Diskussionspapierreihe
Working Paper Series

Helmut Schmidt Universität
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Can news draw blood? The impact of media coverage on the number and severity of terror attacks

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Nr./ No. 169
Mai 2016

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Redaktion / Editors
Helmut Schmidt Universität Hamburg / Helmut Schmidt University Hamburg
Fächergruppe Volkswirtschaftslehre / Department of Economics

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Zusammenfassung / Abstract

Using a new data set that captures the share of reporting on terrorism, we explore the nexus between terrorist attacks and the news. It turns out that terrorism mainly influences news reports through the number of incidents. Regarding the reverse causality, we provide evidence that the share of the news devoted to terrorism Granger-causes further terrorist activities. However, short-run and medium-run effects differ: in the short run media coverage on terror only has an impact on the severity of terror attacks, while it affects the number of terror attacks in the long haul. These observations are consistent with the idea of competition between terrorist groups.

JEL-Klassifikation / JEL-Classification: D74, B25

Schlagworte / Keywords: terrorism, media, news reporting

1 Introduction

The hypothesis that terrorist attacks lead up to news coverage cannot surprise anyone. On second thought, one might even wonder whether at some point habituation effects kick in, as in a world plagued with terrorism new attacks are hardly news unless they strike close at home and (or) exceed the customary level of violence. The reverse causality, however, appears much more interesting and politically relevant: Is there a feedback mechanism through which news reporting induces additional terrorism?

There exists a small theoretical literature on the latter issue, in particular Frey and Rohner (2007) and Pfeiffer (2012b). This strand of literature typically focusses on the *share* of news reporting devoted to terrorism. The reason is that the models view optimising networks and newspapers as being constrained by a given volume of news broadcasts or a maximum number of pages available in a daily publication. We believe this constraint to be a plausible one, which merits further study.

Over the past two decades, a rich literature has emerged dealing with both the economic modelling, and the econometric estimation, of terrorism.[1] The pertinent empirical literature using newsfeeds, [2] however, typically relies on the number of Google searches (Pfeiffer, 2012a), the number of articles in a newspaper (Jetter, 2014) and other *absolute* measures of news coverage. The present paper differs from the existing literature in that it exploits a new dataset allowing for a reliable measure of *relative* coverage. We also go beyond most of the existing literature in that we focus on television reports, using a selection of media from three Western countries.

We begin with a short dynamic model that introduces a feedback loop from news reports to terrorist activity, broadly construed (section 2). Section 3 describes our new data set, and section 4 presents our estimation strategy and results. Section 5 concludes.

[1] The standard handbooks in the discipline survey this stuff (Garfinkel and Skaperdas, 2012). Recent results stress the heterogeneity of terrorism (Kis-Katos et al., 2011).

[2] These is a large theoretical and empirical literature that analyses the impact of the media and of media bias on decision-making by economic actors (see, for example, Baron, 2005; Gentzkow et al., 2011). Many papers also use data from Media Tenor (see, for example, Garz, 2014; Lamla and Dräger, 2013). However, this literature typically focuses on voting and macroeconomic variables rather than reports on terrorism and thus we will not survey it here.

2 A simple model

Our model of the interaction between the media and terrorist groups is similar in spirit to Frey and Rohner (2007) and Pfeiffer (2012b). However, their model is static – although they consider a dynamic extension in the appendix – and formulated in terms of controls rather than states. We also explicitly introduce a third sector, namely sponsors of terrorism, to motivate our hypothesis that there exists a feedback loop between the *share* of media capacity devoted to terrorism and terrorist activity. For brevity, we specify the behaviour of agents in our model parametrically rather than derive it from optimisation.

The model contains three state variables, viz. the resources r_t available to the terrorist group, the public attention a_t for terrorism and for other news items (b_t). Suppressing time indices, the latter two are supposed to change over time according to the following linear differential equations:

$$\dot{a} = \frac{\epsilon s r}{p} - \delta_1 a \tag{1}$$

$$\dot{b} = \tilde{n} - \delta_2 b \tag{2}$$

In equation (2), s represents the share of available resources that terrorist groups devote to carrying out attacks, p are the costs of a single attack, and ϵ measures the effectiveness of terrorist attacks, e.g. the average number of casualties per attack.

