

Impact of Terrorism on Consumer Sentiment in Pakistan: A City-Level Analysis

Syed Zulqernain Hussain, University of Otago, New Zealand

The Asian Conference on the Social Sciences 2025
Official Conference Proceedings

Abstract

This study estimates the impact of terrorism on consumer sentiment at city level in Pakistan. Tagged as one of the most dangerous places of the world, Pakistan is the epicenter of terrorism since the events of 9/11. Apart from tangible financial losses and civilian casualties, there is an equally important but unnoticed and intangible impact of terrorism on consumer sentiment in Pakistan. Consumer sentiment is an important indicator as it triggers economic activity and in case of Pakistan, consumer sentiment measured by Diffusion Index is used as a policy input in formulation of monetary policy. Using city fixed effects model on balanced panel data of 59 cities and 36 time periods (bi-monthly), the study estimates that whenever there is a terrorist incident in a city, irrespective of the intensity of the attack; sentiment of the consumers in the targeted city turns pessimistic (diffusion index decreases) relative to those cities which do not face an attack. The coefficient of terrorism is equal to one-half standard deviation of the diffusion index (consumer sentiment) and is consistent in all specifications. Reverse causality test indicates that occurrence of terrorist activity is exogenous i.e., current, and past sentiment do not impact or promote terrorism. Since the impact of terrorism is more significant at the affected cities, there is a need for a region-specific (city-specific) counter-terrorism policy instead of a generic national policy.

Keywords: terrorism, consumer sentiment, diffusion index, counterterrorism, war on terror

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Introduction

The incident of 9/11 (11 September 2001) took place in the United States of America (US) two decades ago; however, the spillover effects of this incident continue to haunt many places around the globe, Pakistan being no exception. Pakistan became a key ally of the US in the Global War on Terror (GWOT); consequently, incidents of terrorism increased dramatically in Pakistan. Tagged as “the world’s most dangerous place” by The Economist and being a permanent member of top five countries affected by terrorism according to the Global Terrorism Index 2017, Pakistan has been the epicenter of terrorism since 2001.

The continuous and intense wave of terrorism has taken lives of more than 60,000 innocent people of Pakistan. Every year 3-5 percent of total deaths in Pakistan are because of terrorism. Around 500,000 people have been internally displaced. On the financial front, on average, 2-3 percent of GDP per year is lost because of terrorism. Pakistan has suffered a loss of US\$ 123 billion since 2001 and almost US\$ 33 billion during last five years in the form of loss of infrastructure, compensation to victims, foreign disinvestment, industrial output, disruption in supply chains, etc.¹ This amount is double the amount of Pakistan’s external public debt.

No part of Pakistan is considered safe as there is no specific pattern of these attacks. Primary schools, shopping malls, airports, cricket stadium, police check posts, hospital, army’s head quarter, entertainment parks, shrines, praying areas, public rallies, bus, and train stations have been attacked by the terrorists since 2001. Prior to 9/11, the frequency of terrorist activities in Pakistan was negligible and limited to areas next to the border with Afghanistan. However, this trend changed dramatically, and the terrorist activities shifted from the southern end of the country to almost all parts of Pakistan (Saeed et al., 2014).

The rise of violent extremism and increase in terrorism in Pakistan not only caused serious damage to Pakistan’s economy in terms of financial losses and civilian casualties but terrorism also has an equally important but unnoticed impact on an ordinary citizen. To be precise, terrorism hampers consumer sentiment over time. To some extent, the impact on business and investment sentiment can be gauged by looking at the performance of the stock market following a terrorist event however no efforts have been made to estimate the impact of terrorism on the economic sentiment of the households in Pakistan. Consumer sentiment is very important not only theoretically as sentiment triggers economic activity but in case of Pakistan, consumer sentiment measured by diffusion index (DI) is used as a policy input. While macro data at national level is useful to analyze the major economic implications, it fails to provide any conclusive direction that how the number of terrorist incidents and consumer sentiment are linked. Hence it is imperative to do analysis of consumer sentiment at city-level to have cross-sectional variations.

