

## Terrorism as Socio-Economic and Cultural Barriers to Indonesian Firms' Financial Performance

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**Abstract:** Terrorism causes ethical and cultural issues and adversely impacts a nation's socio-economic development. Considering the escalating focus on the economic contribution toward Indonesia's stability, growth, and industrial transformation, the current study aims to examine the impact of terrorism on the financial performance of firms listed on the Indonesian stock exchange. The statistics regarding terrorist attacks, fatalities, and injuries during such attacks from 2011 to 2020 in Indonesia were gathered from the Global Terrorism Database, and the data regarding firms' internal characteristics and the external environment was gathered from the credit agency in Indonesia, PT Pemeringkat Efek Indonesia, mostly known as PEFINDO. At the same time, the central Bank Indonesia was approached for the financial statements of the firms listed on the Indonesian Stock Exchange. Applying the Cobb–Douglas production function and Pooled Ordinary Least Squares, the results revealed a significant and negative influence of terrorism on firms' performance. The influence of firms' internal characteristics and external environment were considered control variables. As a valuable addition to the existing literature, the current study provides unique evidence of the effects of previous years' terrorism and within-country variations of terrorism on firm financial performance.

**Keywords:** Terrorist attacks, fatalities, injures, firms' performance, Indonesia.

The frequency and intensity of terrorism have substantially increased in the last two decades (Nyadera & Bincof, 2019; Onat et al., 2022). According to the global terrorism index 2021, 4,886 global terror attacks were reported, resulting in 6,413 injuries and 6,627 casualties. This increase in violence and terrorism further resulted in a drastic decrease in a nation's economic development and progress (Viana & da Silva, 2021). Terrorists mainly target businesses that cause drastic economic repercussions on the productive capacity of organizations (Dimitrova et al., 2022). Moreover, scholars have reported various concepts and aspects of terrorists, including the employment of violence and force to achieve political goals, politically motivated violence against civilians, and criminal acts to provoke the state (Stohl, 2006; Vergani et al., 2019; Wilson, 2021). Although there is no universal definition of terrorism, researchers often conceptualize terrorism as "the systematic use of violence, often across national borders, to achieve a political or religious aim through fear, coercion, or the intimidation of the public" utilizing the concept mentioned above (Czinkota et al., 2010, p. 330).

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Terrorism has several consequences and policy implications. For instance, terrorism affects the business environment by disturbing business strategies, supply, and demand (Farooq et al., 2021), and a country's business activities depend on anti-terror activities and laws and regulations set by government institutions. Organizations must also bear certain costs to protect themselves against terrorism threats, negatively affecting their performance (Zheng et al., 2021). Researchers also reported the creation of fear among organizations and the destruction of business infrastructure due to that fear (Golase, 2022). Regardless of the drastic impacts of terrorism on business performance, research in the domain is scarce (Broeders et al., 2021; Shandler et al., 2022). More recently, scholars suggested examining the impact of terrorism on the financial performance of organizations (Lee et al., 2021; Okafor & Calderon, 2022).

The current study aimed to examine the impact of terrorism on the financial performance of firms listed on the Indonesian stock exchange to fill the research gap. In recent years, Indonesia has been regarded as among the riskiest countries in Southeast Asia due to intense terrorist attacks (Setiawan, 2020). Per the Global Terrorism Index 2022, Indonesia's terrorism score was reported as 5.5, keeping it in 24th place among the 163 countries in the index. Table 1 presents the number of terror incidents, fatalities, and injuries in Indonesia from 2011 to 2020.

