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Correlation factors influencing terrorist attacks: political, social or economic? A study of terrorist events in 49 "Belt and Road" countries

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Abstract
The implementation of the Belt and Road Initiative proposed by China faces security risks brought about by frequent global terrorist attacks, the best solution to which is to identify its root causes and take targeted measures. Panel data from 1999 to 2014 of 49 Belt and Road (B&R) countries have been collected. Using a negative binomial regression model based on panel data, this study explores the impact of political, economic and social factors on the number of terrorist attacks and the total number of fatalities and injuries caused by terrorist attacks. The results show that trade deficit caused by sluggish export growth, structurally unreasonable but enormous military expenditure, the level of democracy and fragile political structure are the main causes of frequent terrorist attacks in the 49 countries. Based on the findings, these 49 countries should fight terrorism with targeted measures, cooperate to combat terrorism and establish a Security Commission for the B&R countries.

Keywords Belt and Road Initiative · Terrorist attacks · Correlation factors · Negative binominal regression

1 Introduction

The Belt and Road Initiative (BRI), proposed by Chinese president Xi Jinping in 2013, is also known as the Silk Road Economic Belt and the twenty-first-century Maritime Silk Road. Aimed at strengthening infrastructure, trade, and investment links between China

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and some 65 other countries, this initiative faces complex security challenges and one of its biggest setbacks is terrorist attack (Ji 2015; Tekdal 2017; Li and Zhang 2019).

Statistics show that BRI regions coincide with areas where international terrorist activities are the most frequent and are notorious "arc of terror" in the world. Terrorist attacks perpetrated by terrorist groups or individuals have posed great security risks to infrastructure investment and construction and economic and trade exchanges along the route (Gong 2016).

Countries around the world all regard terrorism as a potential threat to national security and spare no efforts to prevent and crack down on it. Scholars have reached a consensus on what threats terrorism poses to humanity and advocate that governments should increase military spending and formulate national security policies (Sönmez and Graefe 1998; Huddy et al. 2010; Jiao and Luo 2019). Nasir et al. (2011) contend that these measures are only effective in a short term and the best way to eliminate the terrorist threat is to address root causes that have led to the emergence of terrorism. Caruso and Schneider (2011) also aim to "empirically investigate the socio-economic causes of terrorism and political violence…providing an explanation of the brutality of terrorist activity". The objective of this study is to investigate political, economic and social causes of terrorism in a sample of 49 "Belt and Road" countries through quantitative analysis and to offer explanations of the emergence of terrorist attacks and countermeasures against terrorism.

2 Review of correlation factors that influence terrorist attacks

Entering the twenty-first century, scholars has paid more attention to the the emergence of terrorism, and there has been a lot of researches on the determinants of terrorism (Nasir et al. 2011; Freytag et al. 2011; Yildirim and Öcal 2013; Sansonavarro and Veracabello 2018; Okafor and Piesse 2017; Canavirebacarreza et al. 2017). They attributed terrorism to many potential factors, including economic factors (Piazza 2006; Ljujic et al. 2017), political factors (Bakker 2006; Criado 2017) and social factors (Alcalá et al. 2017; Fu et al. 2012) under theoretical frameworks of opportunity cost theory, exploitation theory, game theory, utility maximization theory and so on. Nonetheless, no consensus has been reached on exactly how each factor correlates with terrorism.

2.1 Economic factors

In his theory of ethnic and religious conflict, Günther Schlee argues that it is more important to analyze ethnic conflicts including terrorism and extremism from an economic angle of "cost–benefit", despite limited influence of ethnic and religious factors (Wei 2018). When it comes to the relationship between terrorism and economic development, there remain differences after a long-time discussion. One opinion is that there is a link between the two. Some researchers believe that there might be a negative correlation between economic development and terrorism as economic development and economy growth will enable salary raises and improved education, health care and transportation services, etc., which increases the opportunity cost of terrorist activity and further decrease the possibility of terrorist attacks (Elbakidze and Jin 2015; Blomberg and Hess 2005; Bravo and Dias 2006). Other scholars hold the view that there might be a positive correlation between economic development and terrorism (Shahbaz et al. 2013; Fearon and Laitin 2003; Debraj 2010; Caruso and Schneider 2013). If economic growth does not benefit the masses, there

will be a large gap between one's expected and real gain; In addition, unequal income distribution will gradually increase the gap between the rich and poor, which altogether stir up discontent among the people and ultimately lead to a growing number of terrorist attacks. An opposite view is that there is no link between the two (Basuchoudhary and Shughart 2010; Shapiro and Fair 2009). Some scholars argue that poverty is not connected with terrorism because poor countries do not generate more terrorism than rich countries. When empirically investigating the economic factor, scholars usually chose different variables to measure a country's economic conditions. For example: most scholars contend that the GDP per capita of a country is an important predictor of the occurrence of terrorist attacks (Sharma 2015; Ismail and Amjad 2014; Debraj 2010; Caruso and Schneider 2013). Other scholars also regarded income level, poverty and openness as measures of economic development (Krueger and Maleckova 2002; Blomberg and Hess 2002; Ilyas et al. 2017; Yin 2017; Coccia 2018).

2.2 Political factors

Numerous empirical studies investigate political factors leading to the emergence of terrorism from a perspective of institutionalism (Abadie 2006; Criado 2017; Parkes 2010; Mcdonald 2002; Choi and Piazza 2016; Bogaards 2018; Boyle 2015). It's argued that terrorism is a kind of political phenomenon and rooted in the failure of state institutions, which includes political exploitation, government corruption, ethnic conflicts, intensified internal and external contradictions and so on. It is therefore recommended to improve political systems to counter terrorism (Kurrild-Klitgaard et al. 2006). Pan and Zhang (2016) contend that terrorism is politically motivated by the intensification of political contradictions and abnormal and extreme politics; autocratic rule, political corruption and lack of political authority all facilitate the emergence and development of terrorism. Inappropriate religious policies also feed religious extremism. In some countries, unstable state power, poor governance capacity, deprivation of citizens' political rights, constant conflicts among political factions and a vacuum in social control conspire to breed terrorism. Scholars usually consider a country's degree of democracy, autocracy, political stability, civil political participation and the scale of government when assessing the country's political situation (Parkes 2010; Mcdonald 2002; Choi and Piazza 2016; Bogaards 2018).

