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The effects of terrorism on economic performance: the case of Islamic State in Iraq and Syria (ISIS)

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Abstract This study evaluates the impact of terrorism on economic performance in Islamic States of Iraq and Syria (ISIS) from the year 2004 to 2013. Study applied the economics of crime monitoring model by Ruiz Estrada and Ndoma (J Policy Model 36:867–882, 2014) for analysis. The application of the model for ISIS has five phases (a) the total terrorism frequency rate (β) (b) the national terrorism vulnerability rate (μ_T) (c) the terrorism devastation magnitude rate (λ) (d) the economic desgrowth rate (δ) (e) the terrorism vulnerability surface. The results of study conclude that terrorism has badly affected the economic performance of ISIS during the study period. Instead of direct fighting against the terrorist group in ISIS, the developed world especially the Europe and United States of America may review the terrorism policy about these economies and may eradicates the terrorism by reducing poverty, religious discrimination and inequality to increase the opportunity cost of terrorism.

Keywords Terrorism · Economic desgrowth · ISIS · Iraq · Syria

1 Introduction

Globally, the socio-economic and geo-political conditions have changed accidently after the terrorist activity of September 11, 2001 (Michael 2007). Shukla (2009) said that terrorist groups have international connections. These terrorist groups are recruiting the people from worldwide, exchanging criminal weapons and generating collective planning

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for producing terror in the economies. The research studies such as Eckstein and Tsiddon (2004), (Enders and Sandler 2006) examined that studies on impact of terrorism on economy has primarily concentrated on developed economies. According to the Global Terrorism Database (GTD) report (2013), the top five economies which are severely affected by terrorism in 2014 are the developing economies. In those five countries, Iraq is ranked first on the basis of global terrorism index (GDI) in 2014 while Syria has ranked fifth in this regard.

The Islamic State in Iraq and Syria (ISIS) has got more attention in the electronic media currently. This terrorist group ISIS has not only created the terror and tension in the economies of Iraq and Syria but also challenged the rest of the world community (Stephens and Barbarani 2014). This particular study has main focus on the effects of terrorism of ISIS on economic growth of Iraq and Syria (Figs. 1, 2, 3, 4, 5, 6, 7).

The rest of the paper is planned as follows. Sections 2 and 3 describe the overview of terrorism and economic performance in Iraq and Syria economies. Section 4 evaluates the overview of ISIS whereas Sect. 5 explains the theoretical framework of study. Section 6 discusses the methodology of the model, while Sect. 7 explores the results of the study. Finally, the conclusions of the paper with some policy recommendations are discussed in Sect. 8.

2 An overview of terrorism and economic performance of Iraq economy

The formal name of Iraq is Republic of Iraq (Al Jumhriyah al Iraqiyah). The capital city of Iraq is Baghdad. Iraq has got independence from the British administration in October 3, 1932. Iraq is located in the Middle East at the Northern most extent of the Persian Gulf. Iraq has boundaries with Saud Arabia in north side and Iran from north side, while Syria and Turkey on east and south sides respectively.

Iraq is a country which is badly affected by terrorism in the year 2013. The number of deaths are increased to 162 % from 2012. 77 % of the terrorist attacks were claimed and took responsibility by ISIS. About 4660 people were killed due to terrorism by unknown

Fig. 1 Terrorists stealing control of Iraq. *Source* Lister (2014)

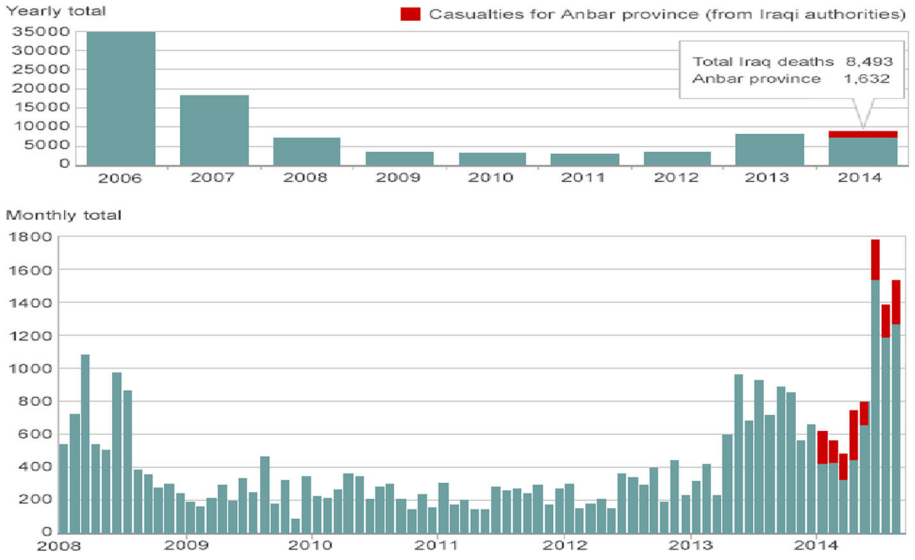

Fig. 2 Civilian deaths in Iraq 2006–2014. *Source* UN Assistance Mission for Iraq

