior, it is possible to analyze by service subtype. We categorize service words into seven sectors: infrastructure, religion, health, education, finance, security, and social services. Categorical analysis can be aggregated to see general trends over time or disaggregated to better understand the particular behaviors of a singular group. This is useful for research questions focused on the behavior of one group (or a collective) of non-state actors as the behaviors relate to provision of particular services (i.e., are non-state actors becoming more involved in providing education over time?). Sector-level analyses also allow for comparative descriptions of governance over time. We note here that we suspect a strong interaction between provision of services by state actors and provision of services by non-state actors. Figure 5 shows the temporal trends across three categories for al-Qaeda.

*We categorize service words into seven sectors: infrastructure, religion, health, education, finance, security, and social services.*
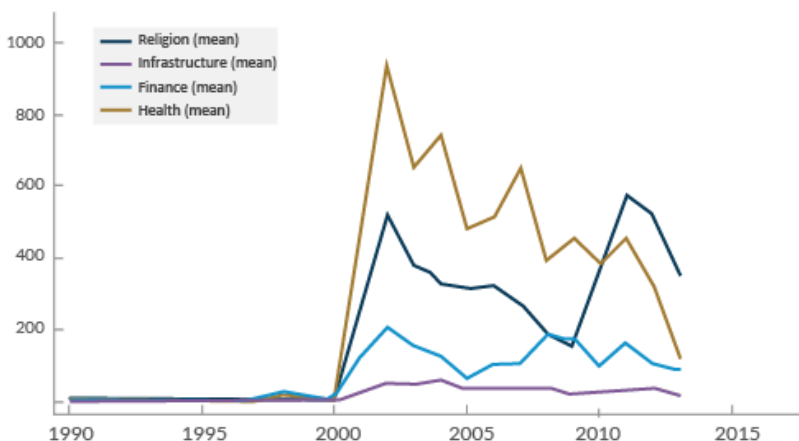
In the pre-9/11 period, 1990–2000, al-Qaeda appears to be primarily a provider of security and social services, which is intuitive from a brief reading of the case. However, after 2000, service provision goes up across most categories, as Figure 6 highlights. It is possible that this uptick represents increased news coverage during conflict periods. The fact that neither the security nor social-service categories show demonstrable changes after this point suggest that the uptick has less to do with coverage and more to do with substantive changes in the service-provision strategy.

Researchers should consider several important caveats when using the data to analyze one group or a small number of groups over time. First, the nature of these data is best suited to drawing conclusions based on aggregate trends. Our measure is an imprecise indicator of the precise level of service provision and, as such, should not be used to draw conclusions about exacting levels, nor should it be used to compare across small numbers of groups. Rather, it is better used as a likely indicator of service-provision presence. For this reason, we use—and encourage the use of—logged coverage variables.

**Figure 5:** Al-Qaeda's provision of services over time, by category (Education, Security, and Social Services)



Rather than using actual raw counts, a more cautious approach to a group-level analysis would compare the level of services from one time period to another. Second, group coverage may be influenced by the beginning of or an uptick in hostilities. Coverage likely correlates with war. Thus, while cross-sector conclusions might still hold, research focused on the absolute level of services should account for an

**Figure 6:** Al-Qaeda's provision of services over time, by category (Infrastructure, Religion, Health, and Financial Services)

inflationary effect from conflict. Finally, certain groups in the dataset concentrate their violence against targets that may correlate with some service sectors. We suspect this is most likely the case for the religion, security, and infrastructure categories. Thus, a group like al-Qaeda may indeed be providing security services in many communities but is also attacking police and other security-related targets. The news coverage of both behaviors will be recorded in the data as security-related service despite the fact that a portion of the group's behavior was hostile. Unfortunately, culling stories focused only on hostilities was impossible during collection; many stories tended to describe both a group's recent attack and, as background, the service provision or community-oriented activities of that same group. We therefore caution researchers to be aware of a group's targeting profile when using these data.

It is also possible to aggregate the data for all non-state actors within a country. To allow this functionality, we code a state location for all groups (standard COW code).I For most groups this is relatively straightforward because the majority of groups operate both violently and non-violently from within the countries where they are based. There are, however, a few exceptions where a group's leadership remains outside the country. This has been the case in the last few decades for a variety of Palestinian groups that have moved outside of the Palestinian/Israeli territory in order to avoid capture while still maintaining an active presence within Palestine. Al-Qaeda Central and some of al-Qaeda's avowed adherent organizations are similarly geographically split between countries or, as in the case of AQI (now ISIS, which is not in the data at present), have cross-border leadership.

Figure 7 shows aggregated non-state service provision for Afghanistan and Colombia from 1990 on. Both countries experienced conflict during this period, albeit to different extents and at different times. In the case of Afghanistan there is a relatively constant upward trend in the amount of service provision across the entire time period. This may reflect one or more conflict dynamics. The Taliban and al-Qaeda significantly increased violent activity during this time period, which may have led to an increase in services as well. It may also be the case that new groups sometimes arise, leading to an uptick in the number of services. The international coalition's strategy to win hearts and minds through an emphasis on service provision may have empowered (or encouraged) some groups to engage in more service provision, which would also increase overall provision. In contrast, there appears to be a lot of variation in service provision by organizations in Colombia during this time period. Though this is speculation, the variation may be related to the last decade of increased peace efforts, which had many stops and starts. There is, however, a large degree of variability in overall provision.

