Small Investment and Large Returns: Terrorism, Media and the Economy

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By

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Abstract

This study investigates the role of the media to the impact of terrorism on the economy. A unique data set of 3045 articles published in major Israeli newspapers covering 180 terrorist attacks was used to evaluate their impact on the Tel Aviv stock market in 2002. We perform an econometric analysis of editorial decision making regarding the articles' placement and print characteristics: number of articles, front page, pictures and large headlines. We found that media coverage is the main channel by which terrorism produces economic damage: i.e., media coverage was the only explanatory variable found to be significant in the equation explaining the economic damage incurred. The economic damage caused increases monotonically with the amount media coverage. For a given terror attack, the greater its media coverage, the greater the economic damage caused. We also found that the impact of the media coverage of terrorism on the economy decreased over time.

JEL classification: G10, G14
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Recent research on the effect of terrorism on the economy has shown that terror attacks produce a relatively large negative impact on the economy; the impact is estimated to be of a macroeconomic magnitude. Abadie and Gardeazabal (2003) found that terrorism reduced per capita GDP in the Basque Country by some 10 percent relative to a control area, Eckstein and Tsiddon (2004) estimated a 5 percent decline in GDP in Israel, Eldor and Melnick (2004, hereinafter EM) estimated a 30 percent decline in the stock market in Israel[1], (for other costs of terrorism in terms of utility see the survey by Frey, Luechinger and Stutzer (2004)). A puzzling still-open issue is why is the impact of terrorism on the economy is so large.[2] The existing empirical evidence on the subject, obtained by a variety of methods and data, share the characteristic of analysis by reduced-form econometric models that are inherently unsuitable for explaining the conundrum. The purpose of this paper is to present an initial attempt to fill this gap by attempting to capture the mechanism at work.

A second motivation for this study is that it seems that the size of terrorism's effect on the economy is unrelated to the rather small amount of resources "invested" by the terrorists. One of the possible reasons terrorism works is that terrorists appear to have found the means to produce sizeable economic "returns" with very small "investments". Understanding the mechanism that produces such a disproportional impact may lead to the design of an efficient strategy or policy that could help reduce the amount of economic damage done, thus reducing the motivation for terrorism and operating as an important counter-terrorism measure.

Many scholars of terrorism have suggested that the media or the media coverage of terrorism plays a key role in the achievement of the goals set by terrorist

[1] For other research in the subject see the special issue of the *European Journal of Political Economy* (2004).

[2] For an open economy, Abadie and Gardeazabal (2005) attribute the economic cost to diversion of net foreign direct investment.

organizations (Nacos (2002), Ganor (2005) and Fielding and Shortland (2006)). It is unimaginable that terrorism could achieve its goals without media involvement. Our assumption is that the impact of terrorism may be related to the amount of media coverage, that terrorist organizations induce production of a large amount of "free" media coverage for the purpose of advancing their causes. An appealing approach to measuring the amount of media coverage produced by terrorism is to evaluate the opportunity cost (hereinafter OC) of the "free" media coverage produced in the wake of a terror attack. We constructed a media coverage variable by answering the question: What would be the opportunity cost of buying the amount of media coverage obtained by terror organizations? Think of how much Bin Laden would have had to pay to, say, CNN, to buy all its TV coverage of the September 11 attack.[3] This figure might be in the order of magnitude capable of explaining the size of the economic impact produced by the terrorist act.

To evaluate the impact of terrorism on the economy we continue the approach developed in EM representing the economy by the total value of Tel Aviv Stock Exchange, which is the sole stock market operating in Israel. The discounted-cash-flow valuation model states that stock prices reflect investors' expectations about future corporate earnings and its cost of equity. Accordingly, if terror attacks negatively affect the expectations of firms' profitability, and positively affect the cost of equity because of the increased uncertainty, share prices are expected to decline. Alternatively, if investors anticipate that firms' profitability will not be jeopardized in the long run and the cost of equity does not change, share prices are not expected to decline.

In this paper we analyze the impact of terrorism on the media and then the impact of the media coverage of terrorism on the stock market. Our main hypotheses are:

[3] Five years after the September 11 attack, Bin Laden and al-Qaeda continue to obtain free media coverage for their terror campaign.