2.3 Social factors

Social factors refer to the quality of economic growth measured by various indices pertaining to people's livelihood. Some researchers assert that national economic growth does not represent an increase in people's wealth. If a country's economic development is not transformed into increasing educational attainment, declining unemployment rate and improved well-being of the people, national economic development might instead deepen social conflicts (Looney 2004; Schiff et al. 2010; Noll 2012; Helfstein 2014; Alcalá et al. 2017). Moreover, the argument of commiserating modernization says that economic growth could fuel social and political unrest. Economic growth, especially rapid economic development, entails a transformation of mode of production, adjustment of industrial structure and introduction of high-end professionals. Unbalanced development doubtless ensues if the speed of social changes doesn't catch up with economic growth rate and a highly unbalanced scenario will in turn induce people to employ extreme violence to disrupt social

order, thus bringing about political turmoil (Noll 2012). Freytag et al. 2011 contend that the impact of social development on terrorism should not be underestimated because social situations directly reflect people's living conditions and terrorists' extreme behavior usually stems from social discontent. Scholars use quantitative indicators such as education, unemployment, urbanization and network development to measure national social development, and empirical data are used to demonstrate the relationship between them and terrorist attacks (Berrebi 2007; Flowers 2014; Brockhoff et al. 2015; Bagchi and Paul 2018).

Although a large quantity of studies have investigated correlation factors that influence terrorism with open data, their results are not exactly the same and no exactly conclusion has been drawn about the relations between terrorism and economic, political and social factors. For example, when scholar investigate the relationship between GDP and terrorism, Some scholars believe that there is a positive relationship, whereas others scholars argue that there is a reverse correlation, Then again, there are scholars who advocate that there is no relationship. Such confusing and in-conclusive answer push us to consider the complex situation in those One Belt and One Road countries. Accordingly, there are some justifications for this study. One is because that samples in those empirical studies have geographical limitations. Researchers tend to choose countries such as Pakistan and Turkey, which are frequently stricken by terrorist attacks or those with similar regional characteristics such as the European Union and South Asian countries as samples instead of comparing across different countries. Therefore conclusions drawn from those studies are not universally applicable. Second, the emergence of terrorism is very complex and terrorism is influenced by various factors, including those that can be quantified such as political, economic and social factors, etc. and less easily quantified ones such as religion, history and culture and so on. Current scholars examine either how a country's economic and social conditions or how its level of democracy influence terrorist activity, with no research testing political, economic and social factors in one model all at once. Additionally, current studies didn't take terrorism, especially terrorist attacks' impact on economy, politics and society into consideration when scrutinizing economic, political and social factors that influence the emergence of terrorism. The non-linear relationship between the two sides suggests that the endogeneity problem in the model can't be solved via linear analysis and the conclusions reached will have limitations. Moreover, with respect to the background of B&R proposed by China, the existing research on terrorism is lacking. Therefore, it is urgent to conduct more comprehensive studies that take multiple factors into consideration.

This paper intends to resolve the aforementioned limitations according to the following aspects. Firstly, we make a systematic review of studies on correlation factors that influence the emergence of terrorism, categorize these factors as political, economic and social and construct a research framework guided by the principle of comprehensiveness. Secondly, to solve the endogeneity problem ensuing from reciprocal causality between terrorist attacks and national economic and social development, we lag all the independent variables influenced by terrorist attacks by one period and utilize quantitative indicators to measure a country's political, economic and social conditions based on credible data available. Finally, we make an empirical analysis using STATA15.0 based on the panel data of 49 "Belt and Road" countries' terrorist incidents between 1990 and 2014, draw conclusions and hence put forward policy recommendations.

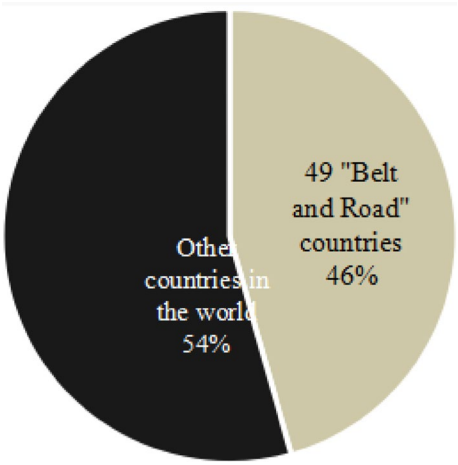

Fig. 1 Fan diagram of comparison between 49 B&R countries and the world

3 Research design

3.1 Research samples

Since the official proposal of the BRI, countries along the Belt and Road have made steady progress in imports, exports and foreign investments and their economic growth prospects exceed that in North American and Europe.[1] According to the statistics published on the official website of the BRI (http://www.yidaiyilu.gov.cn), by 2017, China has established strategic cooperation partnerships with 68 countries along the "Belt and Road", which cover multiple countries and regions including Central Asia, South Asia, Southeast Asia, West Asia, North Africa and Central and Eastern Europe. Some of these countries, such as Syria and Iraq, are abundant in oil and mineral resources; some are more economically developed European countries with relatively high average income; some are less economically developed Central Asian countries with poor education services and health-care facilities. Due to complicated geopolitical factors, countries along the Belt and Road have always been frequently hit by terrorist attacks.

Global Terrorism Database (GTD) is an authoritative database with relatively complete terrorist events in the world, which so far has collected statistics of over 170,000 terrorist cases including the dates, locations, weapons, targets, casualties and attackers (Miller and Jensen 2018). The GTD defines a terrorist attack as "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation", which is also adopted in this study. Based on information provided by GTD, we have gathered all the successful terrorist events of 49 B&R countries in the 1970–2016 period, compared them with all the successful terrorist incidents in the same period in the world and drawn the fan diagram (Fig. 1). Among 91,276 terrorist incidents that occurred during 1970 and 2016 in the world, 76,611 took place in the 49 B&R countries, accounting for 84% of the total. The number of people who got injured and were killed during

[1] http://finance.sina.com.cn/zl/china/2017-05-15/zl-ifyfeivp5713360.shtml.