**Figure 7:** The overall service provision over time of groups in Afghanistan and Colombia (left panel: Afghanistan 1990-2015; right panel: Colombia 1990-2015)
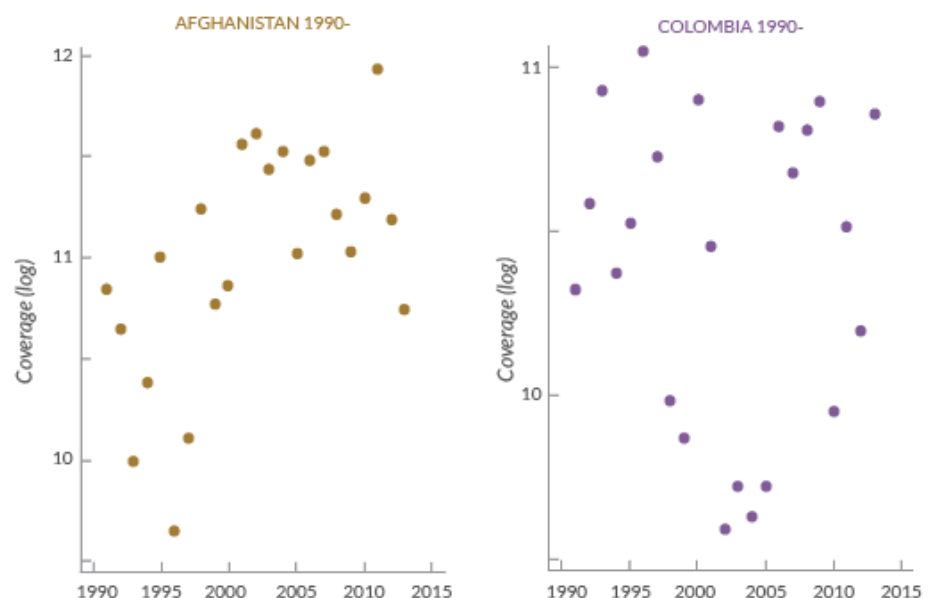
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**Figure 8:** Subcategories over time (left panel: Security and Social Services; right panel: Religion, Health, Finance, Infrastructure and Education)
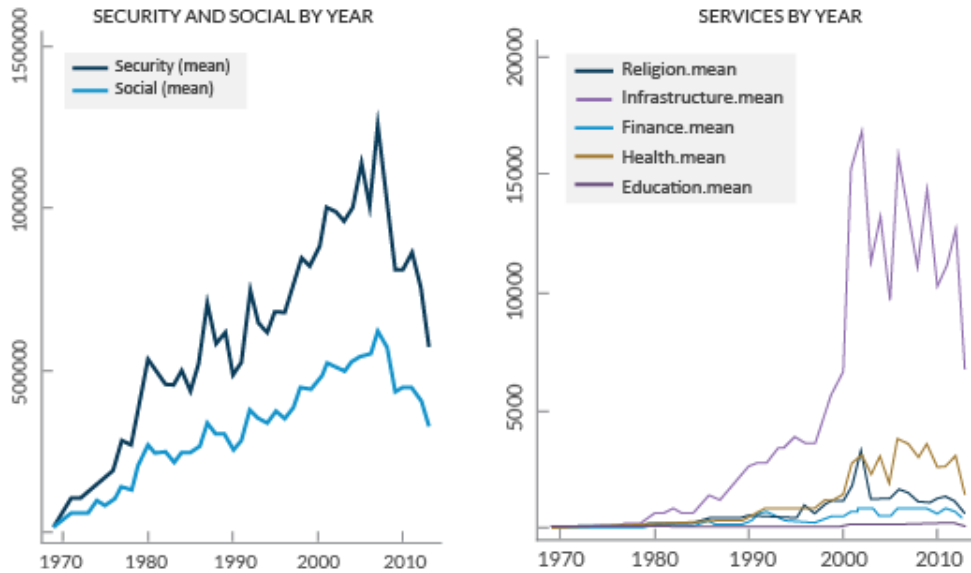


Another way of aggregating the data is for all groups by service sector, or even specific search terms, across time. Figures 8 and 9 show these trends. In Figure 8, we aggregated different service sectors from 1970 onward. Note that here we use two figures because two sectors, security and social services, have significantly more mentions and scale differently. As with total provision (Figure 1), both security and social services trended upward until recently.

> *Non-state actors globally were not actively providing religious, health, financial, or infrastructure-related services until the early 2000s.*

Trends in other sectors show a very different pattern. Non-state actors globally were not actively providing religious, health, financial, or infrastructure-related services until the early 2000s. The category of education services, however, appears remarkably different in both scale and uptake. In the 1980s, non-state-actor involvement in education can be seen to increase, spiking in the early 2000s and remaining high for the next decade.