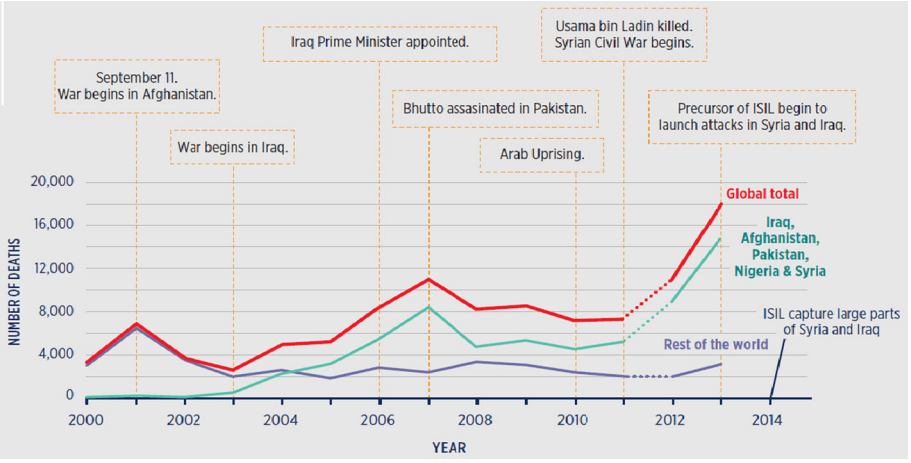

Fig. 3 Terrorism incidents in the World year 2000–2014. *Source* Global Terrorism Database Report 2014

actors in the year 2013. There were 232 suicide attacks in Iraq in 2013, which are responsible for 27 % of fatalities. The average number of deaths and injuries per suicide attack is 10 and 18 respectively. The most affected areas of Iraq by terrorists are Baghdad, Mosul, Kirkuk, Baqubah and Tuz Khormato (GTD 2013).

Iraq economy mainly dominated by the oil sector, which contributes more than 90 % of government source revenue and 80 % of foreign exchange earnings through exports of oil. In the year 2012, Iraq has increased oil exports to 2.6 million barrels per day which is

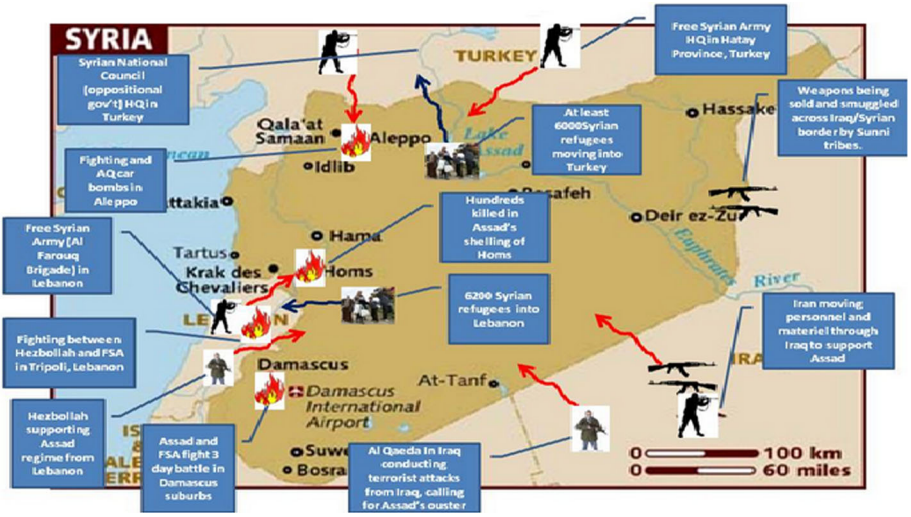

Fig. 4 Chaos in Syria. *Source* Israel seen (2013)