**Table 1**

*The Number of Terror Incidents, Fatalities, and Injuries in Indonesia (2011-2020)*

Year	Number of Incidents	Number of fatalities	Number of injuries
2011	18	14	67
2012	26	12	22
2013	10	13	4
2014	4	3	6
2015	8	10	3
2016	10	8	25
2017	17	6	29
2018	27	61	34
2019	10	7	16
2020	21	13	22

*Note.* Global Terrorism Database: <https://www.start.umd.edu/gtd/>

There is a continuous debate regarding the significance of firms in strengthening the economy, generating spillover effects boosting exports, and creating jobs in the country (Bakry et al., 2021). Regardless of these essential facts, to the best of the authors' knowledge, no empirical investigation has been conducted in Indonesia to date to examine the association of terrorism with the financial performance of firms listed on the Indonesian stock exchange. Hence to address this literature gap, the current study focused on this prime motive based on understanding terrorism's toxic impact on organizations' financial activities and performances, more specifically in developing nations compared to developed nations.

This argument can further be elucidated by the fact that terrorism erodes governance and market structures that run the business and widens the institutional gap in developing nations. Due to limited resources, developing nations are less vulnerable to terrorism, which causes heavy damage. The current study was founded on a contingency view theory that postulates the existence of associations among organizational characteristics, external environmental conditions, and firms' performance. A survey methodology was conducted among Indonesian firms listed on Stock Exchange to achieve the study objectives. The macro-level data on terrorism was collected from the global terrorism database. To establish the

discriminant and convergent validity of the measures (Henseler et al., 2015), a standardized survey instrument was employed with an identical sampling methodology to produce comparable data across firms and countries and minimize any potential error (Okafor & Calderon, 2022). Additionally, the global terrorism database reports the country-specific number of terror attacks and collects data daily.

The current study adds value to the existing body of literature in multiple ways by uniquely investigating the impacts of terrorism on a firm's financial performance in Indonesia. First, some researchers highlighted political instability's influence on multinational corporations' activities (Shabir et al., 2022; Yasuda & Kotabe, 2021). In contrast, the objective type of political instability affecting firms' performance based on terrorist activities has been ignored previously (Coman et al., 2021; Dimitrova et al., 2022). Second, the severe terrorist attack activities causing injuries and deaths were considered in the current study's analysis. Third, country-level terrorist attack data were aggregated, and their impacts on the firms' performance listed on the Stock Exchange of Indonesia are unique and offer valuable policy insights for practitioners and academics.

## **Literature Review and Conceptual Framework**

The literature regarding firms' performance is based on three perspectives, i.e., the theory-based contingency view (Yuen et al., 2019), the universal perspective (Gupta et al., 2020), and the situation-specific perspective (Fuchs et al., 2019). The universal view depicts the irrelevance of the external environment with organizational performance in the presence of encompassing strategies from the management (Chinoperekweyi, 2020). In contrast, the situation-specific view focuses on the external environment and unique situations determining firms' performance (Fuchs et al., 2019). However, the contingency view lies between the universal and situation-specific views. Following a contingency view, the unique organizational characteristics and external environment determine their performance (Yuen et al., 2019). Hence it highlights the significance of external and internal environments in enhancing a firm's productivity. Therefore, the study was founded on a contingency-based view while determining the firm's performance based on the internal characteristics and external environment.

## **Financial Performance and Terrorism**

Research has reported the direct and indirect impacts of terrorism on various business activities (Czinkota et al., 2010; Dimitrova et al., 2022). The destruction of the factors that facilitate production in business activities presents the direct consequences of terrorism (Zheng et al., 2021). Indeed, the increased costs of business operations, supply and value chain interruptions, and buyers' demand decline reflect the indirect consequences of terrorism (Butt, 2021). Kosova and Enz (2012) study of 30,000 US hotels from 2000 to 2009 shows that terrorism adversely affected the financial performance of the firms during the reported period. These results support the arguments that terrorism significantly impacts travel demands and consumer choices. Cam (2008) study of US industries also revealed the significant impact of terrorism on firm performance. Likewise, Shahzad et al. (2017) reported the negative association of terrorism with industry performance based on the research conducted among Pakistanis equity industries from 2000 to 2014. In addition, a recent study conducted among Nigerian manufacturing firms by Okafor and Calderon (2022) reported the significant influence of terrorism on a firm's financial performance. Likewise, Mazhar and Rehman (2021) analyzed the influence of terrorism on manufacturing firms in Pakistan. They reported a reduced growth rate of the firms regardless of age. Researchers also reported the negative impacts of terrorism on employee growth at organizational levels (Soomro et al., 2021). Terrorism has also been