1. The media coverage of terrorism is the main channel by which terrorism produces economic damage, i.e., the only significant explanatory variable in an equation explaining the economic damage of terrorism is media coverage.

2. The economic damage caused by terrorism increases monotonically with the amount media coverage, i.e., for a given terror attack, the greater its media coverage, the greater its economic damage.

3. The impact of the media coverage of terrorism on the economy decreases with time.

In the following section we describe the media and terror data and explain the construction of the OC variable. In section 3 we explore the impact of terrorism on the media. We provide an econometric analysis of newspaper editors' decisions on the coverage of terrorism: how many articles to publish, the criteria for printing the article in the front page, the inclusion of large headlines and the inclusion of pictures. We focus on the estimation of the OC function; this function is interpreted as a production function of terrorism media coverage. The model and the econometric methodology to test our hypotheses are presented in section 4. The hypotheses and results are presented in section 5. Conclusions and a summary follow in section 6.

2. The data and the opportunity cost

To test our hypotheses we collected a unique data set consisting of 3045 articles published in the year 2002[4] in Israel's major daily newspapers[5] (hereinafter referred to as media coverage). We included the number of articles published (AP), the number of articles published on the front page (FP), the number of articles with large headlines (TI) and the number of pictures (PI) on all the attack dates and on the

[4] The most violent year, in the wave of terrorism that begun in September 2000 in Israel.
[5] *Yedioth Ahronoth*, *Maariv*, *Haaretz* and *Globes*.

first two consecutive days immediately following a terror attacks. The media data was merged with the terror data.[6] The terror data pertained to the 180 attacks that took place in 2002. We focused our analysis here on the terror attributes that EM found to have the largest impact on the economy: the number of attacks per day (AT), the attacks that took place within the "Green Line"[7] (GL), the number of suicide attacks (SU), the number of people killed (KI) and the number of people injured (IN).

The total estimated opportunity cost of publishing newspaper media coverage of terrorists attacks in Israel, during 2002, was NIS 0.5 billion.[8] This estimate was obtained by summing up the OC of printing each of the articles in each of the newspapers, considering the size of the text, the page, the size of the headline and the pictures included.[9] Is this a large sum? One way of addressing that question is to ask what size of media campaign could be launched with a budget of $11 billion in the US.[10] This sum is 2 times larger than the Proctor & Gamble advertisement budget, three times larger than the GM budget (the two largest corporations in the world in terms of advertising budgets), and 10 times larger than the budgets of McDonald's and Coca Cola, two well-known global corporations that base their marketing on strong publicity campaigns.[11]

Table 1 presents summary statistics for the media coverage of terrorism in 2002. The total number of articles published[12] was 3,045; on average, each attack produced 17.7 articles. The number of articles appearing on the front page was 466, the

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[6] The data on terror was collected for our previous study, Eldor and Melnick (2004), which consisted of a much larger period; here we focus on the attacks that took place in 2002.
[7] The Green Line marks Israel's pre-1967 borders.
[8] This equals $ 105 million, approximately 0.1 percent of Israel's GDP in 2002.
[9] Since we are measuring here only newspaper coverage, our estimate represents only a fraction of the total OC, which should include TV, Internet and other media coverage. Our study implicitly assumes that newspaper OC is proportional to total media coverage OC.
[10] Relative to GDP in 2002, NIS 0.5 billion in Israel is equivalent to $11 billions in the US.
[11] See www.mind-advertisment.com for the year 2003.
[12] Including the day after the attack and two lags.

number of pictures 2,441 and the number of large headlines 981; hence, each attack produced, on average, 2.7 front page articles, 14.2 pictures and 5.7 large headlines.

Table 1
Summary Statistics of Daily Media Coverage of Terror Attacks in Israeli Newspapers, 2002[1]

	AP	FP	PI	TI
Mean	17.7	2.7	14.2	5.7
Maximum	128	15	104	29
Total[2]	3045	466	2441	981

[1] Media coverage in Israel's major daily newspapers: *Yedioth Aharonoth*, *Maariv*, *Haaretz* and *Globes* on attack dates and two consecutive days after a terror attack. AP, FP, PI, TI denote number of articles printed, front page articles, number of pictures and number of large headlines, respectively.
[2] Annual totals.