Table 1 Comparison between 49 B&R countries and the world in numbers of terrorist attacks, the injuries and fatalities

Subject	Total Number	49 countries: the world
Terrorist attacks (49 B&R countries)	76,611	84:100
Terrorist attacks (the world)	91,276	
Injuries (49 B&R countries)	203,296	85:100
Injuries (the world)	240,375	
Fatalities (49 B&R countries)	323,988	86:100
Fatalities (the world)	374,809	

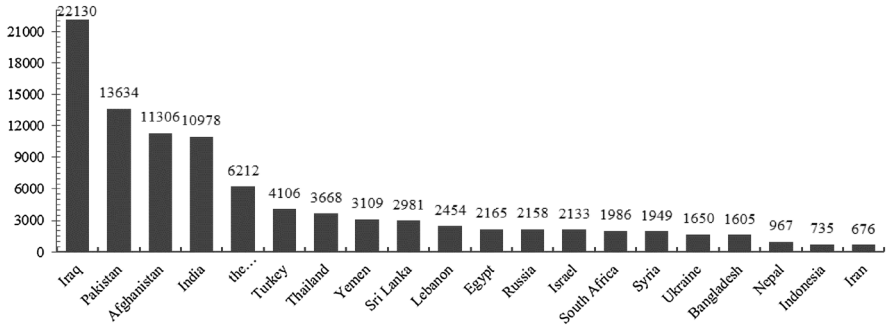

Fig. 2 B&R Countries ranking top 20 in numbers of terrorist attacks, 1970–2016. Figures 1 and 2 are drawn based on the World Terrorism Database from 1970 to 2017. It should be noted that data for the year 1993 are lost due to negligence in database management. To count the total number of terrorist incidents in the 49 B&R countries as accurate as possible, we choose to treat the missing value for the year 1993 as zero. As we make regression analysis afterwards, however, we count in the value for the year 1993 by calculating the mean of values for the year 1992 and 1994 to ensure the integrity of the panel data

terrorist attacks in the 49 countries respectively makes up 85% and 86% of the total, indicating that these states are heavily affected by terrorism (Table 1). Figure 2 shows B&R countries that rank top 20 in the number of terrorist events. Iraq, Pakistan and Afghanistan are the top 3 countries most frequently hit by terrorist attacks, among which Iraq and Afghanistan are rich in oil and caught in political unrest with regime changes. Despite positive GDP growth in these countries in recent years, terrorist incidents have not been effectively curbed, which makes it more urgent to investigate complicated causes of terrorism in the B&R countries.

Figure 3a, b demonstrate numbers of terrorist attacks, fatalities and injuries caused by terror-related attacks. There is an upward trend in numbers of terrorist operations for both B&R countries and the world. The number of terrorist attacks declined a bit during 1998 and 2005 but then rebounded. It should be noted that the fluctuation ranges of Fig. 3a, b are different despite the same trend on the whole. The reason is that there is no necessary and direct connection between the number of terrorist events and the number of injuries and fatalities, i.e., a larger number of terrorist attacks are not tantamount to a rise in casualties.

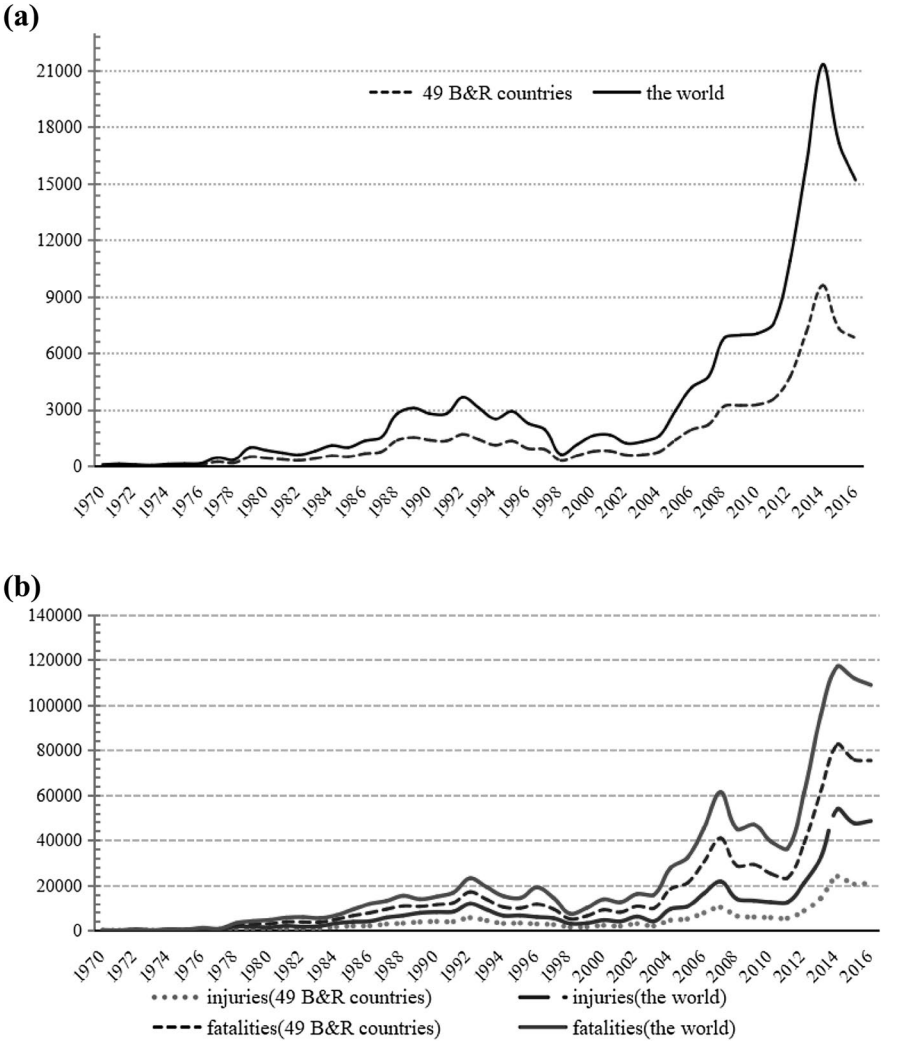

Fig. 3 **a** Comparison between 49 B&R countries and the world in frequencies of terrorist attacks. **b** Comparison between 49 B&R countries and the world in total numbers of injuries and fatalities

3.2 Operationalization of key variables

This study chooses two dependent variables to measure terrorism of the 49 B&R countries: one is the total number of terrorist events in each country per year; the other is the number of casualties caused by terrorist attacks every year. The first variable is aimed at investigating the causes of terrorist attacks, i.e., exploring the impacts of economic, political and social factors on terrorist events. The second variable is employed to investigate what factors influence the lethality of terrorist attacks and empirically test the influence of a national's political, economic and social factors on the lethality of terrorist attacks.

According to the literature review, correlation factors that influence terrorist activities are classified as economic, political and social. Based on the credibility and availability of data, we use a number of correlates of economic, political and social success to indicate such linkages, where all the indicators derive from global open databases like the Global Terrorism Database, World Bank, International Monetary Fund and so on.