reported negatively influence an organization's accumulation, capital mobility, productivity, and labor growth rate (Okafor & Calderon, 2022), depicting the poor performances of such organizations (Mazhar & Rehman, 2021). Regardless of the research available in the domain, there is a dearth of empirical studies considering the impact of terrorism on the firms listed on the Indonesian Stock Exchange, and very few studies have considered the financial performance of various firms related to a specific industry, that is, manufacturing (Okafor & Calderon, 2022).

### **Factors Impacting Firms' Financial Performance**

Other than terrorism, several internal and external characteristics of the firms influence their performance. For instance, firms' age, ownership structure, the type of competition faced by the firms, export activities, and capital intensity (Deng et al., 2021). Firms achieve speedier efficiencies, strong market positions and high bargaining power in terms of sellers and buyers based on the soundness of these factors (Edeh & Acedo, 2021). The research reports the significant influence of these factors on the firms' performance. For instance, Leung and Sharma (2021) found a positive association between firm age with firm performance. Din et al. (2021) reported predictive differences in firms' performances based on ownership structure. In this context, Chuang and Hsu (2004) reported that firms with foreign ownership outperformed domestic or state-owned firms while researching Chinese firms. Gurbuz and Aybars (2010) stated similar results in their study conducted among Turkish firms. Researchers also highlighted a positive association of fixed assets with a firm's performance (Liu et al., 2021; Vellisicig et al., 2022). The high involvement of bureaucrats or the unnecessary government regulation that hinders business practices were found to be negatively associated with firm performance (Okafor & Calderon, 2022). Likewise, Anafia and Ulpah (2021), in a study conducted among the Indonesian Stock Exchange listed firms, found that the competition of non-listed firms negatively impacted the performances of the listed firms on the Indonesian Stock Exchange. Likewise, the barriers to entry that create less competition were positively associated with the firm's performance (Lugovoi et al., 2022). Based on the literature support, the current study considered these internal and external factors as control variables to predict their influence on the firm's performance on the Indonesian stock exchange. Hence, the current study postulates that;

**H1a:** A negative association will exist between terrorists incidents and the financial performance of firms listed on the Indonesian Stock Exchange.

**H1b:** A negative association will exist between the number of fatalities and the financial performance of firms listed on the Indonesian Stock Exchange.

**H1c:** A negative association will exist between the number of injuries and the financial performance of firms listed on the Indonesian Stock Exchange.

### **Research Method**

#### **Data Collection and Sampling Measures**

The current study was conducted among the Indonesian Stock Exchange-listed firms. In September 2021, there were 750 listed companies on the Indonesian Stock Exchange. Indonesian market capitalization imparted 45.2% of its nominal GDP by December 2020. The total number of investors on the Stock Exchange reached 6.4 million compared to 2.5 million in 2019. The dependent variable in the current study, which is of the main interest, is the firm financial performance measured by the sales and profit per employee. Although some scholars

reported these as the narrower measures of the firms' performance (Țilică, 2021), they are compatible across the firms and deal with both the profitability and revenue side of the firms (Kim & Park, 2021). When using an accounting-based approach, firms' performance allows greater comparability, criterion stability, and financial viability across different firms (Baydaş & Elma, 2021). In addition, the counting-based approach used in the current study helped to compare firm performances via return on investments and a single index.