The public interest in a newsitem wanes as time goes by. We capture this by including depreciation of a and b at the rates δ_1 and δ_2, respectively. "Other" news is assumed to arrive at a random rate $\tilde{n}$; in numerical simulation, we typically assume this to be uniformly distributed over some range $[0; n_{\max}]$.

$$\dot{r} = \frac{aw}{a+b} - \delta_3 r - sr \tag{3}$$

The terrorist sector receives funding from sponsoring nations, groups and individuals, whose willingness to pay depends on the parameter w and the *share* of reporting on terrorist events in the media (Pfeiffer, 2012b). The fraction $\frac{a}{a+b}$ represents the familiar ratio conflict success function (Hirshleifer, 2001), where the scale parameter has been set to unity. Terrorist resources can be spent on attacks (sr) or saved, in which case they depreciate at a rate δ_3. This assumption reflects the hypothesis that terrorist groups find it difficult to put their capital to productive use in the official economy, and that some resources will be destroyed by anti-terror efforts.

There is no stationary state proper in this model due to the random stream of general news $\tilde{n}$. However, if n were a constant and equal to its expectation, a stationary state could be computed. Letting $\dot{a} = \dot{b} = \dot{r} = 0$, two solutions to our system of equations can be obtained. The first one is a corner solution where both the number of attacks and the terrorist resources are zero, and the second one is

$$a^* = \frac{\epsilon s w}{\delta_1 p(\delta_3 + s)} - \frac{\mathrm{E}\tilde{n}}{\delta_2} \tag{4}$$

$$b^* = \frac{\mathrm{E}\tilde{n}}{\delta_2} \tag{5}$$

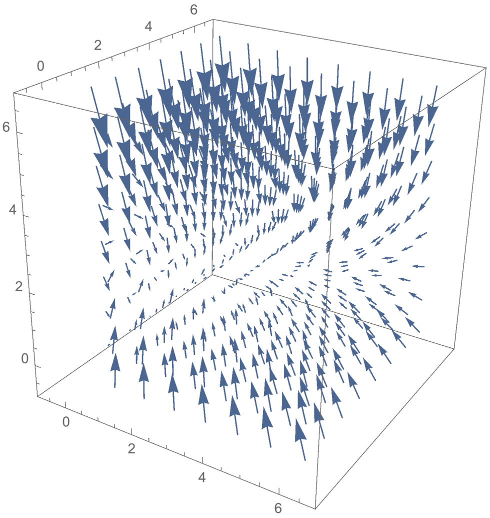
$$r^* = \frac{w}{s + \delta_3} - \frac{\delta_1 p \mathrm{E}\tilde{n}}{\delta_2 \epsilon s} \tag{6}$$

Besides imposing obvious restrictions on the values of our parameters required to ensure that the stationary state lies in the positive orthant, these results do not offer any surprises. In order to determine the stability properties of the system, we compute its Jacobian

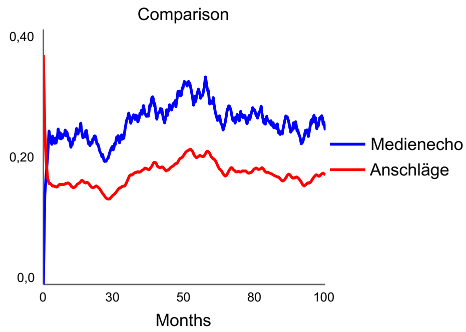
$$\mathcal{J} = \begin{pmatrix} -\delta_1 & 0 & \frac{\epsilon s}{p} \\ 0 & -\delta_2 & 0 \\ \frac{bw}{(a+b)^2} & -\frac{aw}{(a+b)^2} & -\delta_3 - s \end{pmatrix} \tag{7}$$

and find its eigenvalues to be $\lambda_1 = -\delta_2$, $\lambda_2 = \frac{\sqrt{A^2+4b\epsilon sw}-(a+b)\sqrt{p}(\delta_3+s+\delta_1)}{2(a+b)\sqrt{p}}$ and $\lambda_3 = \frac{-\sqrt{A^2+4b\epsilon sw}-(a+b)\sqrt{p}(\delta_3+s+\delta_1)}{2(a+b)\sqrt{p}}$, where A is the expression $A = (a+b)\sqrt{p}(\delta_3 + s - \delta_1)$. As $A^2 + 4b\epsilon w > 0$, all three eigenvalues will be elements of the real line. Furthermore, it is obvious that $\lambda_1 < 0$ and $\lambda_3 < 0$. The sign of λ_3 is indeterminate, although numerical experimentation shows that it is positive only for small values of a and b. Consequently, the stationary point – if it exists at all in the positive orthant –, is either asymptotically stable or saddle point stable, with the former case being more likely. Figure 1 on page 5 presents a representative simulation run of the model.[3]

[3] The specific values chosen for this example are: $\delta_1 = \delta_2 = \delta_3 = \frac{1}{5}$, $w = 3$, $s = \frac{3}{5}$, $p = 1$, and $\epsilon = \frac{3}{10}$. $\tilde{n}$ is assumed to be uniformly distributed over the unit interval.