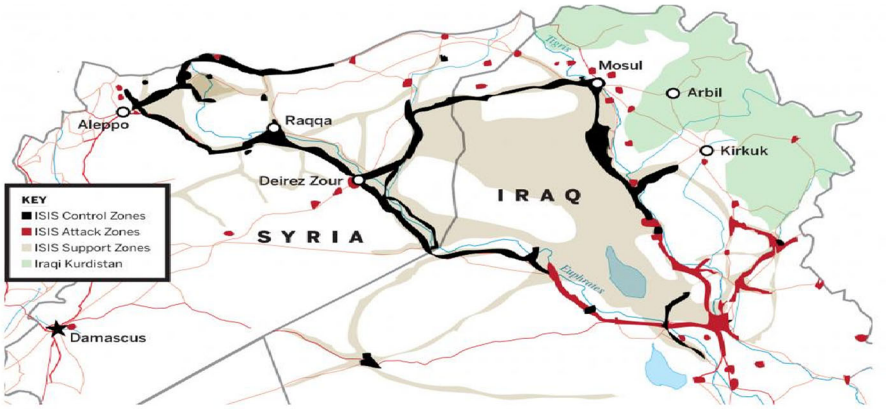

Fig. 5 The total area overview of ISIS. *Source* Institute for the study of war

higher in the previous 30 years and the average per day export of oil was 2.2 million in the fiscal year 2011. Iraq is building slow progress legislating laws and developing the institutions required to implement economic policy. Additionally, the political reforms are still required to adequate investors' concerns regarding the undefined business environment, which may have been harmed by the November 2012 standoff between Baghdad and Erbil and the removal of the Central Bank Governor in October 2012. The government of Iraq is keen to invite additional foreign direct investment, but it faces a number of difficulties including a fragile political system and concerns about security and societal stability. Extensive corruption, inadequate essential services, obsolete infrastructure, skilled labour deficiencies, and antiquated commercial laws suffocate investment and continue to restrain growth of private and nonoil sectors.

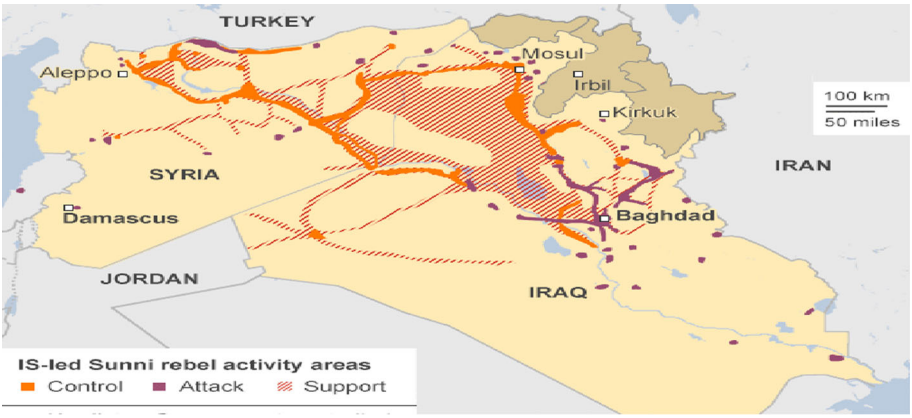

Fig. 6 The map zone of ISIS. *Source* Institute for the study of war

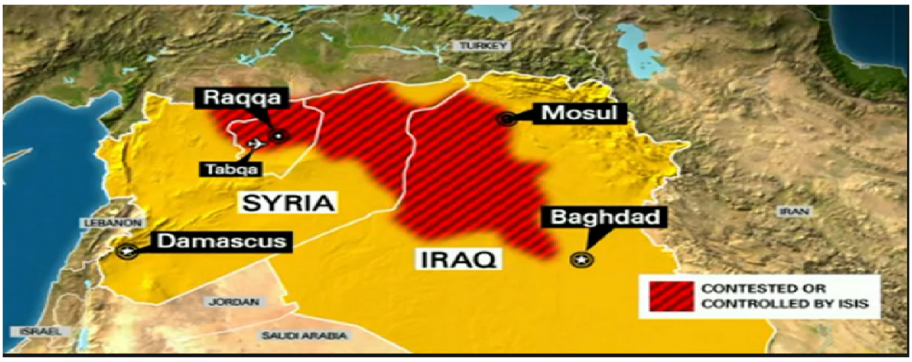

Fig. 7 The territorial area of ISIS. *Source* Middle East news (2015)

3 An overview of terrorism and economic performance of Syria economy

The formal name of Syria is Syria Arab Republic (Al Jumhuriyah al Arabiyah as Suriyah). The capital city of the country is Damascus. The major cities of the country are Aleppo, Homs, Hamah, Al Hasakah, Idlib and Latakia. Syria has got independence from French forces on April 17, 1946. Syria is located in South Western Asia, at the eastern side and of the Mediterranean Sea, with Turkey to the North, Iraq to the East, Jordan to the South, and Israel and Lebanon to the West.