**Table 2**  
*Variables, Their Categories, Conceptualizations, and Measurements*

Variable Category	Variable	Conceptualization and measurement	Expected Sign
Dependent	Profit per Employee	The total amount a firm "i" review in a financial year "t" distributed based on total employees. It is measured in Local Currency Units (LCU).	
	Profit per Employee	The total gross profit attained by a firm "i" in a financial year "t" is divided by the total number of employees and measured in LCU.	
Independent	No. of Terrorist Incidents	Terrorism is conceptualized as "the planned use of the threat of extra-normal violence to obtain a political, religious, or ideological objective" (Okafor & Calderon, 2022, p. 7). The total number of terrorist incidents in the year "t" in Indonesia.	-
	No. of Fatalities	The total number of people killed during terrorist attacks in a year "t."	-
	No. of Injuries	The total number of people injured during terrorist attacks in the year "t."	-
Control	Firms' Age	The total number of years since the firm has operated in Indonesia is listed on the stock exchange and measured in years.	+
	Ownership Status	The domestic or foreign ownership of a firm "i" in a year "t" is measured in percentage.	+
	Fixed Assets Investments	The money invested, do you require physical assets, i.e., machinery plants, and buildings by a firm "i" in a year "t." It is measured in LCU	+
	Competition from the non-listed Firms	This is the perceived degree of competition faced by a firm "i" in a year "t" with the non-listed firms. It was measured on a 5-point Likert scale of 0–4. Where 0 = no perceived and 4 = intense competition	-
	Dealing with Government Regulations	The time spent by senior management in dealing with the government. It is measured in percentages.	-
	Exports Status	The total number of goods sold outside the domestic market by a firm i in a year t." It is measured in percentages.	+

Terrorism, as an independent variable, was measured with terrorist incidents, fatalities, and injuries. Other variables like firm age, ownership structure, the type of competition faced by the firms, export status, and dealing with government regulations that determine the firms' internal characteristics and external environments were considered control variables.

Multiple data sources were used to obtain data for these internal and external variables from 2011-2020. For instance, the oldest and most trusted credit agency in Indonesia, PT Pemingkat Efek Indonesia, mostly known as PEFINDO, was approached to get the credit rating information of the sample firms. The central Bank of Indonesia provided financial statements for firms listed on the Indonesian Stock Exchange. Table 2 depicts the details regarding study variables.

### Descriptive Statistics of the Study Variables

The average sales per employee in the Indonesian local currency unit (IDR) was 79.781 (000,000), and the average profit per employee was 45.670 (000,000). A large variation was found between the minimum and maximum values for the sales and profit per employee. This depicts the high level of depression in profits and sales across the sampled firms. The mean for the number of terrorist incidents, fatalities, and injuries were 15.181, 15.545, and 22.909, respectively. Table 3 presents the descriptive statistics for all the other study variables depicting the firm's external environment and internal characteristics, and Table 4 presents the correlations among the study constructs.

**Table 3**  
*Descriptive Statistics of the Variables*

Variables	Mean	STD.	Minimum	Maximum
Profit per Employee, LCU (000,000 IDR)	45.670	21.731	30.420	1,680.150
Profit per Employee	79,781	118.501	0.170	69,843
No. of Terrorist Incidents	15.181	7.870	4.000	27.000
No. of Fatalities	15.545	6.367	3.000	61.000
No. of Injuries	22.909	10.822	3.000	67.000
Firms' Age	26.712	8.654	1.000	122.000
Domestic Ownership (%)	93.232	18.009	0.000	100.000
Foreign Ownership (%)	3.543	09.643	0.000	100.000
Fixed Assets Investments, LCU (000,000 IDR)	192.926	11.85	0.000	66,495.87
Competition from the non-listed Firms	2.941	1.343	0.000	4.000
Dealing with Government Regulations (%)	12.570	7.120	0.000	100.000
Exports Status (% of total goods)	10.983	4.921	0.000	100.000

