Communications technology and terrorism - Online Supplement

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A Appendices

A.1 Code for Filtering Attacks that Failed without Intervention by Law Enforcement Agencies

To filter out terror attacks that failed without intervention by law enforcement agencies, we carefully studied the characteristics of such attacks. There were two main reasons for failure in these attacks: either the plan could not be executed because of, say, malfunctioning of the weapon or, even when the plan was executed, the intended target was missed. After carefully studying the summaries of unsuccessful attacks, we noted certain terminologies reappearing in the description of such attacks, e.g., the word 'failed' or 'did not explode' appeared when the bomb failed to explode but if the bomb was diffused by law enforcement agencies prior to the intended time for explosion, the words 'discovered' and 'dismantled/diffused' were used. We developed our code on the basis of such particular features of explanation of unsuccessful attacks in the GTD variable *summary* that records summaries for each terrorist attack. We conduct our analysis in *Stata*. We generated a new variable 'other' by employing the following code.

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gen other = $regexm(summary,$ " detonate | exploded | fired | failed | damages | casualties | threw | fled the scene | did not explode | ignited | bombed | unharmed | did not damage ")
if $success == 0$

For the entries that meet the criteria set out in this code, i.e., if $other = 1$, we exclude them both from the count of unsuccessful attacks and total attacks.

A.2 An Alternative Specification of the Profit Function

To separate out the marginal effects of β and τ, let us assume that the profit function of the representative agent takes the following form:

$$\pi(\beta) = \big(1-\tau\big)\beta^{\delta}\tau^{\alpha} + (1-\beta)w, \tag{A1}$$

such that $0 < \alpha < 1$, $0 \leq \tau \leq 1$ and $0 < \delta < 1$. Maximizing π with respect to β yields the optimal time devoted to terrorism β^* with

$$\beta^* = \left[\frac{\delta[1-\tau]\tau^{\alpha}}{w}\right]^{\frac{1}{1-\delta}}. \tag{A2}$$

Comparative statics along the lines of τ give us the change in the optimal time devoted to terrorism in response to a change in τ with the peak in β^* associated with τ^* such that

$$\tau^* = \frac{\alpha}{1+\alpha}. \tag{A3}$$

A.3 Proof of τ^* Constituting a Maximum, not a Minimum

Since $\frac{\partial\beta^*}{\partial\tau} = \frac{1}{1-\alpha}(\frac{\alpha\tau^{\alpha}(1-\tau)}{w})^{\frac{\alpha}{1-\alpha}}(\frac{-\alpha\tau^{\alpha}}{w} + \frac{(1-\tau)\alpha^2\tau^{\alpha-1}}{w})$, we can take another derivative with respect to τ and obtain $\frac{\partial^2\beta^*}{\partial\tau^2} = (\frac{1}{1-\alpha})(\frac{1}{w})^{\frac{1}{1-\alpha}}[(\frac{\alpha}{1-\alpha})(\alpha\tau^{\alpha}(1-\tau))^{\frac{2\alpha-1}{1-\alpha}}(-\alpha\tau^{\alpha}+(1-\tau)\alpha^2\tau^{\alpha-1})((\alpha-1)(1-\tau)\alpha^2\tau^{\alpha-2} - \alpha^2\tau^{\alpha-1}]$. This expression is strictly negative since $(\alpha-1)(1-\tau)\alpha^2\tau^{\alpha-2} < \alpha^2\tau^{\alpha-1}$ (given $\alpha < 1$).

A.4 Alternative Classification of Attacks in the GTD

Table A1: Predicting the number of terror attacks, employing an alternative classification of attacks into domestic and transnational.

	(1) Domestic (excluding unclassified)	(2) Domestic (including unclassified)	(3) Transnational (excluding unclassified)	(4) Transnational (including unclassified)
KOF index of information flows	5.436***	3.931***	5.417***	4.293***
	(0.696)	(0.503)	(0.570)	(0.456)
(*KOF* index of information flows)^2	-4.949***	-3.374***	-5.803***	-4.398***
	(0.665)	(0.456)	(0.505)	(0.414)
Standard controls[a]	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes
Country-fixed effects	yes	yes	yes	yes
# of countries	105	152	140	154
# of years	41	41	41	41
N	2,596	4,468	3,843	4,822

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Standard controls include *polity*2 (re-scaled to range from zero to 20) and its square, regime duration, interstate and internal armed conflicts, the political instability index, the natural logarithm of GDP per capita and population size, as well as the Composite Index of National Capability.