Figure 9 explores one aspect of this trend in more detail by focusing on the trends in references to non-state involvement in madrassas (one of our key search terms). Here we see what appears to be an explosion in non-state involvement in madrassa training throughout the 2000s, likely correlated with wars in Iraq and Afghanistan. This trend passes the "face validity" test in confirming what we know must be true given the expansion of use and coverage. We note, however, that coverage of these groups likely also ballooned over this time period, a fact that underscores our earlier assertion that research using these data should account for periods of significant conflict.

**Figure 9:** Mentions of the word "madrassa" by year
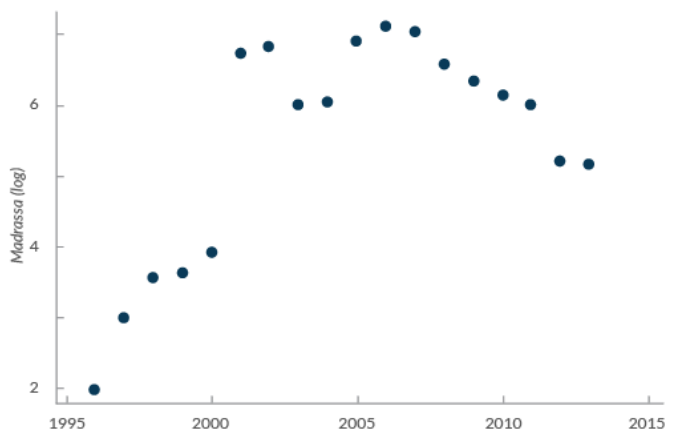
The data can also be used to compare substantive differences in non-state actor behavior across regime types. Non-state actors in democracies may, for instance, provide a very different set of goods than their peers in non-democracies do. Table 2 shows the average across sectors broken into democracies (polity>5) and autocracies (polity<–5). The N in each category is the sum of all non-state-actor–years across each type of regime. Our data track several factors because there are likely differences across regime type. We expect that non-state actors based in democracies likely face fewer barriers to organization and activity in democracies, and that news coverage in these regimes is better.

> *Non-stateactors appear more involved in the provision of health, education, and religion-related social services compared to their peers in autocracies.*

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The sector averages represent the mean number of service mentions per group. Non-state actors appear more involved in the provision of health, education, and religion-related social services compared to their peers in autocracies. Conversely, however, non-state actors in autocracies are significantly more active in the security sector.

**Table 2:** Service category by regime type

| Service Type | Democracies (N=3,517) | Autocracies (N=877) |
|---|---|---|
| Religion (mean) | 4.34 | 1.14 |
| Infrastructure (mean) | 0.29 | 0.04 |
| Health (mean) | 6.11 | 1.94 |
| Education (mean) | 27.81 | 7.68 |
| Financial (mean) | 2.09 | 0.68 |
| Security (mean) | 3,962.42 | 4,326.46 |
| Social (mean) | 2,078.5 | 2,240.35 |
| Total | 6,365.25 | 6,763.21 |

*Afghan boys at a madrassa in Kabul. The 2000s experienced a sharp increase in non-state actors in madrassa training. Massoud Hossaini/AFP/Gety Images*

# IV. COMPATIBILITY AND PREDICTIVE UTILITY

Our goal in this effort is to provide a measure of service provision that, while not perfect, is an improvement on the existing data. In this spirit, we are optimistic that this might be used with GTD, ACLED, and MAROB. We include the crosswalk identifiers to finish these merges cleanly, with the obvious caveat that coverage varies significantly within these samples.

## 4.0.1 Lethality

To show some of the utility of its use with other datasets, we offer a first cut (not a theory or a "test") to look at how the TIOS service-provision measures correlate with lethality. This particular dependent variable was chosen because it has the advantage of offering three different measures, as well as because prior work has shown a robust link between hierarchical, functionally differentiated groups and lethality. We matched groups in our set to groups in the GTD data to create a group-year–level measure of casualties (number killed + number wounded). We get 1,036 group-year matches. We caution against putting too much weight on these analyses given the small initial set of matches, but we believe it provides a good initial plausibility probe. Figure 10 shows the casualties over time of groups in the lethality subsample that can be matched to GTD.
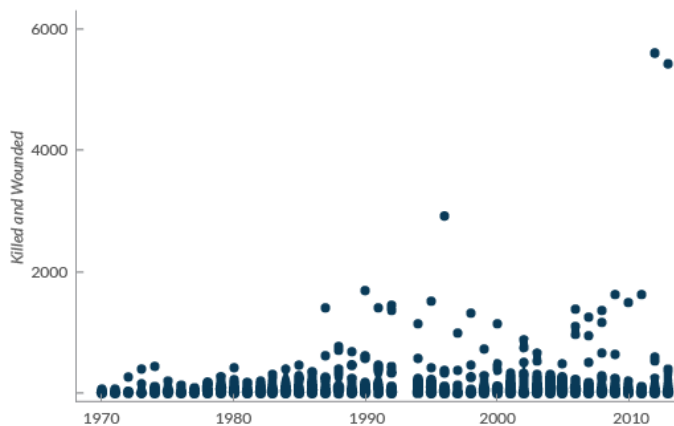
Generally speaking, there is a slight upward trend in the number of people killed and wounded, particularly after 1990. As a very rough check, Table 3 presents some correlations over time between diversity in services provided (a count of the number of different services provided) and casualties. The columns to the right display the dependent variable. The coefficient and SE are displayed below. In addition to including fixed effects by year, we also included the article count per group-year in an attempt to control for disparate coverage issues whereby greater coverage for some group-years may bias the results.