Economic factors: we assume that there is a negative correlation between the economic development of a country and the emergence of terrorism based on the opportunity cost theory. We include: (1) the (log) real GDP per capita. We think that the growth of the GDP can improve the people's level of material wealth and increase the state's defensive capacity, which lead the opportunity cost of terrorist activities increasing, and can further reduce the possibility of terrorist attacks (Freytag et al. 2011). (2) The actual level of consumption. In general, the higher level of consumption means the less the government intervenes in the economy and the higher the degree of satisfaction among the people (Böhnke 2008). (3) The level of openness of a country's trade, as measured by the proportion of the import and export trade to the GDP respectively, is always linked to high growth and the rapid development of a country's economy (Levine and Renelt 1991). (4) The rate of inflation is represented by the increase in the average price level. The higher price level means the devaluation of money and the decline of the social purchasing power which would affect the standard of living of the people (Shahbaz 2011).

Political factors: it is assumed that there is a negative correlation between the political development and terrorist attacks. We introduced: (1) the level of democracy and autocracy. The state with high level of democracy and lower level of autocracy, means that its' citizens have a high degree of political rights and they have more opportunities to engage in political activities and express their own interests. In such environments, the need for citizens to vent their discontent by resorting to force and violence is reduced, thus the frequency of terrorist attacks is similarly reduced (Chenoweth 2013). (2) Political stability. An unstable regime is more conducive to the emergence of terrorism, because terrorist organizations may think that it is easier to overthrow a new government (Piazza 2015). (3) The (log) real military expenditure, which means the government's capacity in counterattacking the terrorists and destroying the armed forces of the terrorist organization, thus can deter terrorism and reduce the possibility of terrorist attacks (Bapat 2011). (4) The scale of government spending. On the one hand, the scale of the government is determined by its public expenditures. The larger government spending means there are less funds available for such things as education. On the other hand, those political and economic rents controlled by government are what terrorist organization want too (Kirk 1983).

Social factors: we hypothesis that negative correlation existed in the relationship between the social development and the emergence of terrorism. We include: (1) the unemployment rate. Particularly, the lower the unemployment rate, the more stable the society and the lower the probability that the country will face terrorist attacks (Kevin B. Goldstein 2005). (2) Internet penetration rate. With terrorists increasingly committing terrorist activities through network channels, the higher the network popularity, the greater the probability that terrorists will use network channels to commit crimes (Reilly 2006). (3) Educational level. High level of education means the citizen's higher cognition level and ability, which would lead the lower probability of its citizens participating in terrorist activities (Berrebi 2007). (4) Urbanization level. The development of urbanization equates to a reduction in the rural population, an improvement in urban characteristics and the standard of people living, thus lower probability of terrorism attack (Flint 2010). Table 2 lists the main independent and dependent variables in this study, definitions of the variables and data sources.

Table 2 Definitions of variables and source

Variable	Symbol	Definition	Source
Terrorist attacks	Total	The total number of terrorist attacks in the 49 B&R countries, 1990–2014	The Global Terrorism Database[1]
Injuries and fatalities	fru	The total number of injuries and fatalities from terrorist attacks in the 49 B&R countries every year, 1990–2014	
GDP	gdpu	Levels of economic development of the 49 B&R countries, measured by constant 2010 US$(million)	World Bank (World development index[2]
Consumption	Cos	Real consumption levels of the 49 B&R countries measured by constant 2011 US$ (million)	Penn world Tables [3]
Exports	Exp	Exports of goods and services (% of GDP) (export ratio)	
Imports	Imp	Imports of goods and services (% of GDP) (import ratio)	
Educational level	Edu	Human capital index, based on years of schooling and returns to education, is used to measure education quality	
Level of democracy	Dem	A state's level of democracy is measured by its democracy score, which is made up of four components: the competitiveness of executive recruitment, the openness of executive recruitment, constraints on the chief executive and the competitiveness of political participation The democracy score is the sum of the weights of the four components a 0–10 scale	Polity IV Project[4]
Level of autocracy	Aut	Same scoring rules as stated above	
Political stability	Dur	The length of years during which the same party rules a country	
Unemployment rate	Yom	The youth unemployment rate is the number of unemployed youths expressed as a percentage of the whole labor force	ILO-KILM[5]
Urbanization level	City	Urban population (% of total)	World Bank (World development index)
Internet penetration rate	Int	Internet users (per 100 people)	
Government spending	Gep	Government spending to GDP	
Military expenditure	Milex	Government spending for national defense, diplomacy and maintaining social order	Armed conflict dataset[6]
Inflation rate	Cpi	Consumer Price Index	International Monetary Fund[7]

[1] http://www.start.umd.edu/gtd

[2] https://data.worldbank.org/

[3] http://cid.econ.ucdavis.edu/pwt.html

[4] http://www.systemicpeace.org/polity/polity4.htm

[5] http://www.ilo.org/global/statistics-and-databases/research-and-databases/kilm/lang–en/index.htm

[6] https://www.prio.org/Data/Armed-Conflict/UCDP-PRIO/

[7] http://data.imf.org/?sk=388DFA60-1D26-4ADE-B505-A05A558D9A42&sId=1479329334655

Table 3 Correlation matrix

	Total	Fru	Gdpu	Cos	Exp	Imp	Cpi	Gep	Milex	Dem	Aut	Dur	Int	Emp	Edu	City
Total	1.000															
Fru	0.879	1.000														
Gdpu	0.120	0.065	1.00													
Lncos	0.204	0.142	0.634	1.000												
Exp	−0.022	0.030	−0.050	−0.119	1.000											
Imp	0.126	0.115	0.080	0.214	−0.743	1.000										
Cpi	0.176	0.096	0.133	0.142	0.308	−0.374	1.000									
Gep	−0.021	−0.009	−0.044	−0.039	−0.089	0.079	−0.088	1.000								
Milex	0.209	0.164	0.521	0.850	0.146	0.126	0.147	−0.049	1.000							
Dem	−0.084	−0.199	0.112	0.105	0.044	−0.172	0.074	−0.303	0.057	1.000						
Ant	−0.144	−0.234	0.017	0.058	0.052	−0.058	0.036	−0.303	0.080	0.885	1.000					
Dur	−0.047	−0.061	0.127	0.291	0.183	0.082	0.109	−0.068	0.421	0.073	0.259	1.000				
Int	−0.013	−0.051	0.155	0.080	0.548	−0.603	0.603	−0.057	0.157	0.137	0.05	0.094	1.000			
Emp	0.076	0.031	0.037	0.026	−0.089	0.134	0.037	−0.015	0.004	−0.048	−0.102	0.037	−0.140	1.000		
Edu	−0.108	−0.094	−0.027	−0.141	0.346	−0.490	0.238	−0.170	−0.066	0.254	0.066	−0.173	0.450	−0.144	1.000	
City	−0.035	−0.002	0.175	−0.108	0.565	−0.446	0.183	−0.145	0.356	0.115	0.122	0.136	0.400	−0.331	0.468	1.000

In total there are 16 variables, including two dependent variables and fourteen independent variables. A correlation matrix (Table 3) is computed to detect multicollinearity; then all the independent variables are narrowed down for later regression analysis; finally the optimal independent variables that can accurately predict a terrorist attack are identified through stepwise regression. The whole process helps to quickly identify relevant data among large amounts of data and thus improves the efficiency and accuracy of quantitative analysis.