This study addresses the broader research question: whether the impact of terrorism on consumer sentiment depends on the intensity and the occurrence of the attack in a city? Based on research question, following null hypothesis and alternative hypothesis are formulated:

Null Hypothesis: terror activity has no impact on consumer sentiments.

Alternative Hypothesis: terror activity has an impact on consumer sentiments.

¹ Economic Survey of Pakistan 2020-21. Ministry of Finance, Government of Pakistan.

There are few studies for developed countries like the US, UK, Israel, and Spain, which estimates the impact of terrorism on household economic decisions and spending behavior, however these studies are either based on *one off* event or are limited to a particular area of a country which allows the authors to make use of a natural experiment.

Feelings tend to play an important role in stimulating economic activity as evident by the conclusion of numerous studies. Terror events have implications on both physical and mental health (Yehuda & Hyman, 2005). Visceral factors (negative emotions for instance anger and fear) force people to act and behave differently when they encounter unnormal situation. Hence, it is imperative to include visceral factors into models of economic behavior to gauge the viscerally driven behavior as these factors have underappreciated but vital consequences for human behavior (Loewenstein, 2000). In another study, 39 survivors of terrorist attacks and 2,124 survivors of motor vehicle accidents were assessed for the prevalence of posttraumatic stress disorder (PTSD) upon admission to a general hospital emergency room. The same survivors were evaluated 1 week and 4 months later. Results showed that survivors of terrorist attacks had higher rates of stress disorder than those survivors who faced motor vehicle accidents (Shalev & Freedman, 2005).

The probability (chances) of facing terrorism is low but the fear created by terrorism has intense and long-lasting impact on behavior of an individual. This study used the response of Israelis to terror incidents. This study divided the individuals into two categories, those who are frequent users of goods & services and those who are occasional users. The study estimated the impact of bus-related suicide attacks on the usage of public bus transport and cafe related terrorist incident on visits to cafe. Findings revealed that there is no impact of terrorism on frequent users of these services; however, the impact on occasional users is quite significant (Becker & Rubinstein, 2011).

Emotions and feelings have an impact on financial decisions. Emotions such as fear and anxiety make people risk averse and they are less confident to make and evaluate investment decisions; on the contrary, positive feelings as excitement compels people to be risk-takers (Kuhnen & Knutson, 2011).

In case of Pakistan, no area is immune and there is a continuous wave of terrorism for the last 20 years and there is no specific trend. Hence, this study is an attempt to fill in the gap and estimate the impact of terrorism on consumer sentiment at city-level.

In this study, two datasets are utilized. First, the dataset of number of terrorist attacks and its intensity (gauged through the total number of victims killed or injured). This terrorism data includes information such as the date, place, and magnitude of the attack. The magnitude of the attack can be seen through the total number of civilians and security forces killed or injured during the attack. During the period of analysis, out of 59 cities, 25 cities did face a minimum of one attack. Second, the Consumer Confidence Survey (CCS) data used in this study cover the periods from Jan 2017 to Nov 2021 (thirty-six waves consisting of almost 70,000 households in 59 cities). Out of these 70,000 households, roughly forty thousand households did not face terrorist attack in their cities while thirty thousand households faced an attack in their cities.

Impact of terrorism is estimated in two ways; 1) terrorism used as binary variable = 1 if city faced an attack and 2) intensity of the attack i.e., total number of people killed or injured during an attack. Few cities have been targeted more during the last 20 years; hence it was

important to incorporate a variable which captures the historical trend of attacks during each city. Adding this variable serves two purposes; robustness check of basic panel model and secondly this variable itself has intuitive implications because people living in those areas which are frequently attacked may have different sentiment (fears).

For consumer sentiment, the results show that intensity of the attack (number of victims killed or injured) is not statistically significant however when terrorism is used as a binary variable (= 1 if city faced an attack) consumer sentiment (diffusion index) in affected cities decreases relative to those cities which do not face an attack. The news of an attack triggers fear and unrest amongst an ordinary household no matter how big or small the intensity of the attack is.