**Table 3:** Conditional correlations: controlling for article count, year fixed effects

| Diversity of services provided | Casualties | Killed | Wounded |
|---|---|---|---|
| | 9.23*** | 4.21*** | 5.02*** |
| | (2.49) | (1.29) | (1.34) |

These back-of-the-envelope results indicate that groups with more diverse services offered correlate quite highly with higher numbers of casualties in violent attacks. This finding is in line with our earlier work, which suggests a positive correlation between service provision and lethality is the result of hierarchy within organizations. That said, we expect this level of consistency and that other findings in the field should be replicable using our data. For instance, research has found that suicide tactics are more likely to be used by groups that provide social services. We anticipate this finding will be borne out longitudinally as well, and we look forward to research into connections between suicide attacks and the types of services or the relative availability of services based on this data. Only anecdotal evidence has heretofore been available for these more nuanced questions.

Our next steps include investigating the period where we see a downward tick in service provision. We also plan to look at the effects of service provision in other conflict dynamics, including settlement and duration.

**Figure 10:** Casualties over time

## 4.0.2 Group Duration

Although less work has been devoted to questions around the relationship between conflict duration and service provision, our data allow researchers to explore the interaction between these variables. We suspect this relationship might be somewhat circular. Groups that provide services are likely able to withstand political pressure and counterinsurgency tactics. Service provision embeds groups in communities, probably giving them more legitimacy as representative agents and more access to community resources. Combined, these benefits allow groups to endure for longer periods of time during conflict compared to groups that do not provide services. On the flip side, groups that last longer during conflict are probably better equipped to provide services to their supporters. By virtue of resource endowments, initial levels of support, or other idiosyncratic factors, when groups endure on the battlefield they may become more sensitive to communities affected by conflict and then be better able to provide targeted goods and services.

> *Service provision embeds groups in communities, probably giving them more legitimacy as representative agents and more access to community resources*

As a first cut at these issues, we ran a simple regression using Cronin's lifespan (Year1) measure against the yearly average of our service diversity indicator controlling for groups' average article counts. Our results were strong and positive; groups with higher service diversity scores were indeed more likely to have longer lifespans. This result holds even if we exclude all groups with lifespan estimates over 20 years (which is more than 25 percent of the data). See Figure 11 for a graphical representation of the relationship.

**Figure 11:** Group lifespan
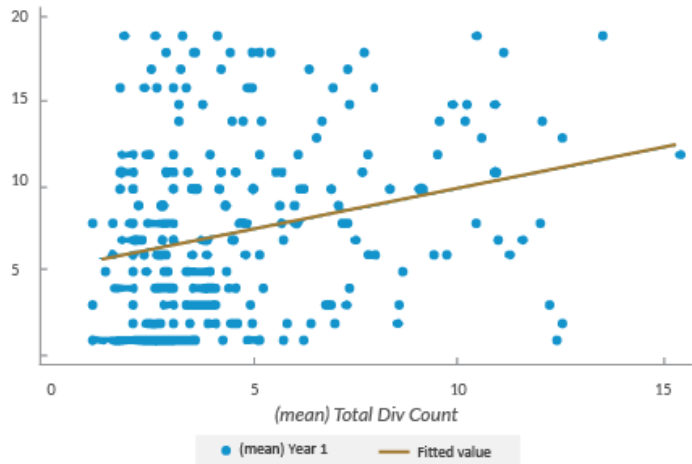


Unlike in the category of lethality, where research has established the positive connection with service provision, we believe there is a significant share of work to be done around questions of duration. We also note here that one advantage of our dataset is that it allows researchers to estimate group lifespan using news coverage rather than violent events. As far as we are aware, most estimates of group lifespans are loosely based around violent activity, which may not actually track to when a group is founded or terminated. News coverage offers a different, perhaps more holistic, view of terrorist and insurgent group activity.

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# V. CONCLUSIONS

While we would be the last to call this a perfect indicator of services, there is a need for a generalizable measure across a larger set of terrorist organizations. We hope that we have demonstrated the utility of this measure, not only for other related data on conflict and governance but also across scholarly and practitioner communities. The role of service provision is well established and growing in the academic literature, and the policy community has an increasing interest in measures of these phenomena. We see this dataset as an opportunity to provide a service to both groups.



*Kanishka Afshari FCO , DFID.*

> *Anecdotal evidence suggests that governance gaps, where they exist, are being filled by non-state actors. TIOS data allows for the ability to assess whether this is empirically true, and if so, which services.*

In concluding, we view several avenues of research as particularly promising uses of TIOS 2.0. First, we think comparisons between what non-state actors are doing and what states are (not) doing will be particularly telling. Anecdotal evidence suggests that governance gaps, where they exist, are being filled by non-state actors. TIOS data allows for the ability to assess whether this is empirically true, and if so, which services. Indeed, in other work, we look at which services groups choose to provide—whether complements or substitutes to what the state (or other groups) provide—but there is much more nuance to explore. These types of activities might also be predictive of other changes in violent strategies.