(a) Vector field



(b) Time path of media attention and the number of incidents

Figure 1: An example simulation of the theoretical model

As the simulated time series in figure 1 illustrates, the model predicts terrorist acts and their share of reporting to move together. All three stocks are endogenous, in particular, there is a causal link from terrorism to media reports as well as the reverse causality. We therefore state the following two hypotheses:

Hypothesis 1 *Terrorist activity Granger-causes the proportion of media reports devoted to terrorism.*

Hypothesis 2 *The intensity of reporting in the media Granger-causes the volume of terrorist activity.*

3 Data

The present study draws on two different data sources: Data on terrorist incidents are taken from the Global Terrorism Database (GTD) (for the Study of Terrorism Responses to Terrorism , START), which has become a staple of the empirical literature on the economics of terrorism (see, for example Kis-Katos et al., 2011). GTD captures a variety of information for incidents (if available), including – but not limited to – date, geographical location, perpetrators, targets, weapons and methods used, number of victims killed and wounded, and an estimate of material damage (for more on GTD, see LaFree et al., 2015). From this data, we construct separate time series containing the total number of incidents per day and the total number of victims (both killed and wounded) for international, domestic and all terrorism, respectively.[4]

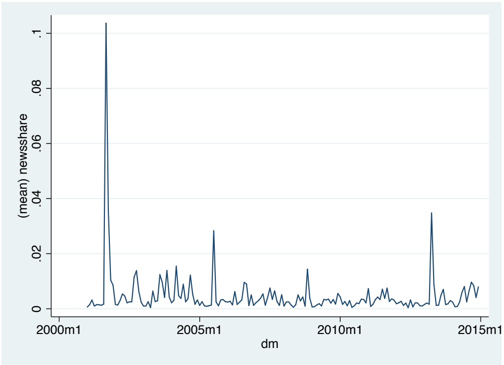
Our data on media coverage comes from a bespoke dataset kindly provided by Media Tenor.[5] *All* news items broadcast by selected television programmes in three countries[6] were captured and *analysed* by human experts. Available variables include date, source country, name of medium, style of the item, category of main topic, main topic, main actor referenced, region or country referenced, and an evaluation. News items are standardized pieces of information provided by a media report. For example, if one terrorist incident is covered, each time the protagonist, such as the terrorist or the victims, or the source, such as the anchorperson or terror expert or a politician, changes, this will be added as a separate item on the same incident. In total 1.797.181 news items were analysed from nine TV news broadcasts As we know the number and type of all news items broadcast in every single TV broadcast, we are in a position to construct a fair measure of the share of reporting an incident receives, in line with the theoretical argument outlined above and in the literature (Frey and Rohner, 2007; Pfeiffer, 2012b).

The four panels in figure 2 on page 7 trace key variables in our data set over time. The top left panel (2a) shows the share of news items, *newsshare*, on terrorism. We immediately see the outlier that was 9/11, but also recognise that the portion of news broadcasts devoted to terrorism is fairly low (below 1 %) on most days. At the top right, we show (panel 2b) the time series of *incidents* and victims killed (*kills*) over time. Again, two outliers stand out, one being 9/11 and the other the attack on the Boston

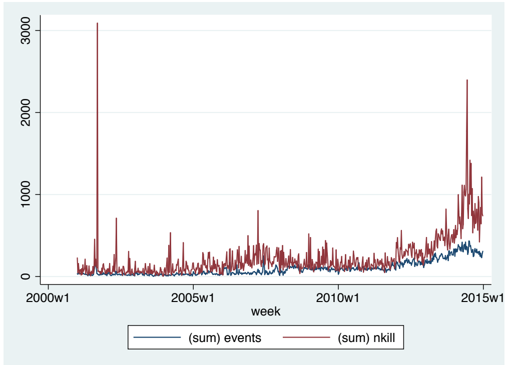
[4] The GTD database contains variables designed to capture various aspects of internationalness. We consider an incident to be “international” if it fulfills *all* of these criteria. In addition, we also compiled a list of terrorist organisations that (a) are responsible for more than 25 incidents over the period of consideration (2001-2014) and (b) appear to operate across national borders according to their description in the media. Using this second delineation failed to make a difference to our results.