**Table 4**  
*Correlational Matrix*

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Profit per Employee (log)	1.000											
Profit per Employee (log)	0.760	1.000										
No. of Terrorist Incidents	-0.347	-0.476	1.000									
No. of Fatalities	-0.425	-0.347	-0.229	1.000								
No. of Injuries	-0.344	-0.279	-0.211	-0.336	1.000							
Firms' Age	0.061	0.042	0.077	0.031	0.056	1.000						
Domestic Ownership (%)	0.059	0.081	0.077	0.074	0.050	0.052	1.000					
Foreign Ownership (%)	0.071	0.065	0.060	0.075	0.045	0.048	0.066	1.000				
Fixed Assets Investments (log)	0.289	0.370	0.311	0.206	0.197	0.218	0.456	0.378	1.000			
Comp. from non-listed firms	-0.143	-0.241	-0.255	-0.227	-0.356	-0.189	-0.321	-0.286	-0.234	1.000		
Dealing with Govt. Policies (%)	-0.120	-0.154	-0.210	-0.234	-0.167	-0.098	-0.461	-0.444	-0.360	-0.321	1.000	
Exports Status (%)	-0.217	-0.233	-0.190	-0.467	-0.413	-0.290	-0.383	-0.111	-0.202	-0.199	-0.346	1.000

## Results and Discussion

### Theoretical Model

A simple and reduced Cobb–Douglas production function was applied to estimate the influence of terrorism on firms' financial performance (Okafor & Calderon, 2022). Terrorism, directly and indirectly, impacts production factors that destroy capital by reducing returns on investment, capital in mobility, and losses of capital assets (Koshkin & Novikov, 2019). Terrorism also drastically hinders the adoption of new technologies and investments in efficient techniques resulting in the displacement of skilled employees and low productivity (Mazhar & Rehman, 2021). In other words, it negatively impacts all production factors determining the firms' performances. Equation one presents the baseline estimation of the current study model.

$$Y_{i,t} = A_{i,t}^{\alpha} K_{i,t}^{\beta} L_{i,t}^{1-\alpha-\beta} \quad (1)$$

*Note.*  $A$ = labour-augmenting technology;  $K$ = capital;  $L$ = labour efficiency;  $Y$ = firm financial performance”.

We enhanced the model by considering terrorism as an influencing factor in the firm's financial performance via the abovementioned production factors. Moreover, while conducting the current study, we followed the guidelines of Mazhar (2018) regarding the influence of terrorism on firms' financial performance.

### Empirical Strategy

The data from 2011 to 2020 was used for the data analysis. The Pooled Ordinary Least Squares (OLS) Technique was used for the baseline analysis (Long et al., 2019). The pooled OLS was used to examine a simple linear relationship between the number of terror attacks, fatalities, and injuries with firm performance in the form of sales per employee and profit per employee. However, there are certain restrictions on the model. For instance, it does not control the heterogeneity among the constructs. Therefore, we considered random and fixed effects to address the issue of heterogeneity among the study constructs. The Hausman test was found suitable among the fixed effects methods to deal with the issue over the random effects methods based on several characteristics. For instance, it helps to control the unobserved time-invariant factors. The reduced form of the baseline estimation for the current study is presented in equation 2:

$$y_{it} = \alpha_0 + \beta_i X_t + \sum_{k=1}^{k=7} \delta_k \text{Control Variables}_{it} + \sum_{t=2009}^{t=2014} \text{Year}_t + \mu_i + v_{it} \quad (2)$$

*Note.*  $y_{it}$ =firm financial performance in firm  $i$ , in time  $t$ ;  $X_t$  = number of terrorist incidents, number of fatalities, and number of injured;  $\delta_{k,1\_7}$ = control variables;  $\beta$  and  $\delta$  = coefficients to be estimated;  $\mu_i$  and  $v_{it}$  = disturbance terms.”

### Baseline Regression Analysis

The pooled OLS baseline results for the association of the terrorist incidents, the number of fatalities, and the number of injuries with firm performance (sales per employee and profit per employee) are given in Table 5.