There was a dramatic increase in terrorist attacks in Syria after 2010. By the end of year 2012, the total number of terrorist attacks was 136, which killed 600 people. In the year 2013, the total number of terrorist attacks was increased to 217 and more than 1000 people were killed. More than ten different groups were involved in all those terrorist attacks in Syria. So for this terrorism and civil war has killed 180,000–260,000 people and the displacement of over 35 % of the population of the country. The biggest insurgent groups in Syria include ISIS, the Free Syrian Army, Hizballah and Popular Front for the Liberation of Palestine, Gen Cmd (PFLP-GC). In the year 2013, the Sunni and Al-Qa'ida

linked Al-Nusra Front was responsible for more than 40 % of deaths. More than 70 % of the terrorist attacks are bombing or explosions and have targeted the private citizens. Kidnapping ratio was also increased and at least 16 European journalists were kidnapped including Danish, French, Italian, Polish, Spanish and Swedish journalists. Two American journalists, James Foley and Steven Sotloff were kidnapped and later on in 2014, both were killed by ISIS. In 2013, terrorist attacks took place in 57 cities. 42 % of the terrorist attacks were occurred in capital city, Damascus (GTD 2013).

Even though, the modest economic growth and reform prior to the outbreak of unrest, the economy of Syria continues to worsen during the current clash that initiated in 2011. Further the economy contracted in 2013 because of international sanctions, widespread damage of infrastructure, abridged domestic production and consumption, and suddenly growing inflation. The government has struggled to address the effects of economic decline including dwindling foreign exchange reserves, rising budget and trade deficits, and the decreasing value of the Syrian pound. The ongoing conflict and economic decline have created a humanitarian crisis prompting widespread need for international aid.

4 Islamic State in Iraq and Syria (ISIS)

The question is raised that what is the ISIS and how it is emerged as one the leading group of insurgency? ISIS is the terrorist group who has occupied the area of territory in eastern Syria and Iraq. The main aim of this group is that to develop a state on the name of Islamic laws and will lead by a religious leader called “Caliphate”. Currently the ISIS is limited to Iraq and Syria, but this group wants to extend its boundaries to Jordan and Lebanon. This group includes the Sunni Muslims from different parts of the world including Europe.

The ISIS was established in 2002 by the late Abu Musab ul-Zarqawi, which later on made alliance with AL-Qaeda in Iraq, which was the major insurgency group. During 2006, after the death of Zarqawi, Al-Qaeda in Iraq was merged into Islamic State in Iraq (ISI). Till 2009, the ISI was not that much strong and was considered as a weak insurgent group. Later on, in the year 2010, Baghdadi become the leader of this group. The profile of Baghdadi shows that he has done Ph.D and very well-educated person. In 2013, Baghdadi has merged the Syrian and Iraqi insurgent group and made foundation of the ISIS. In 2014, ISIS has occupied major part of Iraq including the cities of Fallujah and Mosul. ISIS has controlled hundreds of square kilometres area in Iraq and Syria. Some statistics show that so for the total area control by ISIS is thousand square miles which is almost equal to the area of Austria. According to the Central Intelligence Agency (CIA) report, the total number of persons in ISIS is in the range of 20,000–31,500 (Lister 2014).

4.1 Source of funding

The major sources of financing of ISIS come from the selling of oil and kidnapping of foreigners. They are demanding the money from the home countries for the release of those foreigners. The daily revenue from oil and gas is around US $3,000,000. The recent example of Japanese persons who were kidnapping by the ISIS group and were demanding the money from the Japan’s government. France is thought to have funded $14 million for the release of four journalists. Other than that, they are also demanding the toll tax from vehicles and truck drivers. The other source of income of ISIS is that they attack on large territory and sometimes attacks on banks and take money from them. Today, ISIS is one of the richest insurgent group with almost US $2.38 billion. The ISIS is getting support of the

local people by distributing foods, recreational activities for kids and also arranged hospital facilities for the local community (Giovanni et al. 2014).

5 Theoretical framework of study

The goal of this research study is to examine the effects of terrorism on economic performance. The economic theory "immiserizing modernization theory" shows that economic performance can result in terrorism if the benefits of economic performance could not shifted through trickle- down effect to poor people of the economy. The imbalanced economic performance promotes income inequality therefore poverty is prevailed in the economy. The increase in the level of poverty reduces the opportunity cost of terrorism which favours the poor people to go for suicide bombing and other type of terrorism incidents (Shahbaz 2013). The same logical explanation is provided by Gurr (1970) in the form of economic deprivation.