Indeed, we also view research into conflict-time interactions with service providers as potentially being quite informative. If social services create legitimacy for non-state (or state) actors, we ought to see surges in these behaviors during conflict. We imagine this will be particularly true for groups that seek a broad audience and/or have broad political goals.

Relatedly, we suspect there may be ways to categorize the service profile of organizations. For instance, nationalist groups may provide a different set of goods compared with religiously motivated groups. Likewise, a group's funding sources might predict what types of services they provide. Moreover, there are a slew of questions related to how groups deliver services and who gets those services that remain largely unanswered. How selective are groups about who gets their goods? Under what conditions, if any, do groups deliver services to the constituents of their opponents? Do groups deliver certain goods through closed channels while others are more transparent?

Finally, we hope that practitioners and scholars alike will be able to integrate TIOS data into their own research on specific groups, countries, and conflicts. The anecdotal data on service provision that piqued our interest in the topic in the first place might be usefully enhanced with TIOS data. We hope to expand the coverage for more complete integration with other datasets, as well as use practitioner feedback to refine the data to reflect the behavior of non-state actors. .

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# APPENDICES

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# CODEBOOK

The TIOS 2.0 dataset contains quantitative measures of public service provision by terrorist groups. Each observation in the dataset is a group-year. There are, broadly speaking, four sets of variables. The first are the raw counts of keywords. The values for these variables equal the number of times that keyword was mentioned in all of the .txt files for that group-year. The second set of variables are manipulations of the raw counts. These variables include the combinations of the raw counts into sectors as well as taking the mean of all within-sector variables. These give a broader sense of the types of services each group provides each year. The third set of variables provide a sense of coverage using two metrics. The first of these is the word count for each group-year. The second is the article count for each group-year. The last set of variables includes the identifiers for each observation and includes variables suited to merging these data with other commonly used conflict datasets, including MAROB, ACLED, and GTD.

## Identifiers

1. name
2. year
3. base
4. cowid$_1$
5. tios groupid
6. gtd countrycode
7. gtd gname
8. marob orgid
9. acled name1
10. acled name2
11. acled name3
12. acled name4
13. acled name5
14. acled name6
15. acled name7
16. acled name8

## LIST OF VARIABLES (SECTOR IN PARENTHESES)

### Keywords

1. church (religion)
2. clinic (health)
3. court
4. cultural (society)
5. financial
6. foodbank
7. hospital (health)
8. loan (finance)
9. madrassa (religion)
10. medic (health)
11. medical
12. microloan (finance)
13. militia (security)
14. minister (religion)
15. mosque (religion)
16. news
17. party
18. police
19. radio
20. reconstruction (infrastructure)
21. school (education)
22. septic (infrastructure)
23. shadow
24. social (society)
25. sport (society)
26. teacher (education)
27. trash (infrastructure)

## Variables Constructed out of Keywords

1. religion
2. infrastructure
3. health
4. education
5. finance
6. security
7. society
8. religion.mean
9. infrastructure.mean
10. health.mean
11. education.mean
12. finance.mean
13. security.mean
14. social.mean
15. total
16. total.mean
17. church.dich  (dichotomous)
18. madrassa.dich
19. minister.dich
20. mosque.dich
21. reconstruction.dich
22. septic.dich
23. trash.dich
24. clinic.dich
25. hospital.dich
26. medic.dich
27. school.dich
28. teacher.dich
29. loan.dich
30. microloan.dich
31. militia.dich
32. cultural.dich
33. social.dich
34. sport.dich
35. court.dich
36. news.dich
37. radio.dich
38. education.dich
39. health.dich
40. diversity.count
41. tot.div.count

## Coverage Variables

1. Artcount
2. Words
3. Sentences

# VARIABLE DESCRIPTIONS

## Keywords

1. church
   - Minimum: 0; Maximum: 2,445
   - This variable takes the value of the number of mentions of the words "church" or "churches" for each group each year.

2. clinic
   - Minimum: 0; Maximum: 569
   - This variable takes the value of the number of mentions of the words "clinic" or "clinics" for each group each year.

3. court
   - Minimum: 0; Maximum: 14,680
   - This variable takes the value of the number of mentions of the words "court" or "courts" for each group each year.

4. cultural
   - Minimum: 0; Maximum: 2
   - This variable takes the value of the number of mentions of the word "cultural" for each group each year.

5. financial
   - Minimum: 0; Maximum: 1
   - This variable takes the value of the number of mentions of the word "financial" for each group each year.

6. foodbank
   - Minimum: 0; Maximum: 2
   - This variable takes the value of the number of mentions of the words "foodbank" or "foodbanks" for each group each year.

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7. hospital
   - Minimum: 0; Maximum: 3
   - This variable takes the value of the number of mentions of the words "hospital" or "hospitals" for each group each year.

8. loan
   - Minimum: 0; Maximum: 522
   - This variable takes the value of the number of mentions of the words "loan" or "loans" for each group each year.

9. madrassa
   - Minimum: 0; Maximum: 594
   - This variable takes the value of the number of mentions of the words "madrassa" or "madrassas" for each group each year.

10. medic
    - Minimum: 0; Maximum: 2,681
    - This variable takes the value of the number of mentions of the words "medic" or "medics" for each group each year.