Table 2 presents summary statistics for the terror attacks experienced on Israel in 2002. In that year, 438 people were killed and 2066 injured in 180 attacks. Each attack resulted, on average, in 2.4 people killed and 11.5 injured, if the attack took place within the GL, the average number of casualties were 5.6 people killed and 34.9 injured. Suicide attacks were the most lethal type of attack, resulting in 6.2 people killed and 40.3 injured, on average. Suicide attacks in 2002 caused 55 percent of the deaths and 76 percent of the injuries.

Table 2
Summary Statistics of Terror Attacks in Israel, 2002[1]

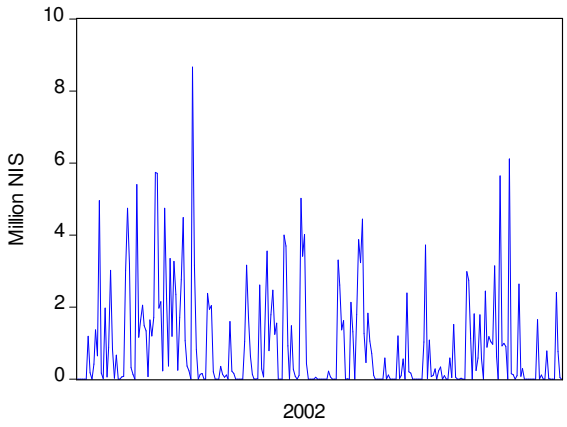
	IN	KI	Total
AT	11.5[2]	2.4[2]	180
GL	34.9[3]	5.6[3]	54
SU	40.3[4]	6.2[4]	39
Total	2066	438	

[1] AT, GL, SU, IN, KI denote attacks, green line, suicide, injured, killed correspondingly.
[2] Mean per attack.
[3] Mean per attack within the Green Line.
[4] Mean per suicide attack.

To construct the OC variable, we obtained the cost of an article's publication from each of the newspapers in our sample.[13] The cost varied by the rate charged by the individual newspapers, per inch, according to page, with the cost of the first page typically 2 to 4 times greater than the cost for internal pages.[14] We constructed a text pricing function for each newspaper and applied it to their articles. Summing up the daily OC of all the newspapers, we obtained a time series that represents the economic value, in 2002 prices, of the media coverage of terrorism. The series is presented in Figure 1.

The cumulative OC of the published text was NIS 0.25 million;[15] the cost of the average daily OC was NIS 1.5 million; the maximum daily OC reached the sum of NIS 8.7 million.

Figure 1. The Opportunity Cost of the Daily Text Coverage of Terrorism
Israel 2002



3. The Impact of Terrorism on the Media

In this section we estimate the newspaper editor's decision functions. We estimate the OC production function and separate functions to explain the editor's

[13] This data were obtained from Ifat Communications.
[14] Some newspapers have different rates for odd- and even-numbered pages.
[15] The OC of the large headlines and the pictures is of the same magnitude, NIS 0.25 million, so, total OC is NIS 0.5 million.

decision on how many articles to publish, the criteria for printing the article on the front page, the inclusion of large headlines and the inclusion of pictures.

Let T be a vector including all the terror characteristics (AT, GL, IN, KI, SU); let M_i, i= 1 to 5, be one of the media coverage variables (OC, AP, FP, PI, TI). The estimated model is:

(1) $A_i(L)M_{it} = B_i(L)T_t + \varepsilon_{it,}$

where $A_i(L)$ and $B_i(L)$ are polynomials in the lag operator and ε_{it} is a stochastic disturbance. The estimated models are presented in Table 3.

Table 3
The Impact of Terrorism on the Media[1]

Dependent variable	AT[2]	GL[2]	IN[2]	KI[2]	SU[2]	R^2	DW
OC	0.38	1.15	0.00	0.22	-0.04	0.65	1.86
	(0.000)	(0.000)	(0.449)	(0.000)	(0.888)		
AP	3.32	9.65	-0.05	3.46	3.87	0.71	2.19
	(0.008)	(0.004)	(0.463)	(0.000)	(0.256)		
FP	1.32	0.88	0.00	0.30	0.12	0.64	1.93
	(0.000)	(0.103)	(0.986)	(0.000)	(0.828)		
PI	3.32	6.77	-0.06	3.04	1.93	0.71	2.29
	(0.001)	(0.013)	(0.260)	(0.000)	(0.499)		
TI	1.64	4.87	-0.06	0.91	-0.59	0.59	1.51
	(0.000)	(0.000)	(0.008)	(0.000)	(0.633)		

[1] AT, GL, IN, KI, SU denote attacks, Green Line, injured, killed and suicides, respectively. OC, AP, FP, PI, TI denote opportunity cost, number of articles, front page articles, number of pictures and number of large headlines, respectively.
[2] Sum of the corresponding lag coefficients. p-values in parenthesis.