6 Evaluation of terrorism monitoring model (ETM-model)

The model used for the analysis of terrorism and economic performance of Pakistan economy (Khan et al. 2015) is applied in this study. This model basically is an application of economics of crime monitoring model (ECM-model) which is introduced by Ruiz Estrade and Ndoma (2014). The model is actual developed for the connection of gross national product (GNP) with the occurrence of terrorism. Here in this particular study terrorism is taken as a hazard and will examine its impact on economic performance. The model determines that how the economy is affected by terrorism at any phase of time span and any place. The potential destruction of terrorism and its impact on gross domestic product (GDP) cannot be unobserved and undervalued. To know about the dynamics of terrorism is not too much essential, but a suitable estimation of its quantification is noteworthy for future policy suggestions and recommendations.

The ECM-model is applied to find that how GDP growth rate is directly connected to the terrorism activities. The ECM-model is divided into five sub-parts which are as follows:

(a) The total terrorism frequency rate (β), (b) the national terrorism vulnerability rate (μ_T), (c) the terrorism devastation magnitude rate (λ), (d) the economic desgrowth rate (δ), (e) the terrorism vulnerability surface.

These five sub parts of ECM-model show the different level of vulnerability and devastation producing from different types of terrorism incidents. The time series data of different terrorism activities are collected to calculate the five indicators of the model. The terrorism incidents can affect any country or economy and its impact on that economy in the form of destruction of capital and infrastructure losses and human capital devastation. The ECM-model explains that the economic impact of terrorism activities is in the form of dwindling production and loss of human capital. A new methodology called economic desgrowth which measures the impact of terrorism on economic performance. The economic desgrowth describes the outflows of economic growth occurring due to terrorism. The key objective of the economic desgrowth is to measure the likely impact of terrorism on the final GDP growth rate over time frame. The twelve different terrorism activities data are applied for the measurement of the ECM-model. These various categories of terrorism activities

contain suicide, assassination, hijacking, kidnapping, barricade, bombing, unknown, armed assaults, unarmed assaults, infrastructure, number of killed and number of wounded.

6.1 The national terrorism vulnerability rate (μ_T)

To find the national terrorism vulnerability rate, it is important to find the total terrorism frequency rate. Total terrorism frequency rate (β_i) is the ratio of a particular terrorism incident in a specific year divided by the total frequency cumulatively (see Eq. 1).

$$\beta_i = \frac{\beta_{i,t=T}}{\sum_{t=T-9}^{t=T} \beta_{i,t=T}} \tag{1}$$

The value of terrorism frequency rate will be in between 0 and 1. As shown in Eq. 2 as below

$$0 \leq \beta_i \geq 1 \tag{2}$$

It assumes that terrorism incident can occur at any time and any place. In this particular research study, the frequency rates of selected twelve different terrorism activities were selected which are as follow, suicide (β_1), assassination (β_2), hijacking (β_3), kidnapping (β_4), barricade (β_5), bombing (β_6), unknown (β_7), armed assaults (β_8), unarmed assaults (β_9), infrastructure (β_{10}), number of killed (β_{11}) and number of wounded (β_{12}). Different terrorism incidents have different intensity according to their nature and location. The ECM-model is supposed that the terrorism incidents cannot be measured with accuracy as according to their nature is unpredictable. To measure, the national terrorism vulnerability rate, the general formula to calculate it as follow

There are three different level of vulnerability to evaluate the terrorism vulnerability rate (μ_T) (see Eq. 3).

$$\mu_T = \left(Ln\sqrt{1-\beta}\right) \tag{3}$$

Level 1 is the high vulnerability lying between values of 1 and 0.75. Level 2 is the average vulnerability whose value is in between 0.74 and 0.34 and level 3 is the low vulnerability with value from 0.33 to 0.

There are three possible relationship between national terrorism vulnerability rate (μ_T) is very high, the economic desgrowth will be high. When the terrorism vulnerability rate (μ_T) is low, the economic desgrowth will also low. At last, due to the application of "The Dynamic Imbalanced State (DIS)" (Ruiz Estrada and Yap 2012) that is dynamic, changes constantly.

6.2 The terrorism devastation magnitude (λ)

The two variables capital devastation and human capital devastation are applied to measure the rate of terrorism devastation magnitude. Capital devastation measures as the total number of incidence of terrorism in a particular area in a specific location area in a geographical location divided by the total area of the same specific geographical location. The human capital devastation measures as the number of killing or missing persons in a

particular area divided by the total population of the same geographical area. By multiply both the results of capital and human capital devastation measures the value of terrorism devastation magnitude rate (λ).

$$\lambda = Ln[(\phi k) \times (\psi L)] \tag{5}$$

6.3 The economic desgrowth

Economic desgrowth which was introduced by Ruiz Estrada et al. (2014). Economic desgrowth is a macroeconomic indicator that elucidates the final impact of any type of any natural hazards on the GNP. This explains that how final GNP-post violence hazards depend on the terrorism devastation magnitude rate (λ). Along with that, terrorism devastation magnitude rate (λ) is directly related to the national terrorism vulnerability rate (μ_T). So the economic desgrowth is measured by the rates of product of terrorism devastation magnitude and national terrorism vulnerability. The general formula of economic desgrowth is as below:

$$\delta = (\mu_T)(\lambda) \tag{5}$$

The Eq. (5) confirms that the economic desgrowth value will be negative. The observed analysis examines that when both national vulnerability rate and terrorism devastation magnitude rate are moving upward, the economic desgrowth will also move in the same direction (see expression 6).

$$\uparrow \delta = (\uparrow \mu_T)(\uparrow \lambda)C \tag{6}$$

$$\downarrow \delta = (\downarrow \mu_T)(\downarrow \lambda) \tag{7}$$

The above expressions determine that the economic desgrrowth is directly proportional to terrorism devastation magnitude rate and national vulnerability rate.

6.4 The terrorism vulnerability surface (VV-surface)

The plotting of vulnerability surface (VV-surface) depends on the mega-surface coordinate space and terrorism frequency rate (B). In this particular case of the research study, the vulnerability surface is drawn through three by four matrix (single value of all 12 variables). All the 12 variables values are putted into four rows and three columns on the VV-surface. The VV-surface explains the diagrammatic representation of the terrorism of any economy or country. The VV-surface can be expressed as bellow.

$$\eta = (\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}) \tag{8}$$

The VV-surface depends on the variation that happened due to any terrorism activity during a specific time span.

7 Results and discussion

7.1 The application of ECM-model for Islamic State in Iraq and Syria (ISIS)

The application of ECM-model for ISIS explains how terrorism affects the economic performance of this specific area. Before going into the details of the model results, just show the snap shot of terrorism situation in Iraq and Syria as follow.

The terrorism situation was seen very alarming in both the economies during 2013–2014. Thousands of people were died in both countries. The major cities in Iraq where terrorism has occurred are Baghdad, Mosul, Kirkuk, Baqubah and Tuz Khormato. The terrorist affected areas in Syria are Damascus, Aleppo, Homs, Hamah, Al Hasakah, Idlib and Latakia. The major terrorist group in these economies is ISIS which has a major control in most part of both countries.

7.2 The total terrorism frequency rate of Islamic State in Iraq and Syria (ISIS)

In this part of the research work, we investigate the terroirsm vulnerabilty propensity rate in Iraq and Syrian economies. The Figs. 8 and 9 show the terrorism growth rates of Iraq and Syria economies. The Fig. 3 shows that risk of highest terrorism activites is by armed assault 33.69 % in economy of Iraq. In case of Syria, the highest terrorism activites is by number of killings with 56.37 %. Second highest terrorism frequency rate is occupied by bombing explosions with 33.56 % in case of Iraq economy while number of wounded has captured the second highest position in case of Syria economy. The third highest position in terrorism gorwth rates is assasination in both of the economies with the values 29.24 and 32.65 % respectively.

Below figures show the terrorism vulnerability surface of Iraq and Syria economies for the year 2004 and 2013 respectively. All these results explain that terroism rates are too much high in both of of the economies (Figs. 10, 11, 12 and 13).

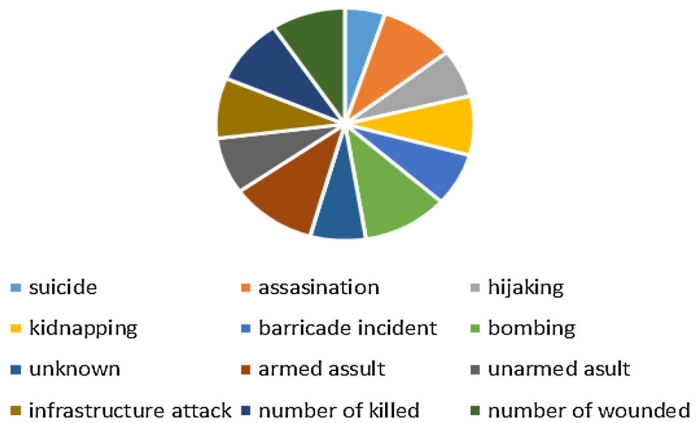

Fig. 8 Terrorism frequency rate of Iraq economy

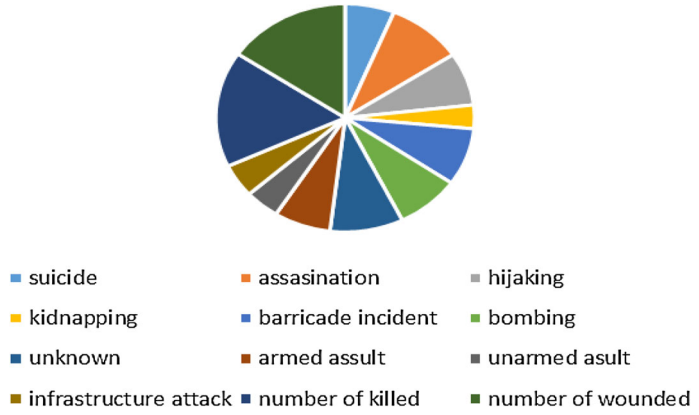

Fig. 9 Terrorism frequency rate of Syria economy

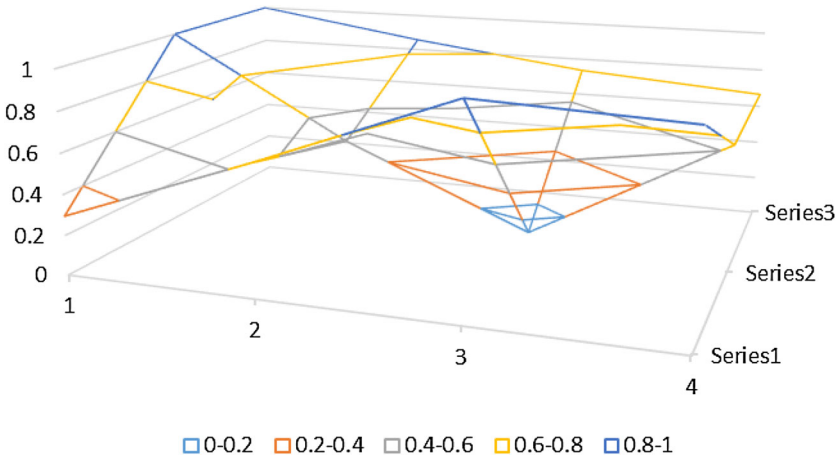

Fig. 10 VV-surface for the year 2004 of Iraq economy

7.3 The Iraq and Syrian economies terrorism vulnerability rate (Ω_T): max and min

Accordin to our estimated results, the Iraq economy has terrorism vulnerability rate (Ω_T) with (Ω_{Tmin}) = 0.12–0.047 and (Ω_{Tmax}) of 0.96. In case of Syrian economy, the terrorism vulnerability rate has (Ω_{Tmin}) 0.06 and (Ω_{Tmax}) of 0.95.