11. medical
    - Minimum: 0; Maximum: 1
    - This variable takes the value of the number of mentions of the word "medical" for each group each year.

12. microloan
    - Minimum: 0; Maximum: 10
    - This variable takes the value of the number of mentions of the words "microloan" or "microloans" for each group each year.

13. militia
    - Minimum: 0; Maximum: 4,922
    - This variable takes the value of the number of mentions of the words "militia" or "militias" for each group each year.

14. minister
    - Minimum: 0; Maximum: 5
    - This variable takes the value of the number of mentions of the words "minister" or "ministers" for each group each year.

15. mosque
    - Minimum: 0; Maximum: 5
    - This variable takes the value of the number of mentions of the words "mosque" or "mosques" for each group each year.

16. news
    - Minimum: 0; Maximum: 36,330
    - This variable takes the value of the number of mentions of the word "news" for each group each year.

17. party
    - Minimum: 0; Maximum: 1
    - This variable takes the value of the number of mentions of the words "party" or "parties" for each group each year.

18. police
    - Minimum: 0; Maximum: 1
    - This variable takes the value of the number of mentions of the word "police" for each group each year.

19. radio
    - Minimum: 0; Maximum: 4,915
    - This variable takes the value of the number of mentions of the words "radio" or "radios" for each group each year.

20. reconstruction
    - Minimum: 0; Maximum: 2
    - This variable takes the value of the number of mentions of the word "reconstruction" for each group each year.

21. school
    - Minimum: 0; Maximum: 9,034
    - This variable takes the value of the number of mentions of the words "school" or "schools" for each group each year.

22. septic
    - Minimum: 0; Maximum: 10
    - This variable takes the value of the number of mentions of the word "septic" for each group each year.

23. shadow
    - Minimum: 0; Maximum: 959
    - This variable takes the value of the number of mentions of the words "shadow" or "shadows" for each group each year.

24. social
    - Minimum: 0; Maximum: 21,360
    - This variable takes the value of the number of mentions of the word "social" for each group each year.

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25. sport
    - Minimum: 0; Maximum: 2,685
    - This variable takes the value of the number of mentions of the words "sport" or "sports" for each group each year.

26. teacher
    - Minimum: 0; Maximum: 1,499
    - This variable takes the value of the number of mentions of the words "teacher" or "teachers" for each group each year.

27. trash
    - Minimum: 0; Maximum: 162
    - This variable takes the value of the number of mentions of the words "trash" for each group each year.

## Manipulations of Keywords

1. religion
    - Minimum: 0; Maximum: 2,602
    - This variable sums results from across church, mosque, madrassa, minister, and temple.

2. infrastructure
    - Minimum: 0; Maximum: 164
    - This variable sums results from across septic, trash, and reconstruction.

3. health
    - Minimum: 0; Maximum: 3,170
    - This variable sums results from across hospital, medic, and clinic.

4. education
    - Minimum: 0; Maximum: 10,380
    - This variable sums results from across school and teacher.

5. finance
    - Minimum: 0; Maximum: 522
    - This variable sums results from across loan and microloan.

6. security
    - Minimum: 0; Maximum: 4,922
    - This variable equals militia.

7. society
    - Minimum: 1; Maximum: 21,480
    - This variable sums results from across cultural, social, and sport.

8. religion.mean
    - Minimum: 0; Maximum: 520.4
    - This variable sums results from across the religion categories—church, mosque, madrassa, minister, and temple—and then divides by the number of categories: 5.

9. infrastructure.mean
    - Minimum: 0; Maximum: 54.67
    - This variable sums results from across the infrastructure categories—septic, trash, and reconstruction—and then divides by the number of categories: 3.

10. health.mean
    - Minimum: 0; Maximum: 1057
    - This variable sums results from across the health categories—hospital, medic, and clinic—and divides by the number of categories: 3.

11. education.mean
    - Minimum: 0; Maximum: 5,192
    - This variable sums results from across the education categories—school and teacher—and divides by the number of categories: 2.

12. finance.mean
    - Minimum: 0; Maximum: 261
    - This variable sums results from across the finance categories—loan and microloan—and divides by the number of categories: 2.

13. security.mean
    - Minimum: 0; Maximum: 4,922
    - This number sums results from across the security category—militia—and divides by the number of categories: 1.

14. society.mean
    - Minimum: 0.3; Maximum: 7,160
    - This variable sums results from across the social categories—cultural, social, and sport—and divides by the number of categories: 3.

15. total
    - Minimum: 1; Maximum: 32,380
    - This variable sums results from across church, mosque, madrassa, minister, temple, septic, trash, reconstruction, hospital, medic, clinic, school, teacher, loan, microloan, cultural, social, sport, tax, and militia.

16. total.mean
    - Minimum: 0.05; Maximum: 1,619
    - This variable sums results from across church, mosque, madrassa, minister, temple, septic,trash, reconstruction, hospital, medic, clinic, school, teacher, loan, microloan, cultural, social, sport, tax, and militia, and divides by the number of categories: 20.

17. church.dich
    - Mean: 0.44
    - This variable equals one when there is at least one mention of the keyword "church" and zero otherwise.

18. madrassa.dich
    - Mean: 0.049
    - This variable equals one when there is at least one mention of the keyword "madrassa" and zero otherwise.