**Table 5**  
*Regression Analysis*

Variables	OSL 1 Sales/worker	OSL 2 Sales/worker	Fixed effects 3 Sales/worker	Fixed effects 4 Sales/worker	OSL 5 profit/worker	OSL 6 profit/worker	Fixed effects 7 profit/worker	Fixed effects 8 profit/worker
No. of Terrorist Incidents	1.000							
No. of Fatalities	0.760	1.000						
No. of Injuries	-0.347	-0.476	1.000					
Firms' Age	-0.425	-0.425	-0.425	1.000				
Domestic Ownership (%)	-0.344	-0.344	-0.344	-0.344	1.000			
Foreign Ownership (%)	0.061	0.061	0.061	0.061	0.061	1.000		
Fixed Assets Investments (log)	0.059	0.059	0.059	0.059	0.059	0.059	1.000	
Comp. from non-listed firms	0.071	0.071	0.071	0.071	0.071	0.071	0.071	1.000
Dealing with Govt. Policies	0.289	0.289	0.289	0.289	0.289	0.289	0.289	0.289
Exports Status (%)	-0.143	-0.143	-0.143	-0.143	-0.143	-0.143	-0.143	-0.143
Constant	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120
F stat	-0.217	-0.217	-0.217	-0.217	-0.217	-0.217	-0.217	-0.217
Prob. > F								
No. of observations								

*Note.* Robust standard errors are in parentheses; \*significance at 10%, \*\*significance at 5%, and significance at 1%; Sales/Worker and Profit/Worker are logarithms transformed.

The Results revealed a significant and negative influence of the terrorist incidents ( $\beta = 0.211^{***}$ ;  $\beta = 0.189^{***}$ ), number of fatalities ( $\beta = 0.196^{***}$ ;  $\beta = 0.127^{***}$ ), and number of injuries ( $\beta = 0.203^{***}$ ;  $\beta = 0.148^{***}$ ) on sales per employees and profit per employees respectively depicting the firm's performance. We also extended the estimations using the fixed effect techniques and found consistent results from the pooled OLS estimations. Applying fixed effect estimation, an increase of terrorist incidents by 1 negatively impacted the sales per employee and profit per employee by approximately -0.1%. Similar findings were extracted for the number of fatalities and injuries and their association with firms' performance. Hence, the results supported the hypothesis of the study. These results align with the ongoing debate regarding the economic consequences of terrorism. Previously research reported that terrorism negatively impacts a country's economic conditions by drastically impacting business conditions (Tauringana et al., 2021).

Researchers have also reported that terrorism significantly impacts firms' supply chains by destroying a country's basic infrastructure for economic development (Awodola & Oboshi, 2015; Kah, 2017). This drastic impact further causes the economic agents to limit their economic participation because of the less expected returns on their investments or the fear of terrorist attacks. A study conducted among Indonesian firms reported a significant negative influence of cyberattacks on business activities and firms' performance, further leading to the limitation of economic activities in a country (Marune & Hartanto, 2021; Noor et al., 2022). This argument can be likened to terrorist activities affecting economic growth in Indonesia. Researchers also debate the decrease in foreign direct investment in Indonesia over the last few decades due to terrorist activities (Setiawan, 2020). It further negatively impacts a firm's productivity highly dependent upon foreign investments or foreign exchange (Bakry et al., 2021). At the same time, in recent years, the Indonesian government has imposed specific laws and regulations regarding terrorism, which has some adverse effects on economic activities based on the lack of clear instructions regarding the ban of certain products in certain areas or the movement of the people in the certain areas (Syam et al., 2020).

Moreover, comparing the mean values of the number of terrorist incidents, fatalities, and injuries presented by Okafor and Calderon (2022) in their study on Nigerian manufacturing firms, we can see a drastic difference in the number (exponentially high in the Nigerian context). This further affects the ranking of the countries in the global terrorist index, which keep Indonesia at the 24th number. However, the impact size of terrorists attacks, the number of fatalities, and the number of injuries on Indonesian firms' performance are larger than those Okafor and Calderon (2022) reported, which reveals that in Indonesia, regardless of the fewer incidences than Nigeria, their impact is more drastic on business performances and economic situations. This further reveals the intolerance of the economy towards such terrorist attacks. Hence, the government should consider modifying regulations and policies to win investors' trust. The model also included the control variables with varied results, as presented in Table 5.