The R^2 is relatively high for all the equations; the different terror characteristics capture between 60 to 70 percent of the variance in media coverage. The DW statistics indicate that no serial correlation is present in the residuals. Only two lags were needed for the $B_i(L)$ polynomials and none for the $A_i(L)$ in all the models. That is, the different media measures react to the terror attacks attributes of the previous day and of the day before; the further away from the event in terms of time, the media

coverage of a particular attack fades away. The terror attributes capturing the attention of the media are AT, GL and KI; once they are included in the regression, the IN and SU variables do not contribute to the equation. Our interpretation of this finding is that since that the number people of injured is almost proportional to the number of killed and because suicide attacks is the cause of the greatest number of people killed, once the KI variable is included in the equation, it statistically captures the effect of all three.

The OC equation can be interpreted as a production function, with media coverage representing the output of terror attribute inputs. Under this interpretation, we can say that an additional terror attack produces NIS 0.38 million worth of media coverage, if the attack is within the GL terror it produces an additional NIS 1.15 million of media coverage and each person killed adds NIS 0.22 million.

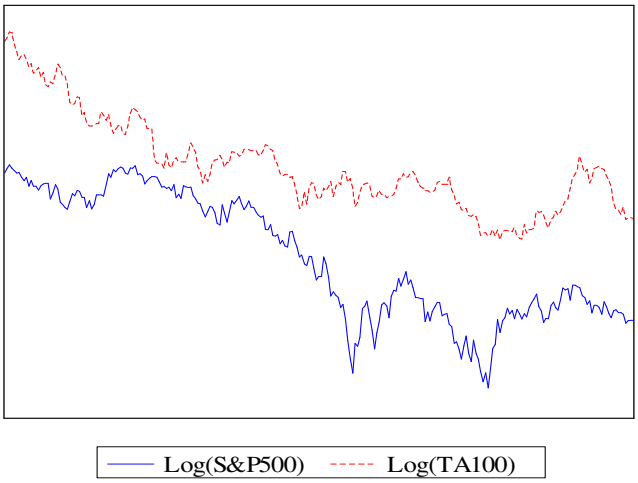
4. The theoretical model and the econometric methodology

To test our hypotheses, we expanded the model developed in EM. The basic equation is given in (2); x_t is a non-stationary I(1) variable with a possible drift f_t, and u_t is a white noise innovation:

$$(2) \quad x_t = f_t + x_{t-1} + u_t ,$$

x_t represents the log of Israel's stock market index (TA100) and f_t is specified by the log difference of the S&P500 index. This specification is justified by the liberalization of Israel's domestic capital markets, the openness of the Israeli economy to free capital movements, and the relatively large number of stocks that are traded simultaneously in the Israeli and the US markets. The market trends are given in figure 2.

Figure 2. The TA100 and the S&P500 Stock Indices
January 1, 2002 - December 31, 2002



Tables 4 and 5 present empirical evidence to support this specification. Table 4 presents the results of augmented Dickey Fuller tests for unit roots, using daily Israeli data. The table shows that the presence of a unit root cannot be rejected for the log levels and is rejected for the first differences. Table 5 presents Granger causality test results, which indicate Granger causality from the S&P500 index to the TA100 index and, obviously, not the other way around.

Table 4
Testing for Unit Roots
January 1, 2002 – December 31, 2002

	ADF	1% Critical Level	5% Critical Level
Level - TA100[1]	-3.2	-4.0	-3.4
First difference - TA100[2]	-8.8	-3.5	-2.9
Level – S&P500[1]	-2.1	-4.0	-3.4
First difference – S&P500[2]	-9.0	-3.5	-2.9

[1] In log including constant and trend.
[2] Log differences including a constant.