A.5 Correlation between Control Variables

Table A2: Correlation Matrix for Control Variables

Variable	*KOF* index	Polity2	Duration of regime	Interstate conflict	Internal conflict	Political instability index	Ln(GDP /capita)	Ln(pop)	CINC
KOF index	1.00								
Polity2	0.511	1.00							
Duration of regime	0.358	0.103	1.00						
Interstate conflict	-0.119	-0.050	0.010	1.00					
Internal conflict	-0.243	-0.045	-0.104	0.126	1.00				
Political instability index	-0.286	-0.123	-0.138	0.132	0.514	1.00			
Ln(GDP/capita)	0.758	0.450	0.471	-0.084	-0.214	-0.246	1.00		
Ln(pop)	-0.255	0.081	0.084	0.147	0.310	0.233	-0.148	1.00	
CINC	0.056	0.057	0.236	0.140	0.047	0.016	0.120	0.456	1.00

Table A3: Predicting the number of terror attacks, employing a negative binomial regression framework.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
KOF index	4.350***	4.607***	4.598***	4.136***	4.523***	4.103***	5.642***	3.896***	4.408***
	(0.448)	(0.450)	(0.445)	(0.445)	(0.460)	(0.446)	(0.411)	(0.444)	(0.446)
(*KOF* Index)^2	-4.070***	-4.247***	-4.345***	-3.893***	-4.230***	-3.655***	-4.051***	-3.852***	-4.090***
	(0.406)	(0.407)	(0.403)	(0.404)	(0.412)	(0.402)	(0.404)	(0.407)	(0.406)
Polity2	0.119***		0.160***	0.126***	0.162***	0.098***	0.106***	0.116***	0.121***
	(0.022)		(0.020)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
(Polity2)^2	-0.004***		-0.006***	-0.004***	-0.006***	-0.003***	-0.003***	-0.004***	-0.004***
	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Regime Durability	-0.108***	-0.176***		-0.119***	-0.083***	-0.133***	-0.083***	-0.119***	-0.103***
	(0.023)	(0.020)		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Interstate conflict	-0.607***	-0.677***	-0.649***		-0.612***	-0.517***	-0.659***	-0.588***	-0.609***
	(0.125)	(0.127)	(0.124)		(0.128)	(0.124)	(0.123)	(0.126)	(0.125)
Internal conflict	0.700***	0.749***	0.664***	0.693***		0.889***	0.710***	0.757***	0.691***
	(0.062)	(0.061)	(0.061)	(0.062)		(0.055)	(0.062)	(0.062)	(0.061)
Political instabliity index	0.130***	0.103***	0.141***	0.117***	0.206***		0.115***	0.133***	0.130***
	(0.017)	(0.018)	(0.017)	(0.017)	(0.014)		(0.017)	(0.017)	(0.017)
Ln(GDP/cap)	0.273***	0.314***	0.248***	0.287***	0.278***	0.245***		0.280***	0.275***
	(0.036)	(0.035)	(0.035)	(0.036)	(0.036)	(0.035)		(0.036)	(0.036)
Ln(pop)	0.154***	0.161***	0.165***	0.147***	0.198***	0.159***	0.161***		0.175***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.027)	(0.028)	(0.028)		(0.022)
CINC	1.756	2.044	0.434	1.769	0.325	2.091	2.302	6.719***	
	(1.444)	(1.407)	(1.430)	(1.448)	(1.449)	(1.433)	(1.463)	(1.074)	
Year-fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country-fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
# of countries	155	155	155	155	155	155	155	155	155
# of years	41	41	41	41	41	41	41	41	41
N	4,934	4,934	4,934	4,934	4,934	4,934	4,934	4,934	4,934

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A.6 Results from a Semi-parametric Regression Model