19. minister.dich
    - Mean: 0.003
    - This variable equals one when there is at least one mention of the keyword "minister" and zero otherwise.

20. mosque.dich
    - Mean: 0.0006
    - This variable equals one when there is at least one mention of the keyword "mosque" and zero otherwise.

21. reconstruction.dich
    - Mean: 0.002
    - This variable equals one when there is at least one mention of the keyword "reconstruction" and zero otherwise.

22. septic.dich
    - Mean: 0.02
    - This variable equals one when there is at least one mention of the keyword "septic" and zero otherwise.

23. trash.dich
    - Mean: 0.13
    - This variable equals one when there is at least one mention of the keyword "trash" and zero otherwise.

24. clinic.dich
    - Mean: 0.28
    - This variable equals one when there is at least one mention of the keyword "clinic" and zero otherwise.

25. hospital.dich
    - Mean: 0.002
    - This variable equals one when there is at least one mention of the keyword "hospital" and zero otherwise.

26. medic.dich
    - Mean: 0.44
    - This variable equals one when there is at least one mention of the keyword "medic" and zero otherwise.

27. school.dich
    - Mean: 0.60
    - This variable equals one when there is at least one mention of the keyword "school" and zero otherwise.

28. teacher.dich
    - Mean: 0.42
    - This variable equals one when there is at least one mention of the keyword "teacher" and zero otherwise.

29. loan.dich
    - Mean: 0.28
    - This variable equals one when there is at least one mention of the keyword "loan" and zero otherwise.

30. microloan.dich
    - Mean: 0.007
    - This variable equals one when there is at least one mention of the keyword "microloan" and zero otherwise.

31. militia.dich
    - Mean: 0.40
    - This variable equals one when there is at least one mention of the keyword "militia" and zero otherwise.

32. cultural.dich
    - Mean: 0.002
    - This variable equals one when there is at least one mention of the keyword "cultural" and zero otherwise.

33. social.dich
    - Mean: 1
    - This variable equals one when there is at least one mention of the keyword "social" and zero otherwise.

34. sport.dich
    - Mean: 0.38
    - This variable equals one when there is at least one mention of the keyword "sport" and zero otherwise.

35. court.dich
    - Mean: 0.62
    - This variable equals one when there is at least one mention of the keyword "court" and zero otherwise.

36. news.dich
    - Mean: 0.82
    - This variable equals one when there is at least one mention of the keyword "news" and zero otherwise.

37. radio.dich
    - Mean: 0.60
    - This variable equals one when there is at least one mention of the keyword "radio" and zero otherwise.

38. education.dich
    - Mean: 0.63
    - This variable equals one when there is at least one mention of any of the education keywords ("school" and "teacher") and zero otherwise.

39. health.dich
    - Mean: 0.28
    - This variable equals one when there is at least one mention of any of the health keywords ("hospital" and "clinic") and zero otherwise.

40. edu.health.diversity
    - Minimum: 0; Maximum: 4
    - This variable sums school.dich, teacher.dich, clinic.dich, and hospital.dich for each group-year.

41. tot.div.count
    - Minimum: 0; Maximum: 18
    - This variable sums results from across church.dich, mosque.dich, madrassa.dich, minister.dich, temple.dich, septic.dich, trash.dich, reconstruction.dich, hospital.dich, medic.dich, clinic.dich, school.dich, teacher.dich, loan.dich, microloan.dich, cultural.dich, social.dich, sport.dich, tax.dich, and militia.dich.

## Coverage Variables

1. artcount
    - Minimum: 1; Maximum: 33,750
    - This variable provides a count of the number of articles associated with each group for each year.

2. words
    - Minimum: 58; Maximum: 28,510,000
    - This variable provides the word count for each group-year.

3. sentences
    - Minimum: 1; Maximum: 1,126,000
    - This variable provides a count of the number of sentences associated with each group for each year.

## Identifiers

1. name
   - This variable identifies the name of the group for that observation.

2. year
   - This variable identifies the year for that observation.

3. base
   - This variable indicates the country in which the group is based.

4. cowid1
   - This variable indicates the Correlates of War country code for the base country.

5. tios groupid
   - This variable provides the corresponding group identification number of the Terrorist and Insurgent Organization Social Services Dataset.

6. gtd countrycode
   - This variable provides the appropriate country code to facilitate merging with the Global Terrorism Database based upon country code rather than group name.

7. marob orgid
   - This variable provides the appropriate group name to facilitate merging with the Minorities at Risk Organizational Behavior dataset.

8. acled name1
   - This variable provides the appropriate group name to facilitate merging with the Armed Conflict Location and Event Data Project dataset.

9. acled name2
   - Where a group is associated with more than one of the ACLED groups, this variable provides the name of the second ACLED group.

10. acled name3
    - Where a group is associated with more than one of the ACLED groups, this variable provides the name of the  third ACLED group.

11. acled name4
    - Where a group is associated with more than one of the ACLED groups, this variable provides the name of the fourth ACLED group.

12. acled name5
    - Where a group is associated with more than one of the ACLED groups,  this variable provides the name of the fifth ACLED group.