Table 5. Granger causality tests (3 lags)
January 1, 2002 – December 31, 2002

Null Hypothesis:	F-Statistic	Probability
Dlog(TA100) does not Granger Cause Dlog(S&P500)	1.37	0.25
Dlog(S&P500) does not Granger Cause Dlog(TA100)	2.86	0.04

The residual u_t is a white noise innovation. Denoting by D the first difference operator, equation (2) can be transformed into:

(3) $Dx_t = f_t + u_t$.

The impact of terrorism is obtained by decomposing the u_t innovation into two components:

(4) $u_t = \tau_t + \varphi_t$,

where τ_t is the innovation associated with the terror attack and φ_t is pure noise. Modeling $\tau_t = \gamma T_t$, we can estimate the vector of parameter γ that captures the impact of the different actual attributes of a terror attack on the economy through its effect on the stock market. T_t includes the new information at the beginning of trading day t, that is, the terror attacks that transpired after the closing of trade at 5 PM of the previous day and the opening of trade at 9:30. Given the discrete nature of the dependent variable, we use closing trade data; we include all the attacks occurring on the previous day.

Under efficient markets, information about a terror attack should be instantaneously incorporated in market prices so that the inclusion of additional lags is unnecessary. We used this feature in EM to test for the efficiency of the Israeli stock market. Here we introduce a second lag into the equation for two reasons. The first is technical: Assume that a terror attack has a transitory effect on the market, that is, an effect that will not be permanently incorporated in market prices. In this case, lagged effects will capture a reversal of the temporary terror attack impact without violating efficiency. The second reason is more substantial: Assume that Israel retaliates or reacts in some way to the attack. This will introduce new information that will affect market prices and will therefore be captured in lagged effects. The stock market in

Israel trades from Sunday till Thursday, so we have a five-trading-day week. The basic model to estimate τ_t is:

(5) $Dx_t = \alpha + \beta f_t + \gamma_0 T_t + \gamma_1 T_{t-1} + \varphi_t$.

To test our basic hypothesis we augment model (5) by adding the media coverage δM; δ is a parameter capturing the impact of the media coverage on the stock market.

(6) $Dx_t = \alpha + \beta f_t + \gamma_0 T_t + \gamma_1 T_{t-1} + \delta M_t + \varphi_t$.

M_t is represented by the OC of the attack coverage on the morning before the opening of trade.[16] If we cannot statistically reject the hypothesis that $\delta=0$ and $\gamma\neq0$, we can conclude that the actual attributes of terrorism explain the economic impact and not the terrorism as perceived through media coverage. If, on the other hand, we cannot reject a second case, that is, $\gamma=0$ and $\delta\neq0$, we can infer that the terrorism as perceived by means of the media coverage is exclusively responsible for the economic damage rather than the actual terror attack.

5. Testing the Hypothesis

The first hypothesis was tested with the estimated equations presented in Table 6. To overcome multicollinearity, we first tested our hypotheses by running five different models, introducing a different terror attribute in each. Equations (2), (4), (6), (8) and (10) show that the new information captured by the empirical attributes of the terror attacks is statistically significant. We report the F test for $\gamma_0 + \gamma_1 = 0$; all were rejected as having the anticipated negative sign. Those estimates qualitatively reproduced the results obtained in EM. After adding the OC variable to each of the equations, the results obtained for equations (3), (5), (7), (9) and (11) indicate that the empirical attributes of the terror attacks became statistically insignificant whereas

[16] *Globes* is an evening paper so its coverage is based on information from the previous day.

terrorism as perceived by the media coverage became highly significant in all cases with the correct negative sign.

Table 6
The Impact of Terrorism and the Media[1] on the Stock Market
Dependent Variable TA100[2]
January 1, 2002 – December 31, 2002