If two or more independent variables are highly correlated, the estimate of one independent variable's impact on the dependent variable tends to be less precise. Therefore, we choose to omit one if two independent variables are highly correlated ($r > 0.7$). As Table 3 suggests, real consumption level and military expenditure, level of democracy and level of autocracy, exports of goods and services (% of GDP) and import of goods and services (% of GDP) are highly correlated, therefore the three independent variables: real consumption level, level of autocracy and import of goods and services (% of GDP) are excluded from the final regression model.

3.3 Econometric model

As the correlation matrix only shows that two variables are correlated, regression analysis is still needed to determine whether the 11 independent variables impact the 2 dependent variables and how much influence there is. We have collected 20-year panel data of 49 B&R countries between 1990 and 2014 based on the availability of data. Taking the number of terrorist attacks of each country every year and the number of injuries and fatalities as two dependent variables, we examine political, economic and social factors with the regression model below, whose mathematical formula is:

$$Y_{i,t} = \alpha + \beta \times economy + \lambda \times politic + \delta \times social + A_i + \varepsilon_{i,t} \quad (1)$$

The symbol i represents the 49 B&R countries, the symbol t represents time (1990-2014) and the symbol Y_{it} represents the number of terrorist attacks or the number of injuries and fatalities from terror-related attacks of country i in year t. The three words "economy", "politic" and "social" denote economic, political and social factors. The symbols β, λ and δ are the coefficients of the independent variables to be estimated. To nondimensionalize and remove heteroscedasticity, variables pertaining to money are converted into natural logarithm while other data remain unchanged. The symbol A_i represents state and year fixed effect, which means that the effect varies with states but not with time, the symbol $\varepsilon_{i,t}$ is the residual term which can prevent the missing variable error and the symbol α is the constant term of the regression model. Table 4 presents the descriptive statistics of variables.

The two dependent variables, i.e., the number of terrorist attacks and the number of injuries and fatalities caused by terrorist attacks, are count variables with non-negative integer values and not normally distributed. If these dependent variables fit equidispersion then Poisson regression model based on panel data shall be adopted; otherwise negative binomial regression model. Considering that one of the requirements of using Poisson regression is that the dependent variables' expected value is equal to its variance, we calculate the sample variances and sample means of two dependent variables and the results show that the sample variance (217.4348) of the number of terrorist attacks is 4 times that of the sample mean (53.42894) while the sample variance (1584.069) of the number of injuries and fatalities caused by terrorist attacks is 5 times that of the sample mean (325.3973). In

Table 4 Variables' descriptive statistics

	Variable	Sample	Mean	SD	Min	Max
Independent variables	Number of terrorist attacks	1175	53.429	217.435	0	3926
	Number of injuries and fatalities	1175	328.773	1580.431	0	29,874
Economic factors	GDP in mil.	1175	241,902.2	650,227	0.046	8,333,287
	Exports	1175	0.187	0.169	0.00002	0.907
	Inflation rat	1123	66.690	35.145	0	250.829
Political factors	Government spending	1175	90.883	978.421	2.0485	22,299.18
	Level of democracy	1155	0.080	17.637	-88	10
	Duration of government	1155	17.086	20.298	0	97
	Military expenditure	1099	5,645,947	1.45e+07	8820	1.34e+08
Social factors	Urbanization level	1099	52.548	22.388	8.854	98.326
	Internet penetration	1175	13.951	21.446	0	87.557
	Unemployment rate	1175	20.497	13.215	0.1	71.9
	Educational level	975	2.397	0.660	1.040	3.687

both cases over-dispersion can be observed, therefore negative binomial regression model based on panel data is chosen in this study.

4 Results

We choose the best regression model with STATA15.0 and then employ negative binomial regression model based on panel data to estimate parameters. Considering that while the emergence of terrorist attacks is influenced by a country's social, political and economic conditions, it also impacts the country's social, political and economic development, suggesting that there might be a reciprocal relationship between the independent and dependent variables. This endogeneity problem of the model leads to biased estimates, therefore we lag all the independent variables by one period in regression to solve the endogeneity problem. In addition, to remove heteroscedasticity, we log the two variables pertaining to economy: GDP per capita and military expenditure. Having decided to use the negative binomial regression model with panel data, we test mixed model, random effects model and fixed effects model to finally determine whether to use negative binomial mixed regression model, random effects negative binomial regression model or fixed effects negative binomial model. Table 5 and 6 respectively show regression analysis results of the number terrorist attacks as a dependent variable and the number of injuries and fatalities caused by terrorist attacks as a dependent variable.

As is shown in Table 5, model one uses mixed negative binomial regression and its overdispersion parameter alpha's confidence interval is [2.62,3.95], therefore the null hypothesis is rejected and overdispersion can be observed, suggesting that it is more efficient to use negative binomial regression model, which further proves that negative binomial regression model fits better than Poisson regression model in this study. As the LR test in model two strongly rejects the null hypothesis of mixed negative binomial regression, random effects negative binomial regression based on panel data should be adopted. Then Hausman test is employed in model two and three and accepts the null hypothesis of

Table 5 Negative binomial regression results (a)

Variable	The number of terrorist attacks		
	Model 1: mixed model	Model 2: random-effects model	Model 3: fixed-effects model
Economic factors			
GDP per capita (ln)	− .010 (0.962)	− .021 (0.745)	− .033 (0.617)
Exports	− 1.073 (0.445)	− 1.207*** (0.002)	− 1.185*** (0.003)
Inflation rate	.009 (0.118)	.002 (0.172)	.002 (0.229)
Political factors			
Government spending	− .0002*** (0.000)	.00002 (0.340)	.00002 (0.295)
Military expenditure (ln)	.908*** (0.000)	.205*** (0.001)	.193*** (0.001)
Level of democracy	− .029 *** (0.000)	− .008*** (0.001)	− .008*** (0.001)
Political stability	− .013* (0.081)	− .011*** (0.000)	− .011*** (0.000)
Social factors			
Internet penetration rate	− .008 (0.423)	.003 (0.369)	.004 (0.291)
Unemployment rate	− .001** (0.032)	.0002 (0.590)	.0001 (0.741)
Educational level	− .285 (0.360)	− .167 (0.133)	− .151 (0.186)
Urbanization level	− .035*** (0.000)	.0006 (0.860)	.001 (0.684)
Constants	− 6.730*** (0.000)	− 2.713*** (0.000)	− 2.467*** (0.000)
N	826	826	826
Pseudo R2	0.0626	\	\
Log likelihood	− 3136.1663	− 2958.2254	− 2691.273
Alpha	[2.62,3.95]	\	\
LR test	\	552.19 > 0	\
Hausman re fe	\	Prob > chi2 = 0.0125	