13. acled name6
    - Where a group is associated with more than one of the ACLED groups, this variable provides the name of the sixth ACLED group.

14. acled name7
    - Where a group is associated with more than one of the ACLED groups, this variable provides the name of the seventh ACLED group.

15. acled name8
    - Where a group is associated with more than one of the ACLED groups, this variable provides the name of the eighth ACLED group.

16. gtd gname
    - This variable provides the corresponding group name to facilitate merging with the Global Terrorism Database based upon the group name rather than country code.

# REFERENCES

1   For examples of both, see Eli Berman, *Radical, Religious, and Violent: The New Economics of Terrorism* (Cambridge, MA: MIT University Press, 2011); Eli Berman and David D. Laitin, "Religion, Terrorism, and Public Goods: Testing the Club Model," *Journal of Public Economics* 92 (2008): 1942–1967; Alex Braithwaite, "Resisting Infection: How State Capacity Conditions Conflict Contagion," *Journal of Peace Research* 47, no. 3 (2010): 311–319; Cullen S. Hendrix, "Measuring State Capacity: Theoretical and Empirical Implication for the Study of Civil Conflict," *Journal of Peace Research* 47, no. 3 (2010): 273–285; Zachariah Cherian Mampilly, Rebel Rulers: Insurgent Governance and Civilian Life During War (Ithaca, NY: Cornell University Press, 2011); David Sobek, "Masters of Their Domains: The Role of State Capacity in Civil Wars," *Journal of Peace Research* 47, no. 3 (2010): 267–271; Zeynep Taydas and Dursun Peksen, "Can States Buy Peace? Social Welfare Spending and Civil Conflicts," J*ournal of Peace Research* 49, no. 2 (2012): 273–287; Cameron G. Thies, "Of Rulers, Rebels, and Revenue: State Capacity, Civil War Onset, and Primary Commodities," *Journal of Peace Research* 47, no. 3 (2010): 321–332; Clayton Thyne, "ABC's, 123's, and the Golden Rule: The Pacifying Effect of Education on Civil War, 1980–1999," *International Studies Quarterly* 50 (2006): 733–754.

2   Lindsay L. Heger, Danielle F. Jung, and Wendy Wong, "Linking Non-State Governance and Violence," *Journal of Global Security Studies* 2, no. 3 (2017): 220–236.

3   Benjamin Bahney, Radha Iyengar, Patrick Johnston, Danielle Jung, Howard Shatz, and Jake Shapiro, "Insurgent Compensation: Evidence from Iraq," *American Economic Review* 103, no. 3 (2013): 518–522; Patrick Johnston, Jacob N. Shapiro, Howard J. Shatz, and Danielle F. Jung, *Foundations of the Islamic State: Management, Money and Terror in Iraq*, 2005–2010 (RAND Corporation, 2016).

4   Kelly McEvers, "Jihadi Fighters Win Hearts and Minds by Easing Syria's Bread Crisis," *All Things Considered*, National Public Radio, 2013, http://www.npr.org/sections/thesalt/2013/01/18/169516308/as-syrian-rebels-reopen-bakeries-bread-crisis-starts-to-ease.

5   Jonathan Wilkenfeld, Victor Asal, and Amy Pate, "Minorities at Risk Organizational Behavior (MAROB) Middle East, 1980–2004," 2011, http://hdl.handle.net/1902.1/15973.

6   Audrey Kurth Cronin, *How Terrorism Ends: Understanding the Decline and Demise of Terrorist Campaigns* (Princeton, NJ: Princeton University Press, 2011).

7   Lindsay L. Heger and Danielle F. Jung, "Negotiating with Rebels: The Effect of Rebel Service Provision on Conflict Negotiations," *Journal of Conflict Resolution* 61, no. 6 (2017): 1203–1229.

8   Aaron Clauset, Lindsay L. Heger, Maxwell Young, and Kristian Skrede Gleditsch, "The Strategic Calculus of Terrorism: Substitution and Competition in the Israel-Palestine Conflict," *Cooperation and Conflict* 45, no. 1 (2010): 6–33.

9   William A. Wagstaff and Danielle F. Jung, "Competing for Constituents: Trends in Terrorist Service Provision," *Terrorism and Political Violence*, 29 September 2017, http://dx.doi.org/10.1080/09546553.2017.1368494.

10   Ibid.

11   National Consortium for the Study of Terrorism and Responses to Terrorism (START), 2017, "Global Terrorism Database [Data file]," https://www.start.umd.edu/gtd.

12   Clionadh Raleigh, Andrew Linke, Havard Hegre, and Joakim Karlsen, "Introducing ACLED-Armed Conflict Location and Event Data," *Journal of Peace Research* 47, no. 5 (2010): 651–660.

13   Wilkenfeld, Asal, and Pate (MAROB).

14   Lindsay L. Heger, Danielle F. Jung, and Wendy Wong, "Organizing for Resistance: How Group Structure Impacts the Character of Violence," *Terrorism and Political Violence* 24 no. 5 (2012): 743–768.

15   Heger, Jung, and Wong, "Organizing for Resistance"; Heger and Jung, "Negotiating with Rebels"; Heger, Jung, and Wong, "Linking Non-State Governance and Violence."

16    Cronin, *How Terrorism Ends*.

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