### **Robustness analysis**

To check and verify the robustness of the results extracted from pooled OLS analysis, a restoration of the baseline regression was conducted using lagged data (t-1) of terror incidents, the number of fatalities, and the number of injuries. The logic behind this robustness check is based on the understanding that past terrorism activities may also affect the association between terrorism and firms' performance. This robustness check revealed that regardless of the lagged or non-lagged data, terrorism negatively impacted the firms' performance, as shown in Table 6.

**Table 6**  
*Robustness Checks-Terrorism Estimates and Firm Performance*

Variables	OSL 1 Sales/worker	Fixed effects 2 Sales/worker	OSL 3 profit/worker	Fixed effects 4 profit/worker
No. of Terrorist Incidents (previous year)	-0.214*** (0.000)	-0.213*** (0.000)	-0.190*** (0.000)	-0.191*** (0.000)
No. of Fatalities (previous year)	-0.194*** (0.000)	-0.195*** (0.000)	-0.126*** (0.000)	-0.127*** (0.000)
No. of Injuries (previous year)	-0.203*** (0.000)	-0.203*** (0.000)	-0.149*** (0.000)	-0.149*** (0.000)
Control variables	Yes	Yes	Yes	Yes
Constant	0.643*** (0.000)	0.645*** (0.000)	0.783*** (0.000)	0.789*** (0.000)
Wald $\chi^2$	112.290	119.432	101.324	111.710
Prob. > $\chi^2$	0.000	0.000	0.000	0.000
No. of observations	750	750	750	750

*Note.* Robust standard errors are in parentheses; \*significance at 5%, \*\*significance at 1%, and \*\*\*significance at 0.001%; Sales/Worker and Profit/Worker are logarithms transformed; Control variables of the baseline regression are included.

Furthermore, the robustness check was performed to avoid the potential for endogeneity linked with the association of terrorism with the firm's performance. Previous research reported that poorly performing firms and unsuccessful businesses lead to higher unemployment rates lowering the opportunity cost to participate in terrorism activities (Gurbuz & Aybars, 2010; Iqbal & Usman, 2018; Mansoor et al., 2022). Hence, researchers have highlighted the significance of examining the association of poor firm performance with terrorism (Tauringana et al., 2021).

We employed an instrumental variable specification to deal with this issue. We used religiosity in Indonesia to explain the exogenous terrorism influence on firms' performance because, in Indonesia, religiosity has been associated with terrorism for years. Moreover, religiosity is linked with terrorism directly, as several scholars have suggested (Barton et al., 2021; Halim & Hosen, 2021). The results of the OLS estimations using religiosity as an instrumental variable specification also verified the significant and negative influence of terrorism on the firms' performance (Table 7).

Additionally, logarithmic transformation of all the independent variables, including terrorist incidents, the number of fatalities, and the number of injuries, was considered to address any potential specification errors linked with dysfunctional firms (if any). However, we found consistent results with all the previous estimates. Furthermore, based on the regression analysis results by applying fixed effects output by increasing 1% terrorist incidents, sales per employee and profit per employee were reduced by 0.453% and 0.312%, respectively. Finally, considering the varied intensity of terrorism across various provinces in Indonesia, which further impacts the economic activities in various provinces, we used the data of all the firms listed on the Indonesian Stock Exchange regardless of their origin on a regional basis. Also, we found higher standardized beta values regardless of the available literature, which has previously estimated the impact of terrorism on state-level firms' performances.