1. To remove heteroscedasticity, we log two variables pertaining to economy: GDP per capital and military expenditure. 2. The numbers in parentheses are the estimated *P* values; "*", "**", "***" respectively represent a significance level of 0.1, 0.05 and 0.01. ("*", "**", "***" show whether it is statistically significant while the numeric value shows how significant it is)

model two, indicating that it supports random-effects negative binomial model. Therefore the regression analysis results of model two are chosen for results analysis.

The results in Table 5 show that a country's exports of goods and services (% of GDP), military expenditure, level of democracy and political stability are significantly correlated with the number of terrorist attacks. Among all the social, political and economic factors, all social and economic independent variables have no significant impact

Table 6 Negative binomial regression results (b)

Variable	The number of injuries and fatalities		
	Model 1: mixed model	Model 2: random-effects model	Model 3: fixed-effects model
Economic factors			
GDP per capita (ln)	− .279 (0.243)	− .011 (0.857)	.010 (0.878)
Exports	− 1.467 (0.382)	− .853** (0.049)	− .694 (0.114)
Inflation rate	.011 (0.121)	.0001 (0.943)	− .0005 (0.774)
Political factors			
Government spending	− .0002*** (0.000)	.00006*** (0.005)	.00007*** (0.005)
Military expenditure(ln)	1.319*** (0.000)	.316*** (0.001)	.281*** (0.000)
Level of democracy	− .048 *** (0.000)	− .006** (0.039)	− .006** (0.036)
Political stability	− .0005 (0.958)	− .009*** (0.000)	− .009*** (0.001)
Social factors			
Internet penetration rate	− .027** (0.038)	.0003 (0.944)	.001 (0.773)
Unemployment rate	− .002** (0.036)	.0002 (0.607)	.0001 (0.755)
Educational level	− .337 (0.397)	− .131 (0.231)	− .095 (0.390)
Urbanization level	− .047*** (0.000)	− .010*** (0.005)	− .009*** (0.007)
Constants	− 7.312*** (0.000)	− 4.488*** (0.000)	− 4.305*** (0.000)
N	820	820	826
Pseudo R2	0.0456	\	\
Log likelihood	− 3793.919	− 3631.6838	− 3314.4374
alpha	[4.10, 6.44]	\	\
LR test	\	391.50 > 0	
Hausman re fe	\	Prob > chi2 = 0.0251	

1. To remove heteroscedasticity, we log two variables pertaining to economy: GDP per capita and military expenditure. 2. The numbers in parentheses are the estimated *P* values; "*", "**", "***" respectively represent a significance level of 0.1, 0.05 and 0.01

on the number of a country's terrorist attacks except exports of goods and services (% of GDP). By contrast, most political independent variables have significantly impacted the number of terrorist attacks, which shows to an extent that terrorist events in the 49 countries are correlated with their complex political environments and that political factors are still the most important causes leading to terrorist attacks. This finding is similar to the bulk of empirical studies analyzing the cause of terrorism, which argue

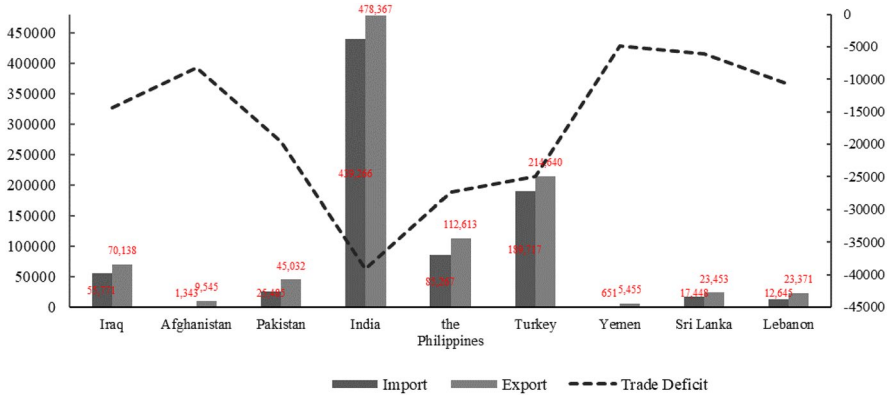

Fig. 4 Statistics of imports and exports of partial B&R countries in 2016. *Source*: World Bank database, website: https://data.worldbank.org.cn

that political factors play a crucial role and terrorism is mainly a political phenomenon (Krueger and Laitin 2004; Piazza 2015; Choi and Piazza 2016; Saha and Yap 2014; Wu et al. 2018). while is contrast to Freytag et al.'s (2011) research on the origin of terrorism which indicated a country's poor social-economic situation are associated with terrorist activity. This finding is most likely a consequence of different research samples and method.

In detail, we find that, given that all the other variables remain constant, the more goods one country exports, which means that the country is in abundant in resources and very productive, the fewer terrorist attacks there will be. Therefore a country's exports of goods and services (% of GDP) are negatively correlated with the number of terrorist attacks. This finding is consistent with the conclusions of Caruso and Schneider (2011) when examining the causes of terrorism in western European countries. We also draw a conclusion that a country's military spending and the number of terrorist attacks are positively correlated. The more a country's military expenditure is, the higher pressure the government exerts on terrorist groups and individuals and the stronger the resilience of terrorists will be, thus contributing to more terrorist incidents. this result doesn't support the hypothesis of the previous studies such as Bapat (2011) and Plümper and Neumayer (2010) which regarded the military spending as an effective measure to facilitate the coordination of counterinsurgency units. Besides, providing that all the other variables remain constant, we find that the more democratic and politically stable a country is, the fewer terrorist attacks will be. Therefore there is a significant negative correlation between level of democracy, political stability and the number of terrorist attacks. This finding is consistent with Piazza (2015) which argue that terrorist activity becomes more likely during unstable time, the detailed explanations are presented in the following part of reason.