[5] Media Tenor International is a globally operating Swiss-based media analysis institute. Media Tenor employs more than 100 professional analysts to carry out media analyses. Only analysts that achieved a minimum reliability of 0.85 are cleared for coding – i.e., the coding of these analysts in training must not deviate at most by 0.15 from the trainers’ versions. The reliability of the coding is checked on an ongoing basis, both with quarterly standard tests and random spot checks. For each month and analyst, three analyzed reports are selected randomly and checked. Analysts scoring lower than 0.80 are removed from the coding process. In none of the months did the mean deviation among all coders exceed 0.15.

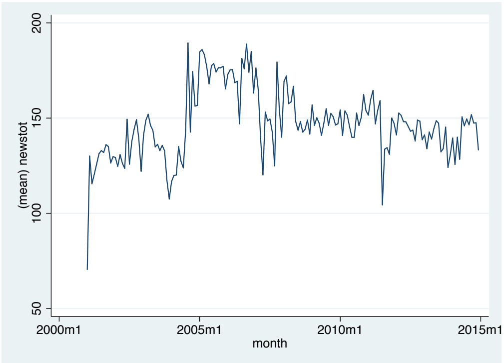
[6] These are: Tagesschau, Tagesthemen, heute and heute journal (Germany); BBC (Newsnight) and Ten o’Clock News on BBC 1 (UK); CBS Evening News, FOX Special Report w/Bret Baier, and NBC Nightly News (USA).



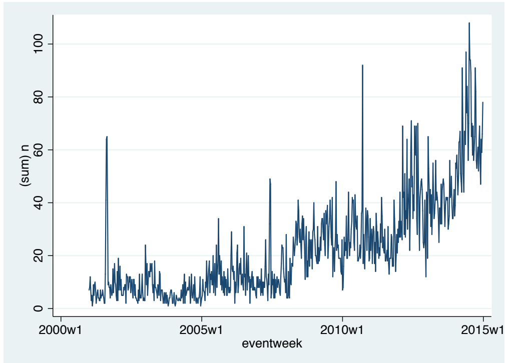
(a) The share of news devoted to terrorism



(b) Terrorist events and victims killed



(c) Number of items



(d) International terrorist events

Figure 2: Plots of selected time series from our data set

Marathon. We also find some indication that terrorist incidents have grown deadlier over time.

On the bottom row of figure 2 on page 7, the left-hand panel shows the time series of the number of items reported on all our media channels, while the right panel (2d) plots the number of terrorist acts classified as international by the GTD over time. It is apparent that international terrorism is on the rise in absolute terms, and a visual comparison to panel 2b suggests that this form of terrorism has also become more prevalent in relative terms. But note the scale on the y axis: Regarding the number of incidents, *localised terrorism still dwarves the international variant.*

4 Results

To analyse the implications of the theoretical model, we aggregate our time series on a *weekly* basis, pooling international and regional terrorism. At a first step, we run Phillips-Perron unit root tests on *incidents*, *kills* and *newsshare* in order to determine possible nonstationarities (see Table 1 below).[7] Overall, all variables are found to be I(0).

Table 1: Philips-Perron unit root tests (H_0: no stationarity)

Variable	Model	# lags	Z(t)	p-value
incidents	constant	6	-2.503	0.11
incidents	constant & trend	6	-6.577	0.00
kills	constant	6	-4.575	0.00
kills	constant & trend	6	-13.056	0.00
newsshare	constant	6	-22.558	0.00
newsshare	constant & trend	6	-22.637	0.00

Next, we tackle hypothesis 1, running Granger causality test using *incidents* and fatalities on the one and *newsshare* on the other hand. Although Bayesian as well as Akaike information criteria suggest the use of six lags, we also include up to a dozen lags in our regressions. By these means, we are able to cover as much a quarter. As can be seen from table 2, the number of incidents Granger cause the newsshare using up to 12 lags. The expected short-run effect through the frequency of attacks channel can therefore be regarded as established.[8]

However, using the number of kills instead of the number of incidents leads to a quite different result: the null that the number of kills do not Granger cause coverage on terrorism can not be rejected in any case. We are unable to find a short-run effect through the severity of attacks channel. The mere occurrence of an incident appears to be more important for the media than its severity. Taking logs of the number of incidents and fatalities to reflect that our left-hand variable is a proportion leads to similar results.[9]

[7] Tests are conducted using levels of *newsshare* and levels as well as logs of *incidents* and *kills* using only a constant term in the underlying regressions. We additionally ran unit root tests for *incidents* and *kills* including a deterministic trend.