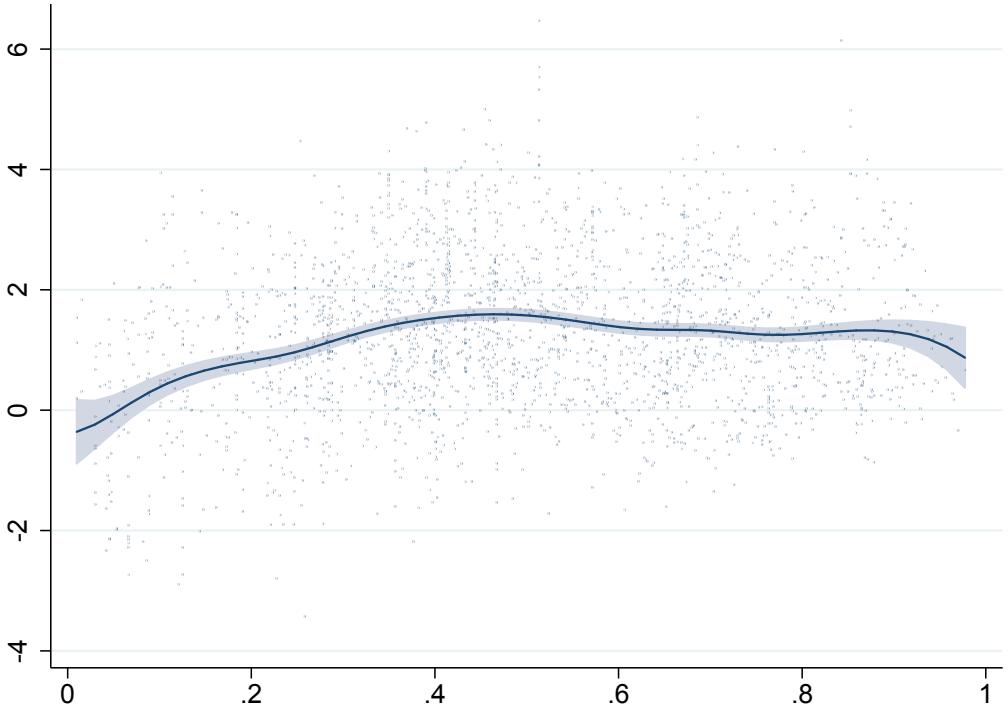

Figure A1: Semiparametric Effects: The logarithm of the number of terrorist attacks and the KOF index of information flows when controlling for the familiar set of covariates and time-fixed effects (see column 4 of Table 2), employing the *semipar* Stata command (Robinson et al., 1988).

A.7 Replacing Year-Fixed Effects with Dummy Variables

Table A4: Predicting the number of terror attacks, employing a negative binomial regression framework.

	(1)	(2)	(3)	(4)
Dependent variable: # of terror attacks in country i and year t (mean = 15.92)				
KOF index of information flows	4.350***	2.904***	4.333***	3.571***
	(0.448)	(0.434)	(0.422)	(0.439)
(KOF index of information flows)^2	-4.070***	-4.526***	-4.143***	-4.205***
	(0.406)	(0.398)	(0.404)	(0.404)
Additional controls		Dummy for Cold war	Dummy for post-9/11	Dummies for Cold War & post-9/11
Standard controls[a]	yes	yes	yes	yes
Year-fixed effects	yes	no	no	no
Country-fixed effects	yes	yes	yes	yes
# of countries	155	155	155	155
# of years	41	41	41	41
N	4,934	4,934	4,934	4,934

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Standard controls include*polity*2 (re-scaled to range from zero to 20) and its square, regime duration, interstate and internal armed conflicts, the political instability index, the natural logarithm of GDP per capita and population size, as well as the Composite Index of National Capability.

A.8 Alternative Specification for Domestic Terrorism

Table A5: Predicting the number of domestic terror attacks, employing a negative binomial regression framework.

	(1)	(2)	(3)
Dependent variable: # of domestic terror attacks in country i and year t			
KOF index of information flows	5.436***	4.550***	4.348***
	(0.696)	(1.211)	(1.206)
(*KOF* index of information flows)^2	-4.949***	-4.467***	-4.773***
	(0.665)	(1.280)	(1.294)
Fractionalization		0.161	
		(0.273)	
Economic discrimination		0.119**	
		(0.055)	
Political discrimination		0.095*	
		(0.050)	
Standard controls[a]	yes	yes	yes
Year-fixed effects	yes	yes	yes
Country-fixed effects	yes	yes	yes
# of countries	105	72	72
# of years	41	29	29
N	2,596	1,156	1,156

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Column 1 shows findings from our baseline specification, Column 2 presents results from the alternative model using the controls specified in Savun and Phillips (2009), while in Column 3 results from baseline specification are reported again after restricting its sample size to that of the alternative specification. [a]Standard controls include *polity*2 (re-scaled to range from zero to 20) and its square, regime duration, interstate and internal armed conflicts, the political instability index, the natural logarithm of GDP per capita and population size, as well as the Composite Index of National Capability.