Table 6 presents the results of regression taking the number of injuries and fatalities caused by terrorist attacks as a dependent variable. Similar to Fig. 4, alpha, LR test and Hausman test all support random effects negative binomial regression model. The results of model two shows that a country's exports of goods and services (% of GDP), government spending, military expenditure, level of democracy, political stability and urbanization level are all correlated with the severity of terrorist attacks. Exports of goods and

services (% of GDP), as an economic factor, and urbanization level, as a social factor and all political factors in the model have significant influence on the number of injuries and fatalities from terrorist attacks while other social and economic factors have no significant impact on it. Similar to the conclusion reached based on Table 5, Table 6 also shows that political factors contribute the most to the emergence of terrorist attacks. To put it clearly, on the one hand, a country's level of democracy and political stability are negatively correlated with the number of injuries and fatalities from terrorist attacks because a strong government in a democratic and stable country to some extent can prevent acts of terrorism; on the other hand, military expenditure and government spending are positively correlated with the number of injuries and fatalities caused by terrorist attacks. Moreover, given that all other variables remain constant, the higher the degree of economic openness is, the lower the probability of terrorist attacks and the fewer injuries and fatalities caused by terror-related attacks will be. This is evidenced by a negative correlation between a country's exports of goods and services (% of GDP) and the number of casualties caused by terrorist attacks.

5 Reasons

Regions covered by the BRI, especially the Middle East, are notorious "arc of terror" in the world because countries along the Belt and Road are greatly threatened by terrorism. When investigating the root causes of terrorism, political, social and economic factors shall all be taken into consideration due to the complexity and comprehensiveness of the emergence of terrorism. It is necessary that we include a country's social, economic and political conditions into one analytical framework to precisely identify the causes of terrorism. Empirical evidence shows that political appeal is still the key factor contributing to terrorist events. The emergence of terrorism in the 49 B&R countries is correlated with factors such as trade deficit, unreasonable military expenditure, low level of democracy and poor political stability.

5.1 Trade Deficit caused by weak export growth

Take countries which rank top 20 in the total number of terrorist attacks as an example. According to the trade statistics published by the World Bank, the import volumes of Iraq, Afghanistan, Pakistan, India, the Philippines, Turkey, Yemen, Sri Lanka, Lebanon and so on are larger than their export volumes in 2016. As is shown in Fig. 4, all the sample countries have trade deficits, among which Iraq, Afghanistan, Pakistan, Yemen and Lebanon, etc. have the largest gap in trade deficit (the amount of trade deficit is not necessarily the largest), for example, Afghanistan's import volume is 7 times that of export. Trade deficit, on the one hand, shows that a country' productivity is low; one the other hand, it suggests that the country' economy is highly dependent on foreign capital and that the country is incapable of becoming economically self-reliant and unstable in economic development (Nassif et al. 2013).

Trade deficits in these countries are mainly brought about by their unbalanced industrial structures. Taking Iraq, where terrorist attacks are the most frequent, as an example. Iraqi economy's pillar is petroleum industry and its economic growth trend almost coincides with that of crude oil production. However, it is stagnant in agricultural productivity and

Table 7 Comparison of military expenditure and armed forces personnel in some of the 49 countries. Source: World Bank Database, website: https://data.worldbank.org.cn

	Military expenditure (% of GDP)			Armed forces personnel (% of total labor force)		
	Israel	Pakistan	Iran	Israel	Pakistan	Iran
2008	15.81	15.84	12.61	2.35	5.56	1.68
2009	16.26	16.94	15.32	2.28	5.41	1.62
2010	15.41	16.83	15.16	2.29	5.28	1.69
2011	15.69	16.98	13.01	2.28	5.21	1.64
2012	14.80	16.09	19.32	2.27	5.07	1.60
2013	14.63	15.91	15.61	2.26	4.97	1.55
2014	14.96	17.30	14.80	2.26	4.85	1.48
2015	14.30	17.96	15.43	2.17	4.76	1.43
2016	11.60	18.03	15.21	2.07	4.66	1.37

suffers from the ensuing lack of domestic food supply. Therefore in Iraq's foreign trade structure, exported goods are mainly crude oil and natural gas while imported goods are mainly food, medicine and manufactured products. In recently years, shifts in world oil price market and turbulent domestic political environment hinder Iraq's exports, and sharp increases in global food prices also impede Iraq's basic food supply. Weak export growth contributes to a sharp decline in Iraqi government revenues and thus makes its fiscal deficit unsustainable. This unstable economic development easily leads to political turbulence and then gives rise to terrorist attacks. It is similar in other countries where terrorist events are frequent as their unbalanced industrial structures lead to unbalanced trade structures. These weak export performances intensify those countries' political turbulence and therefore increase the probability of terrorist incidents.

5.2 Enormous but structurally unreasonable military expenditure

Empirical evidence shows that the more the military spending is, the higher the probability of terrorist attacks will be in the sample countries. One reason is that the increase in military expenditure means cuts in funding for other public services. The more the military spending is, the less the funding used to improve people's livelihood will be. Take Israel, Pakistan and Iran where terrorist attacks are frequent for example. As is shown in Table 7, Israel, Pakistan and Iran' ratios of military spending to GDP always rank high among all the sample countries, which indicates that these countries have been allocating most funds for national defense and the military for a long time and thus reduced expenditure for improving social welfare. If the military spending continues to grow, people's living standards will be affected, which stirs up the masses' discontent and arouses terrorist events. Besides, the expansion in military spending poses a threat to domestic and foreign political forces. With the expansion of military budget, the government needs to raise political and economic rents, whose benefits terrorist organizations also want to obtain. Therefore, terrorists groups will fight to occupy crucial resources via terrorist attacks and launch more terrorist attacks to revenge themselves on the government for its oppression, forming a paradox of more military spending of the government leads to a greater number of terrorist attacks.

The emergence of terror-related attacks can also be attributed to an unreasonable structure of military expenditure because the percentage of military spending on

counter-terrorism capacity building is low. Take India, where terrorist attacks are frequent for example. According to the report of World Military Strength Ranking in 2017, India's military spending in 2017 was 53.5 billion USD, ranking No. 3 in the world, and its total number of armed forces personnel was about 1.17 million, ranking No. 4 in the world. Nonetheless, India didn't spend the funds in improving military equipment and enhancing its capacity of combating. Instead, it spent most of its money on the salaries of some 1.4 million servicemen and the pensions of over 2 million ex-servicemen. The high but unreasonable military expenditure hinders a country from strengthening its capacity to fight terrorism. Therefore, even if one country has an enormous military budget, it may not be able to effectively prevent and address terrorist groups' threats.