[8] Interestingly, it seems to take one period of time for the new incidents to have an impact.

[9] Respective results are not reported but can be provided by the authors upon request.

Table 2: Granger causality tests of terrorism causing media reporting

H_0	# of lags	χ^2-statistics	Prob > χ^2
incidents $\nrightarrow$ newsshare	1	0.63	0.42
incidents $\nrightarrow$ newsshare	2	6.45	0.04
incidents $\nrightarrow$ newsshare	3	10.12	0.02
incidents $\nrightarrow$ newsshare	4	10.53	0.03
incidents $\nrightarrow$ newsshare	5	10.87	0.05
incidents $\nrightarrow$ newsshare	6	11.84	0.06
incidents $\nrightarrow$ newsshare	7	17.82	0.01
incidents $\nrightarrow$ newsshare	8	18.22	0.02
incidents $\nrightarrow$ newsshare	9	18.70	0.03
incidents $\nrightarrow$ newsshare	10	19.05	0.04
incidents $\nrightarrow$ newsshare	11	19.73	0.05
incidents $\nrightarrow$ newsshare	12	19.96	0.07
kills $\nrightarrow$ newsshare	1	0.97	0.32
kills $\nrightarrow$ newsshare	2	0.96	0.62
kills $\nrightarrow$ newsshare	3	1.90	0.59
kills $\nrightarrow$ newsshare	4	1.91	0.75
kills $\nrightarrow$ newsshare	5	6.41	0.27
kills $\nrightarrow$ newsshare	6	8.02	0.23
kills $\nrightarrow$ newsshare	7	8.45	0.29
kills $\nrightarrow$ newsshare	8	8.33	0.40
kills $\nrightarrow$ newsshare	9	8.36	0.50
kills $\nrightarrow$ newsshare	10	8.54	0.57
kills $\nrightarrow$ newsshare	11	8.80	0.64
kills $\nrightarrow$ newsshare	12	8.95	0.70

Table 3: Granger causality tests of terrirosm causing media reporting

H_0	# of lags	χ^2-statistics	Prob > χ^2
newsshare $\nrightarrow$ incidents	1	0.02	0.87
newsshare $\nrightarrow$ incidents	2	0.27	0.87
newsshare $\nrightarrow$ incidents	3	0.96	0.81
newsshare $\nrightarrow$ incidents	4	2.22	0.69
newsshare $\nrightarrow$ incidents	5	2.78	0.73
newsshare $\nrightarrow$ incidents	6	3.75	0.71
newsshare $\nrightarrow$ incidents	7	4.56	0.71
newsshare $\nrightarrow$ incidents	8	4.77	0.78
newsshare $\nrightarrow$ incidents	9	6.15	0.72
newsshare $\nrightarrow$ incidents	10	6.46	0.77
newsshare $\nrightarrow$ incidents	11	7.10	0.79
newsshare $\nrightarrow$ incidents	12	7.17	0.84
newsshare $\nrightarrow$ kills	1	105.00	0.00
newsshare $\nrightarrow$ kills	2	82.19	0.00
newsshare $\nrightarrow$ kills	3	69.93	0.00
newsshare $\nrightarrow$ kills	4	59.72	0.00
newsshare $\nrightarrow$ kills	5	56.10	0.00
newsshare $\nrightarrow$ kills	6	53.69	0.00
newsshare $\nrightarrow$ kills	7	51.14	0.00
newsshare $\nrightarrow$ kills	8	49.83	0.00
newsshare $\nrightarrow$ kills	9	49.02	0.00
newsshare $\nrightarrow$ kills	10	50.90	0.00
newsshare $\nrightarrow$ kills	11	51.33	0.00
newsshare $\nrightarrow$ kills	12	51.01	0.00

Let us now turn to the second hypothesis. To test this, we run Granger causality test under the null that newsshare does not Granger cause the number of incidents or number of fatalities, respectively. Table 3 summarizes the results from both tests regarding a rather short-run perspective. Again, event though information criteria suggest six lags, we admit up to a dozen lags to account for at least a three months period. Interestingly, while the share of reports on terrorist attacks fail as a predictor of the number of incidents, the null of newsshare does not Granger cause the number of kills can be rejected. This finding is consistent with the type of model discussed in section 2, although terrorists appear to compete through the intensity of effort rather than through its quantity.