Although several control variables have been used for robustness purposes, still important variables such as city-level GDP and city-level industrial production are unavailable in Pakistan. If such dataset of real economic activity was available, broader impact of terrorism on the economy would have been estimated however that is not the scope of this study.

The rest of the paper is organized as follows: Section 2 contains details on the data sets and data description. It is followed by the identification strategy and the model described in Section 3. Regression Results and robustness checks are given in Section 4. Lastly, discussion and conclusions are made in Section 6.

Data Description

Consumer sentiment is one of the leading indicators of economic activity. Perception about economic indicators such as inflation, interest rate and employment are important for a country like Pakistan in which forward-looking policy formulation has been adopted.

State Bank of Pakistan (the central bank) in partnership with the Institute of Business Administration (IBA, a leading university) conducts the Consumer Confidence Survey on a national scale largely following the University of Michigan Consumer Sentiment Survey. The information obtained through this survey is used to construct current, expected and overall confidence indices, which are then used in monetary policy formulation and short-term forecasting. This survey is an important source of primary data.²

The IBA-SBP Consumer Confidence Survey (CCS) covers about 1800 households contacted through fixed line telephone across Pakistan and is conducted regularly bi-monthly during the first five days of January, March, May, July, September, and November. In terms of coverage, it covers almost all regions of Pakistan. The questionnaire is asked in different regional languages to ensure maximum outreach. The whole population of Pakistan is divided into 59 strata and each strata gets representation in the sample according to its population. Districts with population equal to/less than 5% of their respective province's population are merged based on their geographical vicinity into one stratum. Districts with more than 5% share in their respective provincial population are considered individual strata. The survey is conducted preferably by the head of the household or anyone involved and responsible for financial matters of the household. The questionnaire mostly adopts the University of Michigan Consumer Sentiment Survey, which solicits qualitative responses on a Likert scale

² State Bank of Pakistan. <http://www.sbp.org.pk/research/CCS.asp>. Accessed 15 May 2021.

having five responses plus “Don’t Know” option. The target respondent is a personality who is a financially responsible member of the household.

In addition, household characteristics such as number of households, age, income, occupation, and qualification of the respondents are also part of the survey. These household characteristics are used as control variables in this study going forward.

SBP reports results of households’ survey, in the form of Diffusion Index (DI). The Diffusion Index shows the general tendency of respondents about a certain aspect of a particular survey. The questionnaire for this survey offers five types of options to the respondents for each question.

PP = Increase/improve significantly; P = Increase/improve;
E = Unchanged/neutral; N = decline /deteriorate; and
NN = decline/deteriorate significantly.

On the basis of these five options, the Diffusion Index is computed in the following two steps:

Step 1: Net Response (NR) is computed as below:

$$NR = (1.00*PP) + (0.50 \times P) + (-0.50 \times N) + (-1.00*NN).$$

Step 2: Diffusion Index (DI) is computed as follows: $DI = (100 + NR) / 2$

Where DI ranges from 0 to 100; interpretation of which is as follows:

DI > 50 indicates that Positive views are more than Negative views;

DI = 50 indicates that Positive views and Negative views are equal;

DI < 50 indicates that Positive views are less than the Negative views.

Table 1 gives the % share of responses by the respondents who faced and did not face terrorist attacks during the period under review. As it is evident in the table that respondents who did not face terrorism in their cities have higher positive responses compared to those who did face terrorism in their cities.

State Bank of Pakistan officially releases the diffusion index at the macro level. However, for this study diffusion index has been calculated for 59 cities to have cross-sectional variation. The difference will show whether terrorism influences the consumer sentiment keeping other factors (such as household size, income, qualification) controlled.

Table 1

Percentage Share of Positive & Negative Responses

	Did not face terrorism	Face Terrorism
% of -ve ans	40	43
% of ext. -ve ans	3	5
% of neutral ans	34	35
% of +ve ans	19	16
% of ext. +ve ans	2	1

Source. State Bank of Pakistan, Analyst's estimates

The Consumer Confidence Survey (CCS) data used in this study will cover the periods from Jan 2017 to Nov 2021 (thirty-six waves consisting of almost 70,000 households). Out of these 59 cities, 34 cities did not face terrorist attack in their cities while the rest 25 cities did face a minimum of one attack.