**Table 7**  
*Robustness Check-Alternative Functional Form of Terrorism*

Variables	OSL	Fixed effects	OSL	Fixed effects
	1	2	3	4
	Sales/worker	Sales/worker	profit/worker	profit/worker
No. of Terrorist Incidents, Log	-0.487*** (0.000)	-0.482*** (0.000)	-0.398*** (0.000)	-0.397*** (0.000)
No. of Fatalities, Log	-0.347*** (0.000)	-0.348*** (0.000)	-0.277*** (0.000)	-0.278*** (0.000)
No. of Injuries, Log	-0.302*** (0.000)	-0.306*** (0.000)	-0.219*** (0.000)	-0.218*** (0.000)
Control variables	Yes	Yes	Yes	Yes
Constant	1.267*** (0.000)	1.280*** (0.000)	0.981*** (0.000)	0.942*** (0.000)
F stat	15.436	15.436	12.450	12.450
Prob. > F	0.000	0.000	0.000	0.000
No. of observations	750	750	750	750

*Note.* Robust standard errors are in parentheses; \*significance at 5%, \*\*significance at 1%, and \*\*\*significance at 0.001%; Sales/Worker and Profit/Worker are logarithms transformed; Control variables of the baseline regression are included.

## **Implications of the Study**

Extending the Cobb–Douglas production function, the current study has several theoretical and practical contributions. The current study is a valuable addition to the terrorism and firm performance literature based on the scarcity of research in the area. Rather than considering the influence of terrorism as a whole on a firm's performance, we considered the terrorist attacks, the number of fatalities, and the number of injuries to see the predictive differences of each on a firm's performance. Firm performance was measured based on sales and profit per employee to extract the predictive differences. Additionally, we considered the internal characteristics of the firms and the external environment other than terrorism to determine their impacts on the financial performance of the firms. In the context of a developing nation, particularly in the southeastern region, this is the first study of its kind where the impact of terrorism on all the firms listed on the Stock Exchange in Indonesia has been investigated. Hence, this adds to the institutional framework and helps developing nations devise their strategies and regulations accordingly.

Practically the policymakers can utilize the study findings to effectively devise and implement security measures to develop a sense of confidence among the firms to operate in a terror-free environment. These findings can be further utilized to provide a threat-free environment to the firms to enhance their productivity. Further, the loopholes and shortcomings in this security system that causes the terrorist attacks should be identified and rectified to provide a peaceful environment for investors and organizations. At the same time, government officials and policymakers in Indonesia must focus on the after-effects of terrorism to mitigate those effects and with a quick rehabilitation process. This can be done by institutionalizing at a large scale and developing safety nets, especially for firms more affected by terrorism. Moreover, results concerning the negative impact of time wastage by managers in dealing with government bureaucrats on firms' performance should be considered seriously, and policies and regulations should be made to keep the firms away from this bureaucratic culture by creating a bias-free environment.

## **Conclusion**

Considering the significance of the law-and-order situation in the economic development and growth of a country linked with the firms' productivity, the current study empirically tested the impact of terrorism on firms' performance by utilizing a unique methodology of assessing data from various data sources. Previously very few studies have recently established the impact of terrorism on firms' performance, but they collectively assessed the influence of the number of fatalities and injuries on firms' performance (Okafor & Calderon, 2022). In contrast, the current study has divided terrorism into three constructs and further examined their impact on the financial performance of the firms listed on the Indonesian stock exchange. Results revealed the significant negative influence of terrorism on the financial performance of the firms.

Regardless of the several strengths, the current study has some limitations that future researchers should consider presenting more policy insights. The current study has considered the data set at the country level. In contrast, future researchers can conduct a study at the state level to see the predictive differences of the impact of terrorism on the firms' performances in different regions and states of Indonesia. The terrorist activities of various terrorist groups should also be considered to see their impact on the firms' productivity. Moreover, the firms listed on the Stock Exchange of Indonesia can be divided into several sectors, and the impact of terrorism on each sector should be examined to see the sectors most affected by terrorism.

Finally, the broader perspective of organizational performance beyond sales per employee and profit per employee can be considered by including the firm's capital structure to analyze the impact of terrorism on their productivity.

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