	S&P500	OC	AT[3]	GL[3]	IN[3]	KI[3]	SU[3]	R^2	DW
(1)	0.10							0.02	2.02
	(0.01)								
(2)	0.10		-0.22					0.07	2.03
	(0.01)		(0.01)						
(3)	0.10	-0.15	-0.04					0.09	2.03
	(0.01)	(0.01)	(0.74)						
(4)	0.11			-0.58				0.10	2.06
	(0.00)			(0.004)					
(5)	0.11	-0.14		-0.19				0.09	2.04
	(0.01)	(0.01)		(0.44)					
(6)	0.10				-0.01			0.04	2.07
	(0.01)				(0.03)				
(7)	0.10	-0.19			0.00			0.09	2.03
	(0.01)	(0.00)			(0.82)				
(8)	0.10					-0.06		0.06	2.09
	(0.01)					(0.004)			
(9)	0.10	-0.21				0.01		0.10	2.01
	(0.01)	(0.00)				(0.72)			
(10)	0.10						-0.52	0.05	2.06
	(0.01)						(0.02)		
(11)	0.10	-0.18					-0.04	0.09	2.04
	(0.01)	(0.00)					(0.88)		
(12)	0.11		-0.03	-0.41	0.00	-0.04	0.00	0.12	2.03
	(0.01)		(0.78)	(0.21)	(0.59)	(0.25)	(1.00)		
(13)	0.11	-0.15	0.02	-0.24	0.00	0.00	-0.01	0.13	1.99
	(0.00)	(0.04)	(0.85)	(0.48)	(0.66)	(0.90)	(0.99)		
(14)	0.10	-0.18						0.09	2.04
	(0.01)	(0.00)							

Hypotheses Testing

In equation (13) - H_0: $\gamma_{AT}= \gamma_{GL}= \gamma_{IN}= \gamma_{KI}= \gamma_{SU}= 0$
H_1: Otherwise
The test statistic is $F = 0.12$, with $p=0.99$. Therefore H_0 cannot be rejected.

[1] AT, GL, IN, KI, SU denote terror attacks, Green Line, injured, killed and suicides, respectively, OC, AP, FP, PI, TI denote opportunity cost, number of articles, front page articles, number of pictures and number of large headlines, respectively.
[2] All regressions include a constant. The dependent variable is Dlog(TA100), the fundamental explanatory variable is the first lag of Dlog(S&P500).
[3] Sum of the corresponding lag coefficients; p-values are in parenthesis.

In equation (13) we perform the same test in a model that introduces all the terror variables into the equation. Again, we cannot reject the hypothesis that all the γ's are statistically equal to zero; only the media OC variable remains statistically significant with the correct negative sign, capturing the impact of terrorism[17].

Our conclusion here is that correct model is given in equation (14). Only the OC variable is statistically significant and serves as a sufficient statistic containing all the information needed to capture the effects of terrorism on the stock market.

The findings presented in Table 6 clearly show that the decline in stock market prices is inversely related to the amount of media coverage. In section 3 we showed that media coverage is related to the terror attack's attributes. In the second hypothesis we would like to explore the question of whether, for a given terror attack, the greater the media coverage, the greater is the attack's economic damage. In principle, this could be tested in an equation similar to those in Table 6, but our results there show that once the OC variable is included in the equation, none of the terror attributes is statistically significant. We therefore turn to a less strict approach.

Terror attacks are never identical. To overcome that difficulty, we classified the daily data on terrorism into clusters of similar attributes, each containing a minimum number of cases, and explored the impact of the media on the stock market within the clusters. The clusters are mutually exclusive. Cluster 1 contains 16 days of massive suicide attacks within the GL that resulted in 5 or more people killed and more that 20 injured per attack. Cluster 2 also contains 16 days of terror events of suicide attacks within the GL with less than 5 people killed and any number injured. Cluster 3 contains 72 days of terror events that resulted in at least 1 person injured but does not belonging to clusters 1 or 2. Finally, Cluster 4 contains all the other trading days of

[17] Similar qualitative results were obtained using the different media coverage measures.

2002; this cluster includes 12 terror attacks that resulted in which no people were killed or injured and days without a terror attack, with the media covering attacks that occurred in previous days.

Table 7
The Relation Between the Media and the Stock Market
Controlling for Terror Attributes
January 1, 2002 – December 31, 2002

	Number of Days	Simple Correlation[1]	Regression Coefficient[1,2]
Cluster 1[3]	16	-0.498	-0.235
		(0.049)	(0.054)
Cluster 2[4]	16	-0.203	-0.247
		(0.452)	(0.412)
Cluster 3[5]	72	-0.358	-0.225
		(0.002)	(0.003)
Cluster 4[6]	156	-0.136	-0.122
		(0.090)	(0.052)

[1] p-values in parenthesis.
[2] Coefficient of OC on Dlog(TA100) while controlling for the effect of Dlog(S&P500), estimated in a regression similar to equation (14), Table 6.
[3] Defined by a suicide attacks within the "Green Line" with more than 5 people killed and more than 20 injured.
[4] Defined as a suicide attack within the "Green Line" with less than 5 people killed and any number injured.
[5] Defined as an attack with at least 1 person injured but not belonging to clusters 1 and 2.
[6] Defined as all other days. This cluster includes 12 attacks with no people either killed or injured and days without a terror attack, with media coverage of previous attacks.