A.9 Exploring the Role of Income Levels

Table A6: Predicting the number of terror attacks for different subsamples of countries and alternative control variables. Specifications (1) – (4) depict results for poor, lower-middle income, upper-middle income, and rich country-year observations, respectively, classified on the basis of GDP per capita quartiles.

	(1)	(2)	(3)	(4)	(5)
Dependent variable: # of terror attacks in country i and year t (mean = 15.92)					
KOF index of information flows	5.083***	5.548***	5.225***	3.684**	5.893***
	(1.342)	(0.816)	(0.596)	(1.782)	(0.514)
(*KOF* index of information flows)^2	-4.625**	-5.453***	-4.870***	-2.636*	-5.591***
	(1.939)	(0.960)	(0.608)	(1.485)	(0.475)
(Ln(GDP/capita))^2					0.093***
					(0.015)
Standard controls[a]	yes	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes	yes
Country-fixed effects	yes	yes	yes	yes	yes
# of countries	58	96	127	40	155
# of years	41	41	41	41	41
N	1,386	2,574	3,713	1,205	4,934

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Standard controls include *polity*2 (re-scaled to range from zero to 20) and its square, regime duration, interstate and internal armed conflicts, the political instability index, the natural logarithm of GDP per capita and population size, as well as the Composite Index of National Capability.

A.10 Additional Robustness Checks

Table A7: Predicting the number of terror attacks, employing a negative binomial regression framework.

	(1) 1970-2015	(2) 1970-1989	(3) 1990-2015	(4)
Dependent variable: # of terror attacks in country i and year t				
KOF index of information flows	4.350***	5.867***	1.377**	3.142 ***
	(0.448)	(1.377)	(0.568)	(0.868)
(KOF index of information flows)^2	-4.070***	-6.536***	-0.958*	-4.002***
	(0.406)	(1.611)	(0.498)	(0.825)
External transparency index				yes
Standard controls[a]	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes
Country-fixed effects	yes	yes	yes	yes
# of countries	155	98	153	144
# of years	42	19	23	16
N	4,934	1,654	2,968	1,896

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Standard controls include*polity*2 (re-scaled to range from zero to 20) and its square, regime duration, interstate and internal armed conflicts, the political instability index, the natural logarithm of GDP per capita and population size, as well as the Composite Index of National Capability.

Table A8: Displaying results from robustness checks to address concerns about reporting bias using different thresholds of fatalities to count terror attacks.

	(1) All attacks	(2) Attacks where deaths>0	(3) Attacks where deaths>5	(4) Attacks where deaths>10	(5) Attacks where deaths>15	(6) Attacks where deaths>20
KOF index	4.350***	3.353***	3.286***	2.823***	2.736***	2.306***
(KOF index)^2	-4.070***	-2.790***	-2.841***	-2.732***	-2.555***	-2.188***
	(0.406)	(0.492)	(0.711)	(0.780)	(0.835)	(0.848)
Standard controls[a]	yes	yes	yes	yes	yes	yes
Year-fixed effects	yes	yes	yes	yes	yes	yes
Country-fixed effects	yes	yes	yes	yes	yes	yes
# of countries	155	136	89	72	67	61
# of years	41	41	41	41	41	41
N	4,934	1,619	943	773	676	594

Notes: Standard errors are displayed in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. [a]Standard controls include *polity*2 (re-scaled to range from zero to 20) and its square, regime duration, interstate and internal armed conflicts, the political instability index, the natural logarithm of GDP per capita and population size, as well as the Composite Index of National Capability.

References

Robinson, P. M. et al. (1988). Root-n-consistent semiparametric regression. *Econometrica 56*(4), 931–954.

Savun, B. and B. J. Phillips (2009). Democracy, foreign policy, and terrorism. *Journal of Conflict Resolution 53*(6), 878–904.