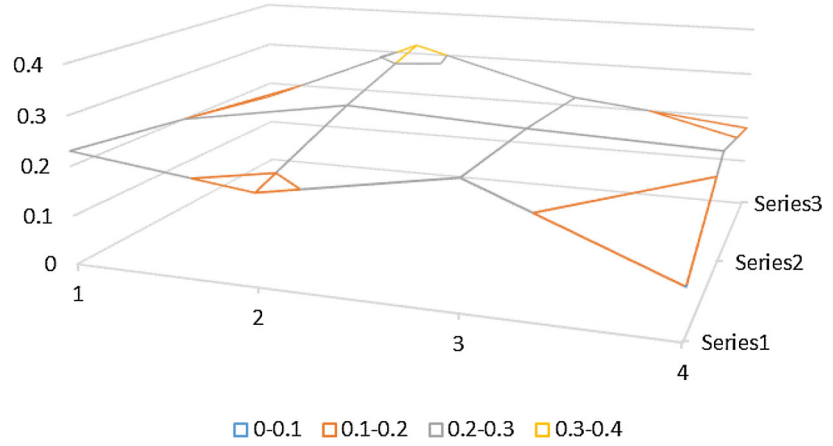

Fig. 11 VV-surface for the year 2013 of Iraq economy

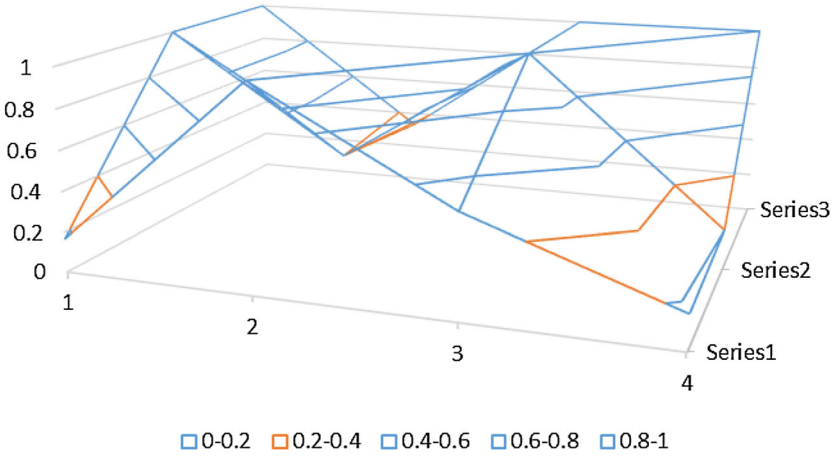

Fig. 12 VV-surface for the year 2004 of Syria economy

7.4 The terrorism devastation magnitude rate of Islamic State in Iraq and Syria (ISIS)

In this section, the terrorism devastation magnitude rate (π) of Iraq and Syria between 2004 and 2013 was evaluated. By this comparison, it would provide a sense of its level of devastation in both of the economies. The results of the study explain that the devastation resulting from terrorism was very limited at -1.52 % in case of Iraq and -0.97 % in case of Syria during 2004. On the other side, the devastation caused due to terrorism in the year 2013 was too large at -17.35 % in case of Iraq while -15.5 % in case of Syria. These results confirm that terrorism devastation magnitude rate (π) in 2013 caused far more devastation in both of the economies as compare to that in 2004.

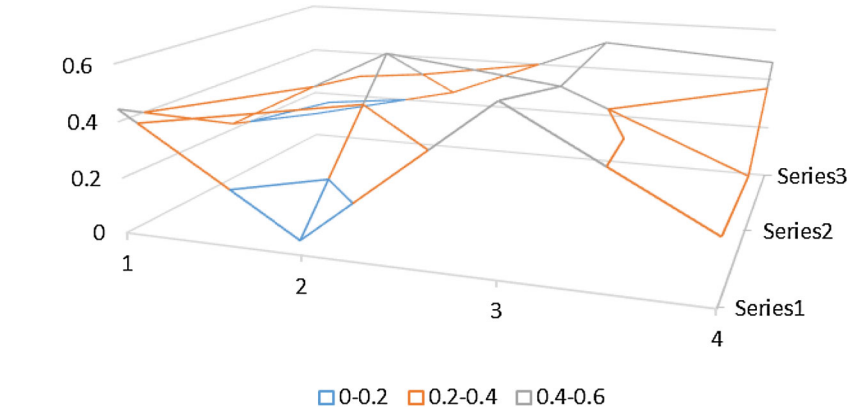

Fig. 13 VV-surface for the year 2013 of the Syria economy

7.5 Economic desgrowth of Islamic State in Iraq and Syria (ISIS)

At the end of the results of study, the impact of terrorism on economic growth was measured. Here a novel concept called two economic desgrowth (δ) developed by Ruiz Estrada et al. (2014) was applied. The main purpose of economic desgrowth helps to examine possible leakages that can badly affect GNP performance. According to our results, the economic desgrowth caused by terrorism in Iraq and Syria has an impact of -1.38 % on the Iraq and -0.50 % Syria economic desgrowth in the year 2004 respectively. Our results further explain that economic desgrowth generated by terrorism in Iraq and Syria in 2013 at -2.58 and -3.20 % have been larger than in 2004. The economic desgrowth ranges between these two time period show -1.2 % in case of Iraq and -2.7 % in case of Syrian economy according to the final estimates (see Figs. 14, 15 and 18).

The actual economic growth rate, economic desgrowth and potential economic growth rate (zero terrorism) were drawn of both the economies to explain the difference between

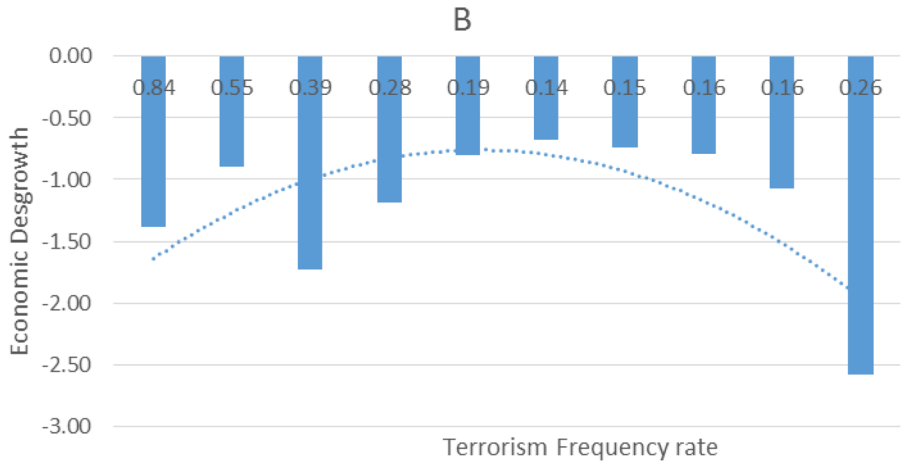

Fig. 14 The relationship between Economic desgrowth and terrorism frequency rate