The impact of the media on the stock market within the clusters is presented in Table 7. In each cluster we obtained a negative correlation between OC and the change in stock market prices; the correlation was statistically different from zero for cluster 1 at 5 percent, at 1 percent for cluster 3 and at 10 percent for cluster 4. In cluster 2 the correlation is not statistically different from zero. In the last column we present the regression coefficient of OC on the change in the stock market controlling for the previous change in the S&P500 in a regression similar to equation (14) in table 6. Again for all clusters we obtain a negative coefficient; significant at 10 percent for clusters 1 and 4; at 1 percent for cluster 3 and not statistically different form zero for cluster 2. These results present evidence in favor of our hypothesis that

other things being equal the larger the media coverage of terrorism the larger the economic damage.

Our final hypothesis relates to the impact of media coverage on the stock market over time. Here we explore whether a desensitization process develops over time, that is, for a similar extend of media coverage, the impact on stock market prices declines over time.

To test the hypothesis we added a time trend and an interaction between the time trend and the OC to equation (14). The results are presented in Table 8 equation (1) is equation (14) from table 6. In equation (2) we obtained a positive and statistically significant interaction term that we interpret as the declining impact of a terror attack's media coverage on the stock market.

Table 8
The Impact of Terrorism and the Media on the Stock Market Over Time
Dependent Variable: TA100[1]
January 1, 2002 – December 31, 2002

	Constant	S&P500	OC^2	T^2	$T*OC^2$		
(1)	0.09	0.10	-0.18			0.09	2.04
	(0.24)	(0.01)	(0.00)				
(2)	0.20	0.10	-0.33	-0.00	0.001	0.11	2.06
	(0.19)	(0.01)	(0.00)	(0.36)	(0.02)		

[1] The dependent variable is Dlog(TA100); the fundamental explanatory variable is the first lag of Dlog(S&P500).
[2] OC denotes the opportunity cost; T denotes the time trend.

6. Conclusions

Our study addressed the question of why the impact of terrorism on the economy is so large. Our findings indicate that the role of the media is a salient element in this questions' response. Our research has shown that the media coverage of terrorist acts is an important channel through which terrorism achieves its goals; terrorism obtains "free" media coverage that reduces the valuation of stocks.

We quantified the media coverage by evaluating the opportunity cost of the "free" media coverage enjoyed by terrorism. The construction of the media coverage variable was performed by answering the question: What would be the opportunity cost of buying the amount of media coverage obtained by terror organizations? This variable was successfully used it in the econometric analysis. The analysis showed that the opportunity cost of the media coverage on the morning before the beginning of trade contains all the relevant information on terrorism needed by stock market traders to choose their trading actions.

We presented statistical support for the hypothesis that stock prices are affected by terrorism. We were able to show that the crucial variable was not the empirical attributes of a particular terror attack but how the attack was perceived by the public by means of the media's coverage of the event.

The economic damage caused by terrorism increases monotonically with the amount media coverage, meaning that the greater the media coverage, the greater the decline in stock market prices. Moreover, controlling for the attributes of a terror attack by grouping the attack data in clusters of similar attributes revealed that the greater the media coverage, the greater its economic damage also within the clusters. We were also able to show that the impact of the media coverage of terrorism on the economy decreases with time.

A second motivation for this study was to gain insight on the possible design of an effective counter-terrorism policy by understanding the mechanism that produces such major economic effects. Here we were confronted with a dilemma: On the one hand, we support a free press and the public's right to know, basic values in a democratic society; on the other hand, we recognize that the “free” media coverage obtained functions as a tool in the hands of terrorist organizations. Our question

remains, then: Is it possible to design a covenant on the appropriate coverage of terrorism in the free and competitive media environment characterizing democratic society?

Interesting, related questions, left for future research, are: What is the optimal amount of terrorism information that the media has to supply? Does the media coverage of terrorism produce more information than the amount needed by the principle of the public's right to know?

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