As the planning of terrorist acts – depending on the type of attack – may require a considerable amount of time, we now aggregate the data on a monthly basis and rerun Granger causality tests in order to determine the predictive power of media reporting on both the number of incidents and the number of kills. Table 4 shows the respective results. While newsshare is found to Granger cause *kills* up to a lag length of ten, which translates into a half a year effect, the number of incidents, again, shows different results. relative media coverage is not causal for the number of incidents during the first two months. However, the null can be rejected for lags more than two and less than ten.

We interpret these results as evidence for an impact of media coverage on terrorist activities. We find the “forward” causation from attacks on news reporting to be a short-term effect, consistent with the waning of public interest depicted in our model, while media coverage has a delayed effect on terrorist acts. This is plausible as attacks usually require planning and preparation. We also posit that the number of kills is rather a measure of quality than quantity. Therefore mimicking terror acts may result in a higher “quality” of attacks or, put differently, in more violent acts.

However, media coverage also seems to have a longer-term “reverse” causal effect. The reporting Granger causes the number of incidents when the time considered is measured in months rather than weeks.

Table 4: Granger causality tests of terrorism causing media reporting (monthly data)

H_0	# of lags	χ^2-statistics	Prob > χ^2
newsshare $\nrightarrow$ incidents	1	0.29	0.58
newsshare $\nrightarrow$ incidents	2	2.01	0.36
newsshare $\nrightarrow$ incidents	3	7.66	0.05
newsshare $\nrightarrow$ incidents	4	8.33	0.08
newsshare $\nrightarrow$ incidents	5	9.79	0.08
newsshare $\nrightarrow$ incidents	6	11.30	0.08
newsshare $\nrightarrow$ incidents	7	11.81	0.10
newsshare $\nrightarrow$ incidents	8	13.52	0.09
newsshare $\nrightarrow$ incidents	9	15.10	0.09
newsshare $\nrightarrow$ incidents	10	13.74	0.18
newsshare $\nrightarrow$ incidents	11	12.97	0.29
newsshare $\nrightarrow$ incidents	12	15.11	0.23
newsshare $\nrightarrow$ kills	1	31.07	0.00
newsshare $\nrightarrow$ kills	2	26.51	0.00
newsshare $\nrightarrow$ kills	3	25.33	0.00
newsshare $\nrightarrow$ kills	4	25.68	0.00
newsshare $\nrightarrow$ kills	5	27.51	0.00
newsshare $\nrightarrow$ kills	6	27.16	0.00
newsshare $\nrightarrow$ kills	7	27.94	0.00
newsshare $\nrightarrow$ kills	8	31.01	0.00
newsshare $\nrightarrow$ kills	9	32.90	0.00
newsshare $\nrightarrow$ kills	10	16.30	0.09
newsshare $\nrightarrow$ kills	11	17.05	0.11
newsshare $\nrightarrow$ kills	12	14.63	0.26

5 Conclusion

This paper uses a new dataset uniquely containing a measure of the share of television news devoted to terrorism in order to investigate two hypotheses derived from a stylised three-sector dynamic model of terrorism, its financial sponsors, and the media: (a) terror acts cause media coverage and (b) media coverage causes further terrorist acts It turns out that the empirical evidence confirms both the main theoretical hypotheses, sort of. *News can indeed draw blood*, but there are qualifications.

We do find the expected short-run effect of terrorism on media coverage (hypothesis 1). This is straightforward as terror attacks are of certain news value for the media. The reverse causality implied by the theoretical model seems to be present as well (hypothesis 2). However, we also present evidence that short-run and medium-run mechanisms differ.

In the short run, media coverage on terror has an impact on the severity, but not on the quantity, of terror attacks. This is plausible because terror attacks need some time to plan and organize, and so terror sponsors can in the short run just "invest" in already planned attacks. On the other hand, the long run adds another margin of choice in that the number of attacks can also be varied to attract sponsorship. As a result the number of terror incidents increase.

These observations are consistent with an extension of our model that emphasizes competition between terrorist groups (instead of the monolithic terrorist sector we posited earlier).

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