5.3 Low level of democracy and fragile political structure

Empirical evidence shows that there is a negative correlation between a country's level of democracy, political stability and the number of terrorist attacks. Theoretically speaking, the more democratic one country is and the better citizens' political rights are defended, the more tolerant the society will be towards diversified values and cultures, which makes it less likely that citizens would resort to violence to air their grievances and therefore reduces the number of terrorist attacks. By contrast, an autocratic government would limit citizens' political rights, which arouses people's discontent and hence provokes a rise in terrorist incidents. In the meantime, political stability also exerts great influence on terrorism. Terrorist groups may believe that they have more room of survival and development because a new government lacks the masses' support and trust, is weak in social governance capabilities and the society is highly divided, therefore unstable regimes also contribute to the emergence of terrorism.

Figure 5 shows how the level of democracy and political stability change with time in countries like Iraq, Pakistan and Afghanistan where terrorist attacks are the most frequent. On the whole, in Iraq, Pakistan, Afghanistan and Iran, the development trends of the level of democracy and political stability are opposite, which is due to a stark conflict between traditional religious ideologies and an increasing sense of democracy. Take Iraq as an example. When Saddam Hussein was in power, Iraq's democracy score was almost zero and was categorized as a totalitarian country. After Saddam's regime collapsed, Iraq's democracy started but its level of democracy was still low. The new government chose to completely inherit western democratic systems and applied them to Iraq without considering Iraq's national conditions when it attempted to democratize Iraq, which, together with a high degree of government corruption, intensifies Iraq's internal contradictions in post-Saddam era and therefore bred terrorism, leading to a series of terrorist attack.

6 Conclusions

This study aims to investigate the impacts of a country's political, economic and social conditions on terrorism. We have constructed a model of correlation factors that influence terrorism and examined the influence of social, economic and political conditions on the number of terrorist attacks and the number of injuries and fatalities caused by terrorist attacks. The results of negative binominal regression based on panel data show that the major causes of the 49 B&R countries' terrorist incidents are political factors despite limited influence of social and economic factors. These 49 countries, especially

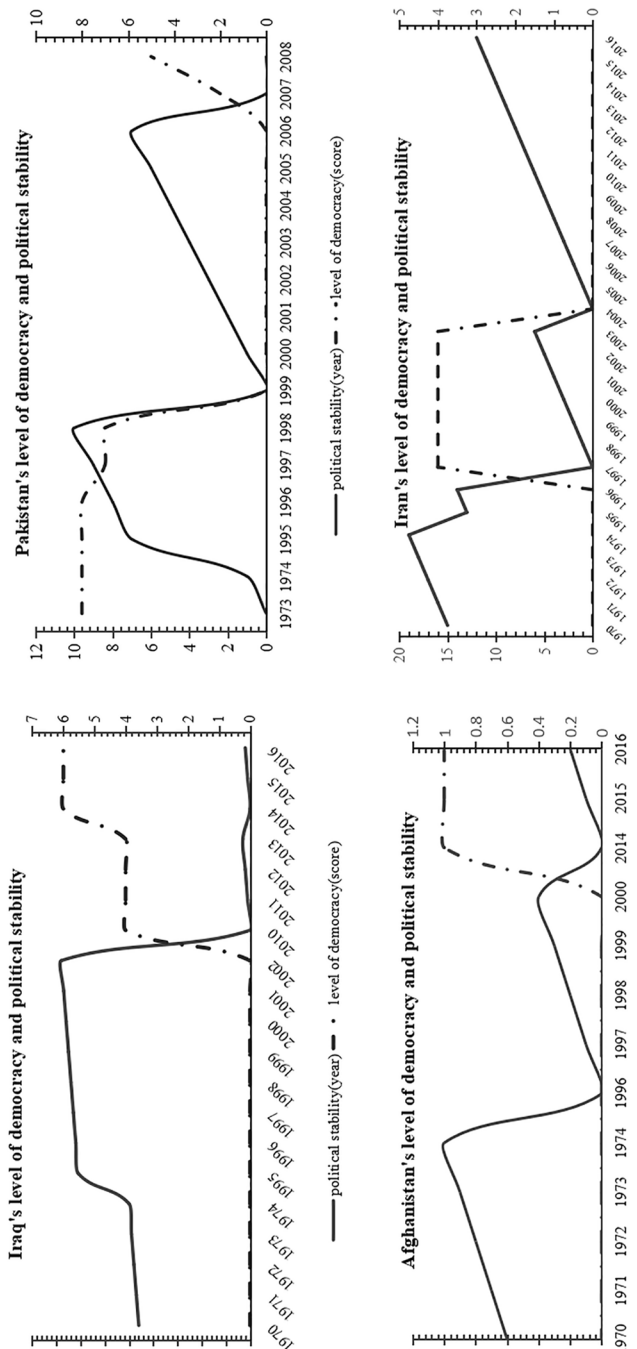

Fig. 5 Political stability and level of democracy of partial countries ranking top in the number of terrorist attacks. Source: Polity IV Project, website: http://www.systemicpeace.org/polity/polity4.htm

those located in the Middle East, have been troubled by terrorist activities for a long time for its complex political environments and frequent replacements of ruling parties. To address the threats and challenges in national economic development and the implementation of the BRI brought about by frequent terrorist attacks, every B&I country should take targeted measures to fight terrorism based on its national conditions, collaborate to build a long-term counter-terrorism cooperation system and establish a Security Community for BRI countries.

Firstly, complex political landscapes and fragile political structures in countries where terrorist attacks are highly frequent like Iraq, Afghanistan and Pakistan are creating room for terrorist groups or terrorists. To cope with that, governments should deepen political and institutional reforms, strengthen democracy, maintain public trust in government and uphold political stability. Besides, governments should bolster social and economic development by implementing income distribution system reform, wage payment system reform, social welfare system reform, formulating policies pertaining to education, employment, etc. that can benefit the public, adjusting economic structure, reducing the negative impact of inflation on people's lives and bringing economic development back on normal track.

Secondly, as this is a globalized world and active terrorist groups have established their presence on the Internet, even if some B&R countries are troubled less frequently by terrorist attacks, they will also face terrorist threats because they are conducting more and more economic and trade exchanges with other B&R countries where terrorist events are frequent. Therefore, these countries should be devoted to building a long-term counter-terrorism cooperation system, setting up a counter-terrorism cooperation platform by taking bilateral cooperation, multilateral cooperation and even global cooperation as governance modes, clarifying their own roles in this system and providing assistance to other members in due time.

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