The data of main independent variable i.e. terrorism includes information such as data, location and its intensity (gauged through the total number of victims killed or injured).³ This data is provided by the Ministry of Information, Government of Pakistan, and counter checked with Global Terrorism Database and South Asia Terrorism Portal (Institute for Conflict Management).⁴ In order to check whether consumers of a particular city (strata) are impacted by a terrorist attack, that will be estimated by looking at the data of terrorist attack before a particular wave. For instance, survey is conducted during the first week of January 2017, hence the number of terrorist attacks prior to this week will be considered (Table 2).

Table 2
Data Merging for Main Model

Time Period	City-level Terrorism	City-Level Sentiment
1	6-Nov-31 st Dec 2016	1 Jan – 5 Jan 2017
2	6-Jan-28 th Feb 2017	1 Mar – 5 Mar 2017
3	6-Mar-30 th April 2017	1 May – 5 May 2017
4	6-May-30 th Jun 2017	1 Jul – 5 Jul 2017
5	6-Jul-30 th Aug 2017	1 Sep – 5 Sep 2017
.	.	.
36	6-Sep-30 th Oct 2021	1 Nov -5 Nov 2021

Source. State Bank of Pakistan, Ministry of Information

As mentioned earlier, Pakistan has been facing continuous and indiscriminate terrorist attacks over the last 20 years, however there have been few cities which have been targeted more which may be influencing the households (consumers) of this area differently than those who did not face terrorism in their cities. To capture this impact (long-term impact), I have created a new variable showing the historical trend of attacks for each city. Out of 59 cities of Pakistan, there are 31 cities which have been attacked at least one time during the last 17 years. Table 3 provides detail of cities which have faced massive terrorist attacks. These cities are located in different areas of Pakistan reflecting that there is no specific area of terrorist attacks.

³ Terrorist attack in this study only includes the suicide bombing.

⁴ <http://www.satp.org/datasheet-terrorist-attack/pakistan>. Accessed on 10 June 2021.

Table 3*History of Terrorist Attacks From 2001-2021*

City	No. of Incidents	No. of Victims
Peshawar	79	3436
FATA	75	2684
Bannu & Hangu	54	1772
Quetta	27	1884
Karachi	26	1840
DIK	26	968
Swat	22	787
Lahore	21	2825
Islamabad	17	897

Source. Ministry of Information

Summary statistics related to terrorism and consumer sentiment for cities that were targeted and for cities that were not targeted during 2017-2021 are given in Table 4 and Table 5 respectively. It is quite evident from Table 4 and Table 5 that the cities which faced terrorism during 2017 tend to have pessimistic (lower) sentiment on average compared to cities which did not face terrorism during 2017-2021. Summary statistics of control variables such as education level, income level and average HH size of the city are quite familiar indicating that dynamics are more or less the same. Standard deviation of consumer sentiment index in the targeted area is higher than that of untargeted areas suggesting that terrorism does influence the sentiment.

Table 4*Summary Statistics (Terrorism and Consumer Sentiment in Targeted Cities)*

Variable	Mean	Min	Max	S.D
Consumer Sentiment Index	48	47.2	49.8	0.72
No. of Victims in each city	43	1	431	80.28
Education level of city (avg)	Graduate	Primary	Post Graduate	-
Average HH size of city	7	6	14	1.2
Income level of city (avg per month)	300-500\$	100-200\$	1000-2000\$	-
History of Terrorist Attacks in each city	25	0	83	27.4
History of Total Victims in each city	1253	0	3483	1239.8

Source. Analyst's Calculations

Table 5*Summary Statistics (Terrorism and Consumer Sentiment in Untargeted Cities)*

Variable	Mean	Min	Max	S.D
Consumer Sentiment Index	49.1	47.1	51	0.6
No. of Victims in each city	0	0	0	-
Education level of city (avg)	High school	Primary	Post Graduate	-
Average HH size of city	7	4	12	1.1
Income level of city (avg per month)	300-500\$	100-200\$	1000-2000\$	-
History of Terrorist Attacks in each city	6	0	84	12.8
History of Total Victims in each city	245	0	3489	578.3

Source. Analyst's Calculations

Estimation Strategy

Most of the previous studies which estimated the impact of terrorism relied on time series data and employed autoregressive distributive lag model to find out the relationship between terrorism and their variable of interests. These studies also used Granger causality to check the direction and nature of the relationships between terrorism and other variables. However, in this study, econometric analysis starts with basic panel model(s) using 59 cities and 36 time periods (bi-monthly) with city-fixed effect.⁵ Panel variable is city and it is strongly balanced implying that 59 cities have data for all 36 time periods. Panel data allows one to control variables one cannot observe or measure like cultural factors across cities; or variables that change over time but not across cities (i.e. national policies, federal regulations, international agreements, etc.).

City fixed effects explores the relationship between explanatory and dependent variables within an entity (country, city, person, company, etc.). In my study, each city has its own individual characteristics that may or may not influence the independent variable i.e., terrorism. By using city-fixed effect, one assumes that something within the city may impact or bias the independent variable, which needs to be controlled. This is the logic behind the assumption of the correlation between entity's (city's) error term and explanatory variable. Fixed effect removes the effect of those time-invariant characteristics so one can assess the net effect of the explanatory variables on the variable of interest. Another important assumption of the fixed effect model is that those time-invariant characteristics are unique to the cities and should not be correlated with other cities characteristics. Each city is different therefore the city's error term and the constant (which captures cities characteristics) should not be correlated with the others.

In specification (1), consumer sentiment is the dependent variable; terrorism is the main independent variable. Terrorism in this model reflects the intensity of an attack i.e. total no. of victims (killed or injured). As mentioned earlier, city-fixed effects is employed in this specification. This specification is used to see the impact of the intensity of an attack.

⁵ Panel data (also known as longitudinal or cross-sectional time-series data) is a dataset in which the behavior of entities are observed across time.

$$CS_{it} = \beta_0 + \beta_1 Terror_{it} + \alpha_i + u_{it} \quad (1)$$

CS = Consumer Sentiment measured by diffusion index

Terrorism = No. of victims (killed or severely injured)

α_i = city fixed effects

I = 59 cities

t = 36

In specification (2), there is only modification from specification (1) i.e. terrorism is used as a binary variable i.e. terrorism = 1 if a city faced an attack. This specification is utilized to see that occurrence of an attack in city irrespective of its intensity impacts sentiment or not.

$$CS_{it} = \beta_0 + \beta_1 Terror_{it} + \alpha_i + u_{it} \quad (2)$$

In addition, I use control variables like household characteristics (average at city level) for robustness check in specification (3). Education implies the average level of education of a city, income implies the average level of income of a city and HH means the total number of people living in a house on average in a city.

$$CS_{it} = \beta_0 + \beta_1 Terror_{it} + \beta_2 Education_{it} + \beta_3 HH_{it} + \beta_4 Income_{it} + \alpha_i + u_{it} \quad (3)$$

For robustness purpose, time fixed effect has also been included in the above specification. Moreover, previous consumer sentiment has also been used as one of the control variables to check whether lagged sentiment influences the current consumer sentiment or not. In addition, dynamic panel model (Arellano Bond Estimator) is also used to analyze whether previous sentiments impact current sentiments or not. The details of Arellano Bond estimator and relevant results are given in **Appendix**.

One may argue that perhaps there is an element of reverse causality i.e., weak consumer sentiment promote or impact terrorism itself. To check the presence of reverse causality i.e., whether terrorism itself is impacted by consumer sentiment, dependent and independent variables are switched to analyze whether current and lag variables of consumer sentiment impact or promote terrorism or not.

It is pertinent to mention here that in all specifications, clustered (by city) standard errors are used. Clustered standard errors are not underestimated like normal or robust standard errors. It is imperative to use clustered standard errors if there are several different covariance structures within the data sample that vary by a certain characteristic – a “cluster” which in this study is city. Clustered standard errors provide unbiased standard errors estimates.

Regression Results

Table 6 shows results of four different specifications (basic model and robustness checks) used to gauge the impact of terrorism on consumer sentiment. In Table 6, terrorism is used as a variable to indicate the intensity of the attack i.e. number of people killed or injured during an incident at a particular city. Although the sign (direction) of the coefficient is negative in all specifications implying that terrorism has a negative impact on consumer sentiment; the coefficient of terrorism is statistically insignificant.

Table 6
Impact of Terrorism on Consumer Sentiment

	(1)	(2)	(3)	(4)
Intensity of Terrorism ^a	-0.0008 (0.0010)	-0.0008 (0.0010)	-0.0012 (0.0010)	-0.0011 (0.0008)
Level of Education (Avg of City)		0.0556 (0.0904)	0.0456 (0.0866)	0.0078 (0.0876)
Members in a House (Avg. of City)		-0.164*** (0.0464)	-0.157*** (0.0463)	-0.122** (0.0472)
Level of Income (Avg of City)		0.0522 (0.0589)	0.0680 (0.0572)	0.0860 (0.0611)
History (No. of attacks previously)			-0.1790 (0.1130)	
City Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	No	No	No	Yes
Observations	2,124	2,124	2,124	2,124
R-squared	0.001	0.072	0.091	0.150
Number of cities	59	59	59	59

Notes. Clustered (by city) standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

a: Intensity of terrorism implies the total number of people killed or injured during an attack.

Consumer sentiment calculated through Diffusion Index is dependent variable in all specifications

In Table 7, terrorism is used as a dummy variable i.e. = 1 if city faced an attack. In this table, the coefficient of terrorism is again negative in all specifications which makes sense intuitively. Interestingly, the coefficient of terrorism is now statistically significant at 5% level of significance in the first four columns of Table 7, which implies that occurrence of a terrorist attack in a city matters irrespective of how intense the terrorist attack is. This number(terrorism) is approximately equal to one-half standard deviation of the dependent variable (consumer sentiment measured by the diffusion index), which implies that a considerable amount of variation in consumer sentiment (diffusion index) is influenced by terrorism.

Table 7
Impact of Terrorism (Binary Variable) on Consumer Sentiment

	(1)	(2)	(3)	(4)	(5)
Terrorism (Binary Variable) ^a	-0.37** (0.17)	-0.347** (0.16)	-0.402** (0.16)	-0.400** (0.18)	-0.341* (0.18)
Level of Education (Avg of City)		0.0332 (0.09)	0.0181 (0.09)	0.0526 (0.10)	0.0383 (0.10)
Members in a House (Avg. of City)		- 0.163*** (0.04)	- 0.155*** (0.04)	- 0.155*** (0.05)	- 0.136*** (0.05)
Level of Income (Avg of City)		0.0555 (0.06)	0.0751 (0.05)	0.0514 (0.06)	0.0587 (0.06)
History (No. of attacks previously)			-0.200* (0.11)	-0.182 (0.13)	-0.0361 (0.14)
Lag of Sentiment				-0.051 (0.08)	-0.114 (0.07)
City Fixed Effect	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	No	No	No	No	Yes
R-squared	0.023	0.091	0.114	0.102	0.151
Number of cities	59	59	59	59	59

Notes. Clustered (by city) standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

a: Terrorism is used as a binary variable which is equal to 1 if city faced an attack.

In column (2) of Table 7, a number of control variables are added for robustness purpose. Socio-economic variables such average education level of the city, average income level of the city, and the average household size in a city. These control variables (HH characteristics within a city) have important economic intuition. The results show that higher the level of income and higher the level of education; sentiment are relatively positive. However, the coefficient of both these two variables are not statistically significant. The third control variable is the average household size, i.e. total number of people within a house. The coefficient of this variable is negative, and it is also statistically significant. This implies that if there are more people in the house, the household head (respondent) is more worried (negative sentiment) about the overall economic and financial situation. Even by adding these three control variables, the coefficient of our main independent variable (terrorism) is statistically significant. Regarding the size of the coefficient, this number (terrorism) is still equal to one-half standard deviation of the dependent variable (consumer sentiment).

In the last three columns of Table 7, additional control variable and time dummy variable have also been included; the result of this specification still keeps our main variable of interest (terrorism) significant. Hence, all specifications are consistent, and we reject our null hypothesis that terrorism has no impact on consumer sentiment. Results validate the hypothesis that cities which face an attack (occurrence of a terrorist activity in a city) tend to have more pessimistic sentiment. In columns 4-5, lag value of dependent variable (previous sentiment) is also used as a predictor for the current value of the dependent variable (current sentiment); results indicate that previous sentiment does not impact the current sentiment.

It is natural to argue that perhaps weak or pessimistic consumer sentiment itself promote and trigger terrorism. To check this claim, in Table 8, dependent variable (consumer sentiment) and independent variable (terrorism) have been switched and lags of consumer sentiment has been created to estimate whether present or past (lagged) consumer sentiment impact or promote terrorism or not? All columns in Table 8 using different number of lags and control variables confirm that there is no indication of reverse causality i.e. consumer sentiments do not impact terrorism. Firstly, almost all coefficients are statistically insignificant. Secondly, most coefficients have a positive sign which does not make logic because if consumer sentiment increase (improves) then terrorism should decrease. Hence it can be inferred that consumer sentiment (current or lagged) do not affect terrorism or promote terrorism. This result is consistent in all specifications.

Table 8*(Reverse Causality) Impact of Consumer Sentiment on Terrorism^a*

	(1)	(2)	(3)	(4)	(5)
Current consumer sentiment	0.00072 (0.03)	0.027 (0.03)	0.0736 (0.05)	0.0237 (0.03)	0.051 (0.05)
Two months old sentiment	-0.00273 (0.02)	0.027 (0.03)	0.0793** (0.04)	0.0243 (0.03)	0.0615 (0.04)
Four months old sentiment		0.0589 (0.04)	0.0639 (0.04)	0.0481 (0.03)	0.024 (0.04)
Six months old sentiment			0.0226 (0.03)		0.00533 (0.04)
Level of Education (Avg of City)				-0.0129 (0.04)	0.0768 (0.05)
Members in a House (Avg. of City)				-0.00671 (0.02)	-0.0303 (0.03)
Level of Income (Avg of City)				0.00185 (0.03)	-0.0296 (0.03)
History (No. of attacks previously)				-0.0688 (0.06)	-0.155 (0.09)
Lags of control variables					
City fixed effect	Yes	Yes	Yes	Yes	Yes
R-squared	0.000	0.020	0.046	0.031	0.130
Number of cities	59	59	59	59	59

Notes. Clustered (by city) standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

a: Reverse causality; dependent and independent variables have been switched to see the impact of consumer sentiment on terrorism.

Terrorism (binary variable) is the main dependent variable in all specifications.

Table 9
Summary of Results Related to Consumer Sentiment

	Statistical Significance of the Coefficient^a	Economics Sense/Intuition	Size of the Coefficient
Impact of Intensity Terrorism on Consumer Sentiment	-0.001 implying that the diffusion index decreases by 0.001 points if the number of victims increase by one person. The coefficient is insignificant.	The coefficient has a negative sign which makes economic sense because consumer sentiment should decrease if there is terrorism.	The coefficient is small if compared with the standard deviation of the dependent variable i.e. diffusion index (consumer sentiment)
Impact of Terrorism (binary variable) on Consumer Sentiment	-0.35 implying that if a city faces an attack, diffusion index in that city decreases by 0.35 points. The coefficient is significant.	The coefficient has a negative sign which makes economic sense because consumer sentiment should decrease if there is terrorism.	The coefficient is big. The coefficient of terrorism is equal to one-half standard deviation of diffusion index.
Impact of Consumer Sentiment on Terrorism	0.005. This coefficient is statistically insignificant.	The coefficient has a positive sign which does not make sense because if consumer sentiments are improving then terrorism should not increase.	The coefficient is small if compared with the standard deviation of the dependent variable i.e. terrorism.

Notes. a: As a no. of specifications(s) has been used for estimations, in this table the average of all those coefficients is used.

Conclusion

Terrorism has been a persistent and intense issue for Pakistan since the events of 9/11 when Pakistan became a key ally of the US in the war against terrorism. Apart from monetary and human resource losses, this continuous and indiscriminate wave of terrorism has shaken the behavior of households in Pakistan as well. Primary schools, shopping malls, airports, cricket stadium, police check posts, hospital, army's head quarter, entertainment parks, shrines, praying areas, public rallies, bus and train stations have been attacked by the terrorist during the last 17 years.

This study by using panel model of 59 cities (covering all areas of Pakistan) and thirty-six time periods estimates the impact of terrorism on city level consumer sentiment. The main model (panel) with city fixed effects indicates that intensity of an attack does not matter statistically however the occurrence of an attack in a city has statistical significance i.e. cities which face an attack tend to have negative sentiment relative to cities which do not face an attack. Usually, when there is a news that a terrorist activity has occurred, panic triggers in the city. The intensity of an attack is secondary thing however the news of an attack triggers

the real panic and fear in the area where the incident took place. This result has been counter checked (robustness) by adding a number of control variables. In terms of the size of coefficient, the coefficient of terrorism is equal to one-half standard deviation of the diffusion index (consumer sentiment) which reflects that a considerable amount of deviation in sentiment is influenced by terrorism. To check the counter argument that perhaps weak socio-economic conditions and negative sentiment promote terrorism, dependent and independent variable are also swapped in this study. However, reverse causality test indicates that occurrence of terrorist activity is exogenous i.e., current, and past sentiment do not impact or promote terrorism.

Since the impact of terrorism is more significant at the affected cities, there is a need for a region-specific (city-specific) counter-terrorism policy instead of a generic national policy.

References

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Appendix

Arellano-Bond Estimator

In the Arellano–Bond method, first difference of the regression equation are taken to eliminate the fixed effects. Then, deeper lags of the dependent variable are used as instruments for differenced lags of the dependent variable (which are endogenous). Linear dynamic panel-data models include p lags of the dependent variable as covariates and contain unobserved panel-level effects, fixed or random. By construction, the unobserved panel-level effects are correlated with the lagged dependent variables, making standard estimators inconsistent. Arellano and Bond (1991) derived a consistent generalized method of moments (GMM) estimator for the parameters of this model. This estimator is designed for datasets with many panels and few periods, and it requires that there be no autocorrelation in the idiosyncratic errors.⁶

Table

Results of Arellano Bond Estimator

VARIABLES	(1)	(2)
Consumer Sentiments Two Months Ago	0.179 (0.114)	0.107 (0.164)
Consumer Sentiments Four Months Ago		0.0404 (0.121)
Terrorism	-0.267 (0.249)	-0.186 (0.263)
Level of Education (Avg. of City)	-0.151** (0.0616)	-0.111 (0.0797)
Members in a House (Avg. of City)	-0.130 (0.116)	-0.0462 (0.150)
Level of Income (Avg. of City)	-0.0300 (0.106)	0.00222 (0.118)
History (No. of Attacks previously in each city)	42.59*** (6.027)	42.94*** (12.73)
Observations	236	177
Number of cities	59	59

Clustered (by city) standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Arellano-Bond estimator has been run to see whether the value of dependent variable (previous sentiments) is a predictor for the current value of the dependent variable (current sentiments). Results in the table columns 1-2 (using different number of lags) indicate that previous sentiments do not impact the current sentiments. Post-estimation test for serial

⁶ Information obtained from Stata Manual.

correlation is also conducted. If we follow the rule of p-value 0.05, then we reject no autocorrelation of order 1 and cannot reject no autocorrelation of order 2 which implies that Arellano-Bond criteria is satisfied.