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# The effect of terrorism on continuing education: evidence from Pakistan

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## ABSTRACT

Education has wide-ranging benefits to both the individual and wider society. This article investigates the consequences of terrorist incidents on whether households can further their children's schooling. Using both the Global Terrorism Database and Pakistan's Social and Living Standards Measurement, we find that persistent exposure to terrorism significantly reduces the likelihood that parents will continue their children's education. The result suggests, that for every million people, an increase in terrorist incidents causes 26,501 fewer children to continue their education at the primary school education level. We also examine the results by various demographic segments and types of terrorism attacks.

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## 1. Introduction

Terrorism triggers intimidation (Becker and Rubinstein 2011). Terrorism creates uncertainty and destroys both physical capital and human capital (Abadie and Gardeazabal 2008). Whether children have the option of continuing their education is also affected by terrorism and conflict (Shemyakina, 2011; Justino, Leone, and Salardi 2014). A well-educated population is a path to development and prosperity (Rodriguez and Sanchez 2012). Education benefits the individual but also has positive spillovers to the rest of society (Vila 2000). The benefits of education, both economic and social, are many and varied. The economic benefits include better jobs, labor productivity, and increased earnings. Social benefits of education include living longer and healthier lives, avoiding environmental hazards, lower levels of crime, and deriving joy from culture (Behrman, Crawford, and Stacey 1997, 4). But human capital formation takes many years. Investment in human capital, in the form of education, is important, particularly in the early years of life (Cunha and Heckman 2007; Heckman and Masterov 2007; Attanasio 2015).

There is a growing body of literature on how terrorism and armed conflict affect different aspects of education (Bertoni et al. 2019). Research reveals that terrorism and armed conflict results in children being less likely to complete their schooling (Justino, Leone, and Salardi 2014) and less likely to perform well in exams (Brück, Di Maio, and Miaari 2019). This in turn affects the labor market, age at marriage, number of children, and socioeconomic characteristics of spouses (Verwimp and Van Bavel 2014). The transmission mechanisms and the impacts of gender and age differ by context. However, few studies quantify how terrorism affects the education investment decision of individuals living in terrorism-plagued countries. This paper adds to the literature by exploring the impact of geographically heterogeneous terrorist incidents on

households' decisions for their children to continue their education. The context of this research is Pakistan. The data is obtained from two sources. The Global Terrorism Database provides the number of terrorist incidents that took place in Pakistan between 2005 and 2014 while children's education levels are obtained from five cross-sectional waves of the Pakistan Social and Living Standards Measurement. We use both OLS regression and IV regression analysis to explore how terrorist incidents influences households' decisions for their children to continue their education. Despite using both OLS and IV regression, we note the limitations of these methods. OLS regression can be subject to reverse causality and the omitted variable problem while IV regression limitations include the challenge of identifying appropriate instrumental variables that affect the treatment variable but not the outcome of interest. Therefore the causal interpretation of the results and their validity should be treated with caution.

The research has important implications for other developing countries where terrorist incidents and armed conflicts are pervasive. We contribute to the existing literature by highlighting the problems of persistent terrorism. This study finds that persistent terrorism reduces the possibility of continuing education. Terrorism is a serious problem for all terrorism-plagued regions. Even those regions with fewer terrorism incidents experience declines in households choosing to keep their children in school.

The rest of the paper is organized as follows: Sections 2 and 3 further explore the literature on the effects of terrorism on education as well as provide a background of terrorism in Pakistan. Section 4 describes the data used in the economic modeling. Section 5 describes the modeling process. Section 6 elaborates on results and discussions and Section 7 concludes the paper.

## 2. Literature review

Regardless of the context and the period under examination, it is clear that terrorism and armed conflict have a deleterious impact on education and more specifically children's schooling.

### 2.1. Theoretical explanations for terrorism/conflict's negative impact on education

Numerous transmission mechanisms have been proposed to explain this. War and terrorism may cause damage to school infrastructure, such as classrooms so that children no longer have a place to study and learn (Akbulut-Yuksel 2014). Teachers may be injured or killed in the conflict and hence schools might not have the human resources to teach. Teachers may also be recruited by the military or militia to take up arms resulting in their unavailability to teach. Likewise, school-aged children may also be recruited as soldiers by the warring parties. Conflicts or terrorism incidents might result in households with children needing to migrate or at least relocate away from the war zone, which would interrupt children's schooling. Living through a conflict might also mean it is dangerous to travel to school (Shemyakina, 2011). Militants might also target education institutions and children to intimidate civilians, for kidnappings or religious reasons (Khan and Seltzer 2016).

Children's schooling might also be interrupted due to terrorism or conflict where the conflict results in a decrease in household income. This decrease in household income may mean families need to find other sources of income. As such, children may have to give up school to undertake work. Child labor may be needed where adults in the households have been injured or killed or have voluntarily or involuntarily joined the conflict or terrorism causes. Lower life expectancy due to terrorism may mean families are less likely to less in education (Chamarbagwala and Morán 2011).

The quality of educational outcomes may be lower due to terrorism. Evidence of this may come in the form of fewer passes in final high school exams, lower test scores, a decreased probability of entering tertiary education (Brück, Di Maio, and Miaari 2019), or impairment of cognitive and non-cognitive skills (Jürges et al. 2022).

## 2.2. Previous empirical research

A wide range of empirical studies shows how terrorism or armed conflict negatively impact school children's education. Akbulut-Yuksel (2014) presents evidence from World War II that shows, not only did the war limit children's access to education (0.3 fewer years of schooling) but also had noticeable effects on children's health (those affected by were, on average, shorter and had higher mortality later in life) and experienced lower labor market earnings. Concerning the violent attacks in Colombia, Rodriguez and Sanchez (2012) find that in municipalities where armed conflict occurs, depending on the levels of conflict, children aged six to 11 years of age will have missed between 0.1 and 0.3 years of schooling compared to areas with no violence. In contrast, for children aged 12–17 years of age, their educational attainment is reduced by between 0.6 and 1.2 years compared to the no-conflict situation. Rodriguez and Sanchez (2012) attribute this difference due to the ability of the younger age group to catch up and the trade-off that the older age group needs to make between entering the labor market and continuing their schooling. Elsewhere in Central America, Chamarbagwala and Morán (2011) investigate the impact of Guatemala's 36-yearlong civil war (1960–1996) on the educational outcomes of individuals. They found that females and rural Mayan males were particularly adversely affected by the conflict. Females completed 0.12, 0.47, and 1.17 years less of schooling across three different periods of the civil war while rural Mayan males completed 0.27, 0.71, and 1.09 years less of schooling.

The relationship between conflict, schooling, and child labor is explored by Di Maio and Nandi (2013) who analyze the impact of the Israeli-Palestine conflict among Palestinian children in the West Bank across the Al-Aqsa Intifada period (September 2000 to December 2006). They find that an increase in the number of days that the Israel-Palestine border is closed results in an increase in child labor and weakly reduces school attendance. Cali and Miaari (2018) also note the impact of border closures on other labor market variables. For example, check-points have a significant negative effect on employment, wages and days worked, while other barriers have small positive effects on employment and no discernible effects on other variables. This conflict was also the context for the Brück, Di Maio, and Miaari (2019) study where they determine that the conflict not only decreases the amount of schooling but also the quality of schooling and therefore educational outcomes such as reducing the probability of passing final high school exams, lowering test scores and decreasing the probability of entering tertiary education. These findings are reinforced by Jürges et al. (2022) who find that an increase in family experience of conflict has large negative long-term effects on the educational attainment of children as measured by grade point averages. We find that non-cognitive skills, such as mental health and personality traits, rather than cognitive skills (verbal, numerical, and figural) are the channels through which exposure affects children's educational achievement.

Examining the effect of armed conflict on the accumulation of education in Tajikistan from the 1992–1998 conflict, Shemyakina (2011) found that men are 3–4 percentage points, and women are 6–8 percentage points, less likely to complete nine grades of schooling compared to the control group. The results are more pronounced for those whose household dwelling was damaged, for lower-income households, and those raised by a widowed mother. Verwimp and Van Bavel (2014) estimate the effect of civil war on schooling in Burundi and find that for every year a schoolboy is exposed to conflict, the probability of completing primary school decreases by six percentage points. Girls in higher-income households were less affected meaning exposure to conflict reduces the gender gap in schooling in this situation. Similarly, Justino, Leone, and Salardi (2014) find, in their analysis of the short-term and long-term impacts of violence on education in the case of Timor Leste, a persistent negative effect on primary school attendance and completion among boys. In the short term, both genders' education is affected but in the longer term, boys' education is more greatly affected than girls. Boys are less able to take advantage of post-conflict recovery due to the need for boys to replace, dead, injured, or missing adults in the household. Dabalen and Paul (2014) estimate that, due to armed conflict in Cote d'Ivoire, school-aged children completed almost a year's (0.94) less schooling compared to an older cohort in conflict-affected regions. The effect was more pronounced among males, older children, and children whose family members lost their jobs or household income declined.

Older male school children were also more likely to be impacted in the 1992–1995 Bosnia and Herzegovina civil war compared to younger female school children in terms of their educational attainment, according to Swee (2015). Swee (2015) attributes this to the military draft that would apply to older males. In contrast, he found no significant effects on the attainment of primary schooling. Along the same lines, Bertoni et al. (2019) note, that due to the Boko Haram conflict in North-East Nigeria, the conflict reduces school enrollments and school completions. This is more pronounced among males and among children who are no longer mandated to attend school. Without free mandated education, in the presence of conflict, these youth have higher opportunity costs with respect to work.

Several studies also note that females are disproportionately disadvantaged in terms of their education as a result of terrorism or armed conflict. The study by Singh and Shemyakina (2016), who examine the long-run effects of the 1981–1993 Punjab insurgency in India on the educational attainment of adults who were 6–16 years old at the time, find that women attained 0.83–0.91 less schooling compared to their male counterparts. This effect was more pronounced in more terrorist-prone districts, the rural areas, in this case, showing the deleterious effect of sustained conflict. Given that the average length of schooling for girls in Punjab is 4.83 years, this is a significant proportion of missing education. With the conflict reducing household incomes, Singh and Shemyakina (2016) attribute the gender differential to households prioritizing their sons' education over their daughters. Especially relevant to this study, Khan and Seltzer (2016) investigate the impact of fundamentalist terrorism on school enrollment in North-Western Pakistan. They find that the impact of school enrollments depend on the levels of exposure to terrorism. Low exposure to terrorism had little effect on school enrollments but high exposure reduced enrollments among girls by 10.5% and boys (5.5%) by about half the rate of girls. Children aged 10–18 years are impacted to a greater extent than 5–9 year-olds. Khan and Seltzer (2016) attribute these differences to the Pakistani Taliban's aim to remove girls from public life from the age of 10. While Khan and Seltzer (2016) proffer that the impact on school enrollments is smaller than commonly portrayed in the media, Khattak (2018) reports a chilling account of physical and psychological trauma experienced by young women seeking education in the North-West of Pakistan, through in-depth semi-structured interview, as a result of the Taliban's terrorism.

A different result concerning gender is revealed by Valente (2014) in her analysis of Nepal's violent civil conflict between 1996 and 2006. Attributed to Maoist ideology, Valente (2014) finds that overall conflict intensity, measured by causalities, is associated with an increase in female educational attainment but targeted school children abductions by Maoists had the opposite effect. This is a result of Maoist ideology having increased the aspirations of young girls to be educated and may have prompted their parents to facilitate their daughters' education. Also using the Nepal context, Pivovarova and Swee (2015) use a longitudinal dataset to quantify the impact of civil conflict on individual schooling attainment. They find that, counter to other evidence that shows the effect of war intensity on schooling attainment, much of the effect of the conflict on education is due to individual heterogeneity. In the Nepal context, low-endowment individuals are doubly burdened as they incur the direct costs of war and also are more likely to be geographically displaced.

This short review of the previous research shows that, while the overall impact of terrorism and armed conflict on children's education is negative, there is a diverse range of findings by age of children, household education, location (urban/rural), and gender. As Shemyakina (2011) notes, how households and individuals are affected is an empirical issue. As highlighted by Singh and Shemyakina (2016), the context of South Asia has been under-researched for this issue. This research contributes to this area.

### 3. Terrorism in Pakistan

Pakistan consists of four provinces and two autonomous regions. The four provinces are Khyber Pakhtunkhwa (KPK), Sindh, Punjab, and Balochistan whereas the autonomous bodies are Azad Jammu Kashmir and Gilgit Baltistan. Pakistan has faced extremely rigid security concerns over the past two decades. The terrorist incidents in Khyber Pakhtunkhwa increase by 58 percent but dropped by nine percent in Sindh. Overall, there is an upward trend in terrorist incidents until

2014 in Pakistan (Saeed, Syed, and Martin 2014). Geographically, Pakistan is surrounded by the Arabian Sea from the south; Afghanistan and Iran from the west, and China and India from the north-east and east, respectively. The western border of Pakistan, adjacent to Afghanistan, is of much importance. Most militants find shelter alongside the Pakistan–Afghanistan border during and after the US-initiated military operation against Afghanistan.

The militants promise these people a more stable system, which the government at the time failed to provide (Sunawar 2015). The Taliban linked with the local militants to increase the scope of terrorism in almost all areas of the country (Kronstadt 2007). Murphy (2012) argues that the only way to combat terrorism is to solve the social, economic, and political problems of Pakistan. Khattak (2018) highlights that the Taliban chose to target stable strong social institutions such as the family, judiciary, and education, that were relatively easy to dominate.

The inhabitants of Pakistan, especially the poor living in urban areas, dislike militant organizations much more than the middle-class dislike such organizations (Blair et al. 2013). Terrorism has devastated not only the economy of Pakistan but also the cultural and social norms of the country (Michael 2007). This has disproportionately affected poor people (Iyer 2009). Before 2006, militants targeted foreigners and various sects, but since then, there has been a shift toward targeting security personnel and public places. This has significantly increased the number of fatalities as well as injuries (Bhatti et al. 2011). The persistent exposure to terrorism in Pakistan has harmed residents' mental health. They have become more apprehensive, disappointed, and nervous in their day-to-day lives (Mehboob Khan et al. 2012).

In Figure 1, we obtain data from the Global Terrorism Database (GTD) from 2005 to 2014, we totaled 3,803 terrorist incidents across the majority of the districts in Pakistan that resulted in 10,272 deaths and 21,184 injuries. This represents a heavy loss of human lives. Balochistan, Sindh, and Khyber Pakhtunkhwa absorb most of the terrorist incidents. The Punjab province and the capital territory suffer fewer terrorist incidents. Notably, the Punjab province has 205 terrorist incidents during this period but it suffers a higher injury and death rate compared to the Sindh province.

After June 2006, there was an increase in the consistent exposure to terrorism all over the country as the Pakistan military counteracted Islamic fundamentalists, adding to the security concerns (Devji

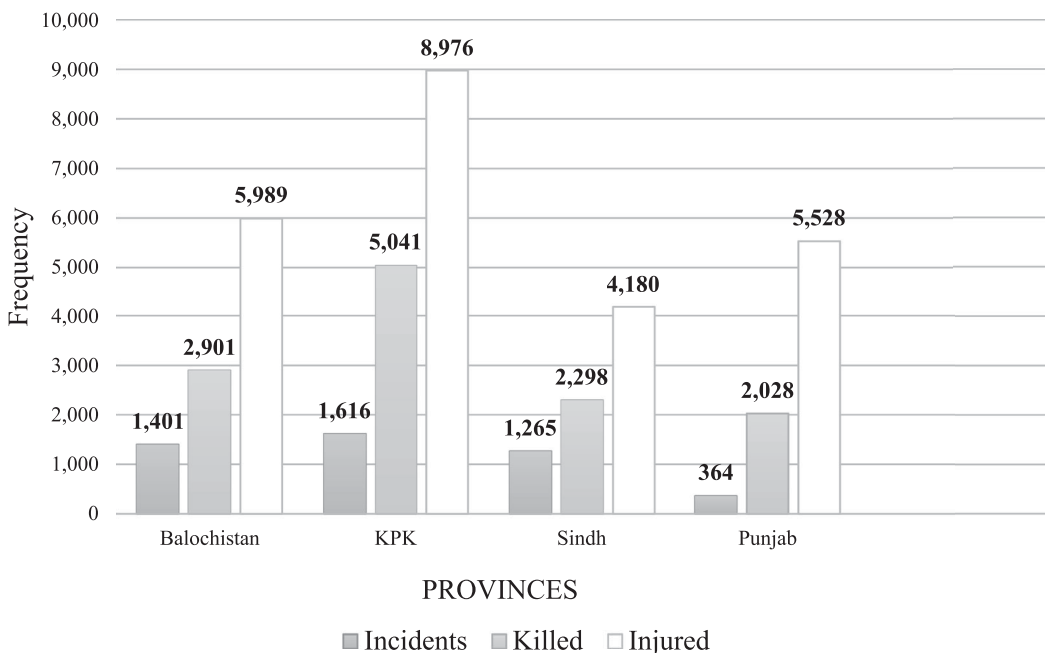


Figure 1. Terrorist Incidents in Pakistan 2005-2014. Source: Adapted from the Global Terrorism Database (GTD)

2008). This lasted until 2013. **Figure 2** shows the geographic distribution of terrorist incidents in Pakistan. The larger the circle, the more terrorist incidents from 2000 to 2013. We can note terrorism incidents all over the country. Although Punjab, Balochistan, and Sindh suffered many incidents, Khyber Pakhtunkhwa has witnessed more incidents, evidenced by larger circles in **Figure 2**. The reason Khyber Pakhtunkhwa had more terrorist incidents is that it shares a long border, as well as religious and cultural similarities, with Afghanistan (Rehman and Vanin 2017).

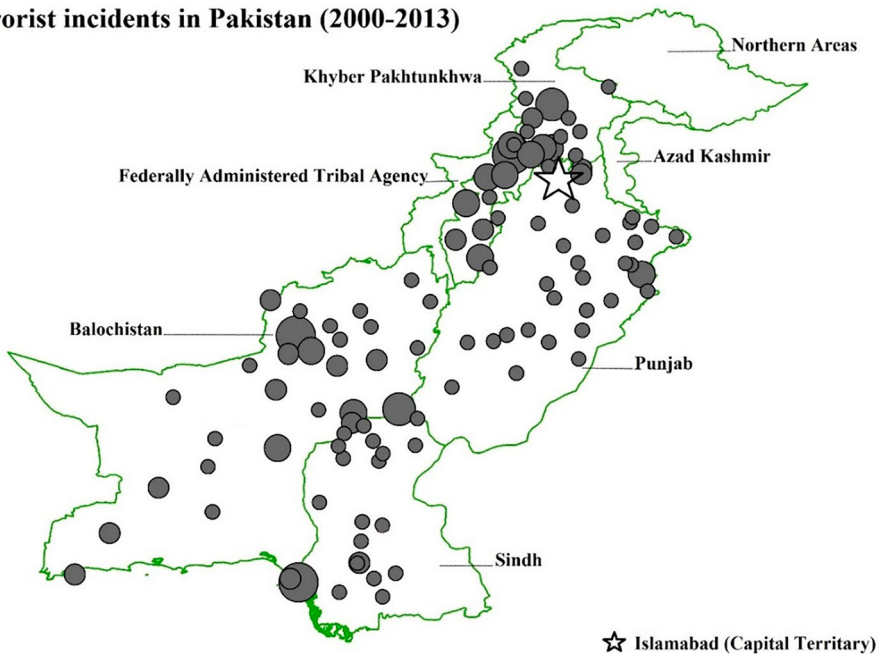
#### 4. Data

This study uses two data sources. The first data source captures terrorist incidents that took place in Pakistan between 2005 and 2014. This data is obtained from the Global Terrorism Database (GTD).<sup>1</sup> The second data source is the Pakistan Social and Living Standards Measurement (PSLM)<sup>2</sup>, which comprises five cross-sectional data waves. Khan and Seltzer (2016) also use the two same sources, although their study focuses exclusively on the northwest province of Khyber Pakhtunkhwa. Our research covers all provinces in Pakistan and, as such, has a wider scope. The Pakistan Bureau of Statistics (PBS)<sup>3</sup> collects this dataset at the district level on alternate years. The database ranges from 2006–07 to 2014–15. It contains detailed information on individual demographics and other characteristics of households. We also employ population census data of Pakistan conducted twice so far during the last couple of decades i.e. 1998 and 2017, available at the Pakistan Bureau of Statistics. To check the robustness of our estimates, we need year-wise population size at the district level in Pakistan. For this reason, we need Population census data for Pakistan.

##### 4.1. Terrorism

We obtain the data on terrorist incidents from the GTD. We extract the terrorist incidents, types of incidents (e.g. suicide and non-suicide), and the name of the place where the incident takes place from the same source. We include incidents that have killed and/or injured at least one person

#### Terrorist incidents in Pakistan (2000–2013)



**Figure 2.** Terrorist incidents by geographic location.

(Enders, Sandler, and Gaibulloev 2011). We assume that these incidents are reported with more reliability. Some of the incidents' district names are missing. We use longitude and latitude to reveal their exact location. Following Enders, Sandler, and Gaibulloev (2011), we can also classify terrorist incidents into transnational and domestic incidents. Specifically, transnational incidents refer to those events where the perpetrator's or victim's nationality is different from the place where the incident occurred. Suicide terrorism incidents are very small in proportion to the total but result in heavier losses compared to non-suicide incidents. Suicide terrorism incidents attract much more attention in the terrorism literature due to their destructive nature (Choi 2014).

Table 1 presents our main independent variables, terrorism incidents during the past year. On average, there were 3.07 terrorist incidents during the past year across the districts. Seven out of 114 districts witnessed no attack at all. During the past year, one district was plagued with 232 incidents. For the terrorist incidents in a particular district during the past year, we employ the lagged average terrorist incidents in neighboring districts during the past year as an instrumental variable. The number of neighbor districts varies for every single district. A district, bordered by intense terrorism-besieged neighbors, is likely to have more potential terrorist incidents. It is beneficial, from the terrorist organization's point of view, to plot an attack in such a district.

We employ two classifications of total terrorism data, simultaneously. These are suicide and non-suicide incidents and transnational and domestic incidents. In the first classification, there is a maximum of 22 suicide incidents and 228 nonsuicide incidents observed in one of the districts during the past year. In the other classification, a maximum of 23 transnational incidents and 230 domestic incidents took place in a particular district in the past year.

#### 4.2. Education and demographics

The PSLM survey contains social indicators collected at the household level in almost all districts of Pakistan. The PSLM survey is conducted on alternate years ranging from 2006–07 to 2014–15. We pool all the five cross-sectional data waves together from 2006 to 2015. The government of Pakistan uses this survey for planning and development at the household level by using indicators such as education, health, water & sanitation, household assets, and satisfaction with services provided by public institutions. The sampling frame includes all four provinces of Pakistan (both urban and rural regions).

A two-stage stratified sampling is conducted by the Pakistan Bureau of Statistics (PBS). In the first stage, Primary Sampling Units (PSUs) are built on enumeration blocks. Each of these blocks contains 200–250 households on average, in both urban and rural regions. Among these households, 12 households are drawn from urban areas and 16 households are sampled from rural areas. This constitutes Secondary Sampling Units (SSUs) in the second stage. All four provinces contain 5,198 blocks and 73,953 listed households in the wave 2006–07. Later, the sample size is increased to 5,428 blocks with 81,992 households during 2014–15. We pooled together five cross-sectional waves from 2006–07 to 2014–15.

**Table 1.** Terrorism related variables.

Variables	Obs.	Mean	Std. Dev.	Min	Max
Terrorist incidents during the past year	963	3.07	13.51	0	232
Domestic terrorist incidents during the past year	963	2.92	12.94	0	230
Transnational terrorist incidents during the past year	963	0.15	0.96	0	23
Non-Suicide terrorist incidents during the past year	963	2.80	12.90	0	228
Suicide terrorist incidents during the past year	963	0.50	1.78	0	22
<b>Instrumental Variables (neighbor districts)</b>					
Lag of avg. terrorist incidents during the past year	1,140	2.01	4.75	0	54.5
Lag of avg. domestic incidents during the past year	1,140	1.91	4.57	0	53.5
Lag of avg. transnational incidents during the past year	1,140	0.10	0.27	0	3.25
Lag of avg. Non-suicide incidents during the past year	1,140	1.80	4.50	0	53
Lag of avg. suicide incidents during the past year	1,140	0.21	0.48	0	3.5

\*Source: Global Terrorism Database (GTD) 2005–2014



The education system in Pakistan starts from kindergarten and contains two to three years in total (i.e. playgroup, Nursery, and KG), which usually represents the pre-schooling of kids. It is an obligatory admission requirement to complete pre-schooling before joining primary school education. Primary school constitutes 5 years of schooling and middle school is equivalent to three additional years of schooling after primary schooling (8 years). Secondary and higher secondary school is comparable to 10 and 12 years of schooling respectively, in Pakistan and enables the students to get admission to the college/university for further studies at the undergraduate level. College/university education involves completing an undergraduate and postgraduate degree program particularly related to their major (equivalent to 16 years of schooling or above). Some formal religious institutions are recognized by the Higher Education Commission (HEC) of Pakistan. The highest education level is postgraduate studies which represent the M.Phil (18 years of education) and Ph.D. (above 18 years) degrees, which are the highest awarding degrees.

We divide the overall sample into three important educational levels i.e. Primary school & above, Middle School & above, and High school & above. These three points of education are very important because people consider these stages to whether continue education further or discontinue. First, we construct the primary school & above sample consisting of respondents who are at least 11 years old in the year they were surveyed (usually considered as benchmark age to complete primary schooling in Pakistan) and could complete at least 5 years of primary school education. These are the most relevant respondents because their education choice is made during persistent exposure to terrorism. For example, in the primary school & above sample, we include only those people who were born from 1995 to 2004. We have our cross-sectional data range from 2006 to 2015, so adding 11 years. These respondents are supposed to at least complete their primary education during this period. We construct our binary outcome variable as 'primarsch' in a sample of primary & above, with values 0 and 1 i.e. equals 1 if education is at least 5 years of schooling (primary & above) and 0 equals less than 5 years of schooling. For the middle school & above sample, we construct 'middlesch' with values 0 and 1 i.e. equals 1 if education is at least 8 years of schooling (middle & above) and 0 equals less than 8 years of schooling. Similarly, for the high school & above sample, variable 'highsch' with values 0 and 1 i.e. equals 1 if education is at least 10 years of schooling (high school & above) and 0 equals less than 10 years of schooling. The values 11, 14, and 16 are added to the birth year for constructing separate samples of primary & above, middle & above, and high school & above. We construct a new variable by adding a proposed graduate year to the birth year of the respondent. We merge this dataset with terrorism dataset ranges from 2006 to 2015 using this new variable and the district code.

Table 2 presents the summary statistics of all the control variables we include in this study. From Table 2, we can see that 55% of the respondents hold at least a primary school education. This sample excludes all those respondents who never went to school or did not finish primary school education. Household sizes range from one to 60 people with an average household size of eight people across the 2006–2015 period. The location and gender of the respondent are binary coded. The code '1' represents male and urban areas whereas '0' represents the female and rural areas in both gender and location variables respectively. In the primary school & above sample, 57% of the respondents are male and 38% are located in an urban region.

Parents' education is classified into four main categories: primary and below; middle and high; above the high/secondary school and missing observations. We control for both the father's and mother's education in our model. There are missing observations for the parent's education. Most of the parents of respondents are born before the 1980s. Household income is in thousands of Pakistan rupees. We convert this nominal household income into real household income by using 2015 as a reference point. On average, household income for the primary school & above sample is 28,610 rupees. For the high school & above sample, the average household income is 70,850 rupees. We note there is a positive relationship between education and household income.

The sample is also divided into three classifications based on regional income: no-income, low-income, and middle & high-income classifications. The high-income group is a very small proportion

**Table 2.** Summary statistics.

Variables	Primary school & above sample					Middle school & above sample					High school & above sample				
	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
Primary and above (>= 5 years)	426,589	0.55	0.50	0	1										
Middle and above (>= 8 years)						360,869	0.42	0.49	0	1					
High school and above (>=10 years)											321,978	0.19	0.39	0	1
Household size	426,589	7.90	3.18	1	60	360,869	7.83	3.23	1	60	321,978	7.78	3.31	1	60
Gender of respondent-Male	426,589	0.57	0.50	0	1	360,869	0.57	0.50	0	1	321,978	0.57	0.50	0	1
Father's education level															
Primary and below	426,589	0.02	0.14	0	1	360,869	0.02	0.14	0	1	321,978	0.02	0.14	0	1
Middle and High school	426,589	0.03	0.18	0	1	360,869	0.03	0.18	0	1	321,978	0.03	0.17	0	1
Above High school	426,589	0.02	0.13	0	1	360,869	0.02	0.13	0	1	321,978	0.01	0.12	0	1
Missing	426,589	0.93	0.26	0	1	360,869	0.93	0.25	0	1	321,978	0.93	0.25	0	1
Mother's education level															
Primary and below	426,589	0.01	0.12	0	1	360,869	0.01	0.12	0	1	321,978	0.01	0.11	0	1
Middle and High school	426,589	0.02	0.12	0	1	360,869	0.02	0.12	0	1	321,978	0.01	0.12	0	1
Above High school	426,589	0.01	0.09	0	1	360,869	0.01	0.08	0	1	321,978	0.01	0.08	0	1
Missing	426,589	0.96	0.19	0	1	360,869	0.96	0.19	0	1	321,978	0.97	0.18	0	1
Household Income (1000 rupees, 2015 prices)	426,589	28.61	89.12	0	6984	360,869	52.44	121.05	0	5580	321,978	70.85	140.53	0	5580
Regional income groups:															
No income classification regions	426,589	0.79	0.4	0	1	360,869	0.77	0.42	0	1	321,978	0.76	0.43	0	1
Low-income classification regions	426,589	0.04	0.19	0	1	360,869	0.04	0.20	0	1	321,978	0.04	0.20	0	1
Middle & High-Income classification regions	426,589	0.17	0.37	0	1	360,869	0.19	0.39	0	1	321,978	0.20	0.40	0	1
Location – Urban	426,589	0.38	0.48	0	1	360,869	0.40	0.49	0	1	321,978	0.42	0.49	0	1
Provinces:															
Sindh	426,589	0.22	0.41	0	1	360,869	0.21	0.41	0	1	321,978	0.20	0.40	0	1
Punjab	426,589	0.45	0.50	0	1	360,869	0.47	0.50	0	1	321,978	0.63	0.48	0	1
Khyber Pakhtunkhwa	426,589	0.21	0.40	0	1	360,869	0.20	0.40	0	1	321,978	0.14	0.35	0	1
Balochistan	426,589	0.14	0.34	0	1	360,869	0.12	0.32	0	1	321,978	0.03	0.18	0	1

\*1 US Dollar = 104.97 PKR (Pakistani rupee) in 31/12/2015

of the sample, approximately 1%. We combine the middle and high-income groups. In Table 2, the proportion of high-income & middle-income groups together ranges from 17 to 19% in the three different education samples. Table 2 also contains a sample share of each province. Punjab has a much larger share in the sampling process due to its larger population. Balochistan has the fewest. Furthermore, the middle school & above (at least 8 years of schooling) and high school & above (at least 10 years of schooling) sample corresponds to 42% and 19% of respondents respectively.

## 5. Methodology

We employ a linear model in this study:

$$Y_{idst} = \alpha + \beta \text{LogIncidents}_{d,t-1} + \gamma X_{idstt} + U_t + U_s + U_d + \varepsilon_{idst} \quad (1)$$

In the above model,  $Y_{idst}$  is the education choice of individual  $i$  graduated from school at a particular education level in the year  $t$ , surveyed in a specific year  $s$ , and living in the district  $d$ . There are three samples; primary school & above, middle school & above, and high school & above. The primary school & above segment contains all those respondents who were born from 1995 to 2004. After adding 11 years to the birth year, we get school graduation year ' $t$ '. The PSLM survey is conducted from 2006 to 2015 i.e. ' $s$ '. The main variable of interest is  $\text{LogIncidents}_{d,t-1}$  estimated for the past year. The criterion for Incidents is at least one terrorist incident occurring in a particular district in the past year. Previous literature has also used past year terrorist incidents as we have (Gai-bulloev and Sandler 2011; Efobi and Asongu 2016). Many individuals graduated from the educational institution in such a year that there was not one terrorist incident during the past year. As such, the dataset contains more than half of the values equal to zero ruling out using the median. We calculate the log of terrorist incidents after adding one to each value. Furthermore,  $X_{idst}$  is a set of controls that include gender, location, parents' education, and income (no income, low, and high).  $U_t$ ,  $U_s$ , and  $U_d$  represent the cohort, sample survey year, and district fixed effects, respectively. For the cohort fixed effects, we control the effects such as how respondents from different regions value education. We include  $U_s$  in our model which removes any specific trend from 2006 to 2015. The model also contains district-level fixed effects<sup>4</sup> ( $U_d$ ), which control time-invariant geographic and physical factors. Lastly,  $\varepsilon_{idst}$  represents the error term in the model. The standard errors are robust and clustered at the district level. The cross-sectional waves provide data for each individual at the household level and our outcome variable is a binary variable related to the educational level of the individual.

The main coefficient of interest is  $\beta$ , which can be interpreted as a one-unit change in the independent variable leading to **0.01** times  $\beta$  units change in a dependent variable. If  $\text{LogIncidents}_{d,t-1}$  is strictly exogenous to education investment decision then  $\beta$  explains the causal relationship between them. However, the OLS estimation may be contaminated by bias due to omitted variables and reverse causality.

Omitted variable bias can be an important issue. For example, subjective hate and involvement in violent activities can be experienced after a traumatic shock. This could result from the terrorism victim having justice delayed or denied. Another contributor to terrorism could be that people cease education because of ideological issues. As many innovations are developed in the West, the individual may associate education with a Western concept and believe education is not to be valued. Cultural differences are the main drivers for these differences in opinions (Huntington 2017). The societies founded on extremism may not be open to a plurality of views that may incite violence. This may ignite terrorism. The main problem with these concepts is the difficulty in operationalizing these aspects. Hence, omitted variable bias may exist.

Reverse causality may be another hazard in cross-sectional analysis. We model the impact of terrorism on the education decision. Our sample comprises education investment decisions by households who have children completing their education while being exposed to terrorism. One might

expect that if youth invest more in education, this may be attractive for terrorist organizations to recruit them (Berrebi 2007). Conversely, if youth don't invest in education, they may be interested in joining a terrorist organization because they have few alternatives to enter the legal workforce. So their lack of education can also increase terrorism. Terrorism and education may have a two-way relationship. To accommodate this and for improved robustness, we undertake both an OLS regression and an Instrumental Variable regression approach. Rodriguez and Sanchez (2012) employ an IV approach in their study on armed conflict and education.

To deal with these possibilities empirically, we employ a lag of average total terrorist incidents during the past year in neighboring districts as an Instrumental Variable (IV) for terrorist incidents in the past year in a particular district. This IV is similar to that used by Berrebi and Ostwald (2016) but with a modification. We employ total terrorist incidents as an IV instead of domestic incidents only. The transnational incidents are a small share of the total incidents. We include them in the IV estimation. Some transnational terrorist incidents are suicide terrorist incidents too and their impact varies from transnational non-suicide incidents. We include transnational incidents because there are cases where foreign militants join local terrorist organizations for a successful terrorist attack (Kronstadt 2007). So, the presence of transnational incidents is a reason to believe that a terrorist organization has a stronghold in neighboring districts.

We use a lag of average terrorist incidents in neighboring districts. Berrebi and Ostwald (2016) use neighboring countries. One might argue the affected residents might migrate away from terrorism-prone districts and adapt to a new environment (Bhugra 2004). However, in Pakistan, the scenario is different. By using the GTD dataset we can observe that 107 out of 114 districts have experienced terrorism incidents in the past decade. So the choice to migrate from a terrorism-prone district to a terrorism-free district is very limited. However, we do note the limitations of the Instrumental Variable approach. These limitations include the difficulty of finding strong and valid instrumental variables that affect participation in the treatment but do not have a direct effect on the outcome of interest (education choice) (Martens et al. 2006; Becker 2016). We, therefore, advise a cautious interpretation of the results, although both the OLS and IV combined provide support for our evidence.

## 6. Results

### 6.1. Ols results

Table 3 presents the results of OLS estimates (Columns 1-5) as well as IV estimates (Columns 6-8). Panels A, B, and C consist of the three different segments: primary school & above, middle school & above, and high school & above. Starting from Panel A in Table 3, we observe a significant negative relationship between terrorism and education choice. In Column 1, we use a dummy variable where 1 equals if at least one terrorist incident takes place during the past year and 0 otherwise, as an independent variable. Interpreting the coefficient, if a terrorist incident takes place, it reduces the possibility of continuing further education by 6.55 percentage points. In Column 2, we use a level-level model specification with the past year's terrorist incidents as the independent variable. A unit increase in terrorist incidents during the past year reduces the probability of continuing education by 0.0024 units.

In columns 4 and 5, we split the districts into 'mild' and 'severe' based on the number of terrorist incidents that occurred in the district. Those with below-average terrorist incidents are categorized as 'mild' while those with above-average terrorism incidents are categorized as 'severe'. From Columns 3-5, we use the log of terrorist incidents during the past year as the independent variables. In Column 3, a standard deviation increase in terrorist incidents during the past year reduces the possibility of continuing education by 1.054 percentage points<sup>5</sup> in the full sample, by 0.461 percentage points in the mild sample, and by 1.270 percentage points for the severe sample. In other words, for every one million people, a standard deviation increase in terrorist incidents results in 10,540 fewer households having their child to continue their education for the full sample, 4,608 fewer individuals in the mild sample, and 12,698 fewer individuals in the severe sample.

**Table 3.** OLS and IV estimates.

Variables	Terrorist incidents	Lev-Lev Model Full Sample	OLS Estimates (Lev-Log Model)			IV Estimates (Lev-Log Model)		
			1	2	3	4	5	6
<b>Panel A: Primary school &amp; above (Schooling&gt;=5 years)</b>								
Terrorist incidents in the past year		−0.0024*** (0.000)	−0.0375*** (0.006)	−0.0291*** (0.007)	−0.0551*** (0.014)	−0.0943*** (0.015)	−0.1287*** (0.029)	−0.0200 (0.044)
Terrorist incidents Dummy	−0.0655*** (0.005)							
Observations	470,129	426,589	426,589	384,071	42,518	388,606	351,253	37,353
Wald F statistic						25.99	25.40	8.063
<b>Panel B: Middle school &amp; above (Schooling&gt;=8 years)</b>								
Terrorist incidents in the past year		−0.0024*** (0.000)	−0.0339*** (0.007)	−0.0247*** (0.007)	−0.0848*** (0.019)	−0.0817*** (0.015)	−0.1099*** (0.029)	−0.0428 (0.093)
Terrorist incidents Dummy	−0.0589*** (0.005)							
Observations	520,830	360,869	360,869	328,471	32,398	338,120	308,531	29,589
Wald F statistic						25.82	27.05	6.471
<b>Panel C: High school &amp; above (Schooling&gt;=10 years)</b>								
Terrorist incidents in the past year		−0.0014*** (0.000)	−0.0224*** (0.003)	−0.0135*** (0.005)	−0.0144** (0.006)	−0.0527*** (0.011)	−0.0665*** (0.025)	0.0339 (0.042)
Terrorist incidents Dummy	−0.0249*** (0.002)							
Observations	522,565	321,978	321,978	291,408	30,570	302,058	274,076	27,982
Wald F statistic						22.49	22.34	8.205
District Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Demographic Controls	Y	Y	Y	Y	Y	Y	Y	Y
Cohort Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Parental Education	Y	Y	Y	Y	Y	Y	Y	Y
Survey Year Dummies	Y	Y	Y	Y	Y	Y	Y	Y

Note: Robust standard errors in parentheses, which are clustered at the district level; the F-statistic for instrumental variable strength in the first stage is also based on the clustered variance-covariance matrix. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

To sum up, OLS results from Columns 1–5 (after controlling for demographics, parental education, district, survey year, and graduation year) show terrorist incidents significantly decrease the likelihood of continued education.<sup>6</sup> In the previous analysis, we recognize that terrorism can affect education choice and education choice can also affect terrorism. To cater to the possibility of this we also employ an instrumental variable approach.

## 6.2. IV results

Columns 6–8 in [Table 3](#) present the IV estimation results, and just like in Columns 3–5, we use the log of terrorist incidents during the past year. The first stage results of the IV estimation are reported in [Appendix Table A1](#). The three columns present the results for primary & above, middle & above, and high & above samples, respectively. All the results show a positive and significant correlation between past terrorist incidents in a particular district and the lag of terrorist incidents in neighboring districts. The coefficient from column 1 represents the primary & above sample. A one percent increase in a lag of average of the past year terrorist incidents in neighborhood districts explains 0.47 percentage points increase in terrorist incidents during the past year. In both columns 2 and 3, the other two segments also possess significant correlations. All the F-statistics for the instrumental variable in the first stage are more than 22, which is actually above the benchmark used in the academic literature, i.e. 10 (Stock and Yogo 2005).

In [Table 3](#), Columns 6–8 present the second stage results of IV. In Column 6, a standard deviation increase in terrorist incidents during the past year causes a reduction in continuing education by 2.65 percentage points in the full sample, by 2.04 standard deviation units in mild terrorism districts, and by 2% in severe terrorism districts. The IV result in Column 8 is statistically insignificant. This sample contains districts that experience above-average terrorist incidents.

Interpreted another way, for every one million people, a standard deviation increase in terrorist incidents during the past year results in 26,501 fewer households choosing to continue their education for their children in the full sample and 20,381 fewer individuals in mild terrorism districts. In Pakistan, the total number of primary school enrollments, in both private and public schools, is 20 million in 2015 (World Bank 2017). According to our estimates, the impact of terrorist incidents means approximately 520,000 children choose not to continue their education during 2015 alone, which is substantial.

Panel B and C present middle and high school samples respectively. In both samples, the impact of terrorism decreases as students have completed more education. Terrorist incidents badly affect the education choice of younger children, especially at the primary school level. Children having the availability or option to continue their high school education & above are the least affected segment from terrorism. These children are 16 years or older. One interpretation for this might be that as children undertake more education, they feel they have enough education already and have achieved a basic level. As these teenagers get older, there will be more likely to get jobs so have to decide whether to undertake more schooling or enter the workforce.

In brief, both OLS and IV estimates suggest terrorism negatively affects the option to continue more schooling. The difference between the OLS and IV estimates, whereby the OLS estimates are lower in absolute value than the IV estimates, is due to the Local Average Treatment Effect (LATE) (Angrist and Imbens 1995). The LATE provides a consistent estimate of the average treatment effect only for a subgroup of the population. It does not measure the effect of the treatment on the total population (ATE).

## 6.3. Results by terrorism type

In [Table 4](#), we classify terrorist incidents into domestic and transnational terrorist incidents, and, suicide and non-suicide terrorist incidents, respectively. In Panel A, we use a lag of average domestic terrorist incidents in neighborhood districts during the past year as an instrument for the domestic

terrorist incidents during the past year in a particular district, and control for transnational terrorist incidents. Transnational terrorism is an exogenous variable and its determinants vary from domestic terrorism. Suicide terrorist incidents involve the perpetrator committing suicide in the attack.

In Column 1, we control for transnational terrorist incidents and instrumenting domestic incidents. This improves the value of the F statistic for IV closer to 10. In Panel A, a standard deviation increase in the domestic terrorist incidents during the past year causes a 2.88 percentage points reduction in the probability the child will continue their education. For every one million people, an increase in domestic terrorist incidents in the past year will result in approximately 28,830 children not continuing their education.

In Column 2, a standard deviation increase in the non-suicide terrorist incidents during the past year causes a 2.91 percentage points reduction in children continuing their education. That is, for every one million people, a standard deviation increase in non-suicide terrorist incidents in the past year will result in approximately 29,090 children not continuing their education. After we control for suicide terrorist incidents, we find that non-suicide terrorist incidents also have a significant adverse influence on children's education. The results of Columns 3–6 display the same pattern as the baseline results.

**Table 4.** Domestic and non-suicide terrorism incidents.

Variables	Primary School & above		Middle School & above		High School & above	
	Domestic Incidents	Non-Suicide Incidents	Domestic Incidents	Non-Suicide Incidents	Domestic Incidents	Non-Suicide Incidents
<b>(A) Domestic and non-suicide incidents</b>						
Domestic terrorist Incidents during the past year	-0.1054***		-0.0816***		-0.0344***	
	(0.016)		(0.012)		(0.010)	
Non-Suicide terrorist incidents during the past year		-0.1077***		-0.0809***		-0.0347***
		(0.013)		(0.013)		(0.008)
Observations	388,606	388,606	338,120	296,144	302,058	302,058
Wald F statistic	8.299	8.517	12.08	13.06	9.601	10.59
<b>(B) Domestic vs. transnational and Suicide and non-suicide terrorism incidents</b>						
Domestic terrorist incidents during the past year	-0.1521**		-0.0867***		-0.0495	
	(0.064)		(0.032)		(0.031)	
Transnational terrorist incidents during the past year	0.3366		0.0647		0.0888	
	(0.443)		(0.165)		(0.164)	
Non-Suicide terrorist incidents during the past year		1.9473		0.3979		0.0695
		(33.933)		(1.915)		(0.391)
Suicide terrorist incidents during the past year		-14.8501		-3.5163		-1.0218
		(239.812)		(12.308)		(3.047)
Observations	388,606	388,606	338,120	338,120	302,058	302,058
Wald F statistic	0.438	0.00191	0.657	0.0395	0.592	0.0494
District Fixed Effects	Y	Y	Y	Y	Y	Y
Demographic Controls	Y	Y	Y	Y	Y	Y
Cohort Fixed Effects	Y	Y	Y	Y	Y	Y
Parental Education	Y	Y	Y	Y	Y	Y
Survey Year Dummies	Y	Y	Y	Y	Y	Y

Note: Robust standard errors in parentheses, which are clustered at the district level; the F-statistic for instrumental variable strength in the first stage is also based on the clustered variance-covariance matrix. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Additionally, in Panel B of [Table 4](#), we also estimate the regression model by instrumenting both variables (domestic/transnational terrorism and suicide / non-suicide terrorism) at the same time but the estimates are not statistically significant.

To sum up, both domestic and non-suicide terrorist incidents possess considerable adverse influences on the probability that children will continue their education, especially among younger children. This result dampens as the children get older and complete more schooling.

#### **6.4. Results by demographics**

In [Table 5](#), we show the effect of several demographic variables on whether children continue their schooling. Panel A presents the primary school & above sample results. We can observe that males, those residing in urban areas, and those residing in urban areas with lower to higher income are less affected by terrorist incidents.

Starting from Column 1, the coefficient for female respondents is  $-0.1184$  while for males, it is  $-0.0799$ . A standard deviation increase in the terrorist incidents during the past year causes a reduction in continuing education by 2.24 percentage points among males and 3.32 percentage points among females. Hence household choices for their daughters to continue education are more sensitive than their sons.<sup>7</sup> Similarly, in Column 2, the coefficient for households in the rural region is  $-0.1081$ , while for those living in urban regions, it is  $-0.0638$ . Terrorism has a larger influence on the education choice of households living in rural regions. To further drill down education choice by region, we divide our urban-rural sample into no-income, low-income, and middle & high-income categories. The no-income classification consists of those households where people live below the low-income benchmark set by PSLM.

In [Table 5](#), Column 3, we can see that no-income households are more badly affected by terrorism compared to higher-income households. For every million people, a standard deviation increase in terrorist incidents during the past year causes 29,000 children from no-income households to discontinue their education while for low-income households, it is 16,680 children and for middle-high income households, it is 16,650 children. For middle school and high school education (Panel B and C), we see the same negative impact of terrorism on education but with a smaller magnitude.

We conclude based on the above estimations that the educational choice for daughters, households residing in rural areas, and no-income households are relatively more adversely affected by terrorist incidents. Those with primary school & above education are more badly affected by terrorism compared to middle and high school & above samples.

### **7. Discussion and conclusions**

This research quantifies the effect of terrorism on whether Pakistani children continue their schooling. We assess this across different education levels, from primary school & above, middle school & above, and high school & above. While there is a growing body of literature on the impact of armed conflict and terrorism on schooling, our contribution combines different levels of schooling with different contextual and demographic variables to provide a nuanced approach that is seldom found in other studies. Further, we answer the Singh and Shemyakina (2016) call to conduct more studies in South Asia. We employ various model specifications and an instrumental variable technique to explore the correlation and causal relationship between the decision to continue education and terrorism. The IV results suggest that a standard deviation increase in terrorist incidents during the past year causes a reduction in the possibility of education continuation by 2.65 percentage points. In other words, for every one million people, a standard deviation increase in terrorist incidents in the past year will result in 26,501 fewer children choosing to continue their education. This is not surprising as the negative relationship between terrorism or armed conflict and education is found in all previous research (Shemyakina, 2011; Akbulut-Yuksel 2014)



**Table 5.** Terrorism impact on sub-samples.

Variables	Primary school & above sample			Middle school & above sample			High school & above sample		
	Male	Urban	Urban x Income	Male	Urban	Urban x Income	Male	Urban	Urban x Income
Log of terrorist incidents during the past year	-0.1184*** (0.023)	-0.1081*** (0.018)	-0.1035*** (0.016)	-0.1050*** (0.020)	-0.0928*** (0.020)	-0.0882*** (0.018)	-0.0709*** (0.015)	-0.0575*** (0.017)	-0.0559*** (0.015)
MaleXpatevent1	0.0385* (0.023)			0.0367** (0.018)			0.0284*** (0.008)		
UrbanXpatevent1		0.0443*** (0.015)			0.0345** (0.014)			0.0168 (0.013)	
Urban Low IncomeXpatevent1			0.0441** (0.018)			0.0322** (0.015)			0.0139 (0.011)
Urban Middle to High IncomeXpatevent1			0.0442*** (0.016)			0.0290** (0.014)			0.0290* (0.016)
Observations	388,606	388,606	388,606	338,120	338,120	338,120	302,058	302,058	302,058
Wald F statistic	16.00	36.63	42.79	14.72	34.84	41.07	12.70	29.33	34.81
District Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Demographic Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cohort Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Parental Education	Y	Y	Y	Y	Y	Y	Y	Y	Y
Survey Year Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: Robust standard errors in parentheses, which are clustered at the district level; the F-statistic for instrumental variable strength in the first stage is also based on the clustered variance-covariance matrix. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

We reveal the presence of terrorism and its impact on education continuation differs among regions (urban and rural areas), household income, and gender. Our results demonstrate that living in a terrorism-prone district has a significant adverse influence on the decision of education continuation of primary-school-aged children. Those with primary school & above education are more badly affected by terrorism compared to middle and high school & above samples. The larger impact on younger children was also found by Dabalén and Paul (2014). This can be particularly harmful to the individual as well as society at large if younger children are not given the chance to continue their education. Children having the availability or option to continue their high school education & above are the least affected segment from terrorism. This suggests that households who have invested in their children's education will continue to do so.

There may be sunk costs involved.

We also find that rural households are more affected by terrorism in the decision for further schooling. Similar to Singh and Shemyakina (2016), households in rural areas are more adversely affected by terrorism when it comes to their children's education. Rural areas are noted for higher levels of terrorism as well as having a higher proportion of no or low-income households. In line with Khan and Seltzer (2016), we note that no-income households are relatively more adversely affected by terrorist incidents. These households are more likely to require their children to work and contribute to household income, especially if adults in the household have been maimed or killed.

In contrast to Valente (2014) but in line with other research (Shemyakina, 2011; Khan and Seltzer 2016; Singh and Shemyakina 2016), we find that girls' education is more affected by terrorism than boys. There are numerous reasons for this. As noted above, the Taliban and other extremists groups have systematically targeted females and their educational institutions based on their ideology. Being attacked or kidnaped on the way to or from school is an ever-present danger for females, especially. Further, prioritizing sons' education over daughters' education may result in females' education being impacted to a larger degree.

Future research could explore more channels through which terrorism influences the education continuation of individuals. This research has important implications for policymakers. Policymakers could put more emphasis on keeping females in education as well as respondents from rural regions, and those with no or low household income. Moreover, domestic terrorist incidents adversely affect investment in education compared to transnational terrorist incidents. The Pakistan government, NGOs, and international law enforcement agencies should put more focus on devising regulations to mitigate terrorism and its impact on education investment.

## Notes

1. <http://www.start.umd.edu/gtd/>
2. <http://www.pbs.gov.pk/content/pakistan-social-and-living-standards-measurement>
3. <http://www.pbs.gov.pk/>
4. We also show the robustness of our results by including district-specific time trends. The output of these regressions can be found in the Appendix Table A2.
5. Coefficient is calculated by multiplying OLS coefficient with standard deviation of predictor variable.  $\text{Beta} = [-0.0375 * \ln(1+0.91)] * 100 = -1.05$  percentage points. All rest of the coefficients are calculated in the same way.
6. We also conduct a robust test by dividing the main explanatory variable of terrorist incidents by the district-level population size. These results are in in Appendix Table A3. The results are consistent with our baseline empirical evidence.
7. As a robust check, we split the sample by gender and re-run the analysis. This is shown in Appendix Table A4. The results are consistent with the interaction analysis shown in Table 5.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Appendix

**Table A1.** First stage instrument variable.

Variables	1 Primary School & above	2 Middle School & above	3 High School & above
Lag of avg. terrorist incidents during the past year (neighbor districts)	0.471*** (0.089)	0.492*** (0.091)	0.475*** (0.091)
Wald F statistic	25.99	25.82	22.49
Observations	536,514	490,447	454,137
District Fixed Effects	Y	Y	Y
Demographic Controls	Y	Y	Y
Cohort Fixed Effects	Y	Y	Y
Parental Education	Y	Y	Y
Survey Year Dummies	Y	Y	Y

Note: Robust standard errors in parentheses, which are clustered at the district level; the F-statistic for the IV strength is also based on the clustered variance-covariance matrix. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table A2.** OLS and IV estimates of Terrorism and Education levels (Inclusion of District-specific Time Trends in the model).

Variables	Primary School & Above		Middle School & Above		High School & Above		
	OLS	IV	OLS	IV	OLS	IV	
	1	2	3	4	5	6	
Log of Terrorist Incidents during past 1 year	-0.0445*** -0.007	-0.1329*** -0.019	-0.0423*** -0.008	-0.1241*** -0.019	-0.0269*** -0.003	-0.0772*** -0.016	
Observations		426,593	388,609	360,874	338,124	321,983	302,062
R-squared	0.261	0.27	0.156	0.156	0.114	0.113	
District Fixed Effects	Y	Y	Y	Y	Y	Y	
Demographic Controls	Y	Y	Y	Y	Y	Y	
Cohort Fixed Effects	Y	Y	Y	Y	Y	Y	
Parental Education	Y	Y	Y	Y	Y	Y	
Survey Year Dummies	Y	Y	Y	Y	Y	Y	
Wald F Statistic		26.74		25.47		23.05	

Note: Robust standard errors in parentheses, which are clustered at the district level; the F-statistic for instrumental variable strength in the first stage is also based on the clustered variance-covariance matrix. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A3.** OLS and IV estimates of Terrorism and Education levels (Adjusted with Population density).

Variables	Primary School & Above		Middle School & Above		High School & Above		
	OLS	IV	OLS	IV	OLS	IV	
	1	2	3	4	5	6	
Log of Terrorist Incidents by population density of each district during past 1 year	-0.0264*** -0.008	-0.1173*** -0.04	-0.0323*** -0.01	-0.1085*** -0.033	-0.0155*** -0.003	-0.0515*** -0.014	
Observations		127,338	117,162	111,715	104,890	102,275	96,154
R-squared	0.334	0.325	0.208	0.205	0.151	0.149	
District Fixed Effects	Y	Y	Y	Y	Y	Y	
Demographic Controls	Y	Y	Y	Y	Y	Y	
Cohort Fixed Effects	Y	Y	Y	Y	Y	Y	
Parental Education	Y	Y	Y	Y	Y	Y	
Survey Year Dummies	Y	Y	Y	Y	Y	Y	
Wald F Statistic		6.826		6.875		5.97	

**Table A4.** OLS and IV estimates of Terrorism and Education levels (Sample split by Gender).

Variables	Primary School & Above				Middle School & Above				High School & Above				
	Male		Female		Male		Female		Male		Female		
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	
Log of Terrorist Incidents during past 1 year	-0.0326***	-0.0864***	-0.0416***	-0.0946***	-0.0319***	-0.0767***	-0.0352***	-0.0849***	-0.0223***	-0.0560***	-0.0227***	-0.0522***	
Observations		255,762	233,188	170,831	155,421	216,231	202,676	144,643	135,448	193,451	181,400	128,532	120,662
R-squared	0.274	0.289	0.253	0.263	0.148	0.154	0.172	0.177	0.106	0.107	0.124	0.127	
District Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Demographic Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Cohort Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Parental Education	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Survey Year Dummies	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Wald F Statistic		27.7		22.84		27.87		22.08		25.21		18.31	

Note: Robust standard errors in parentheses, which are clustered at the district level; the F-statistic for instrumental variable strength in the first stage is also based on the clustered variance-covariance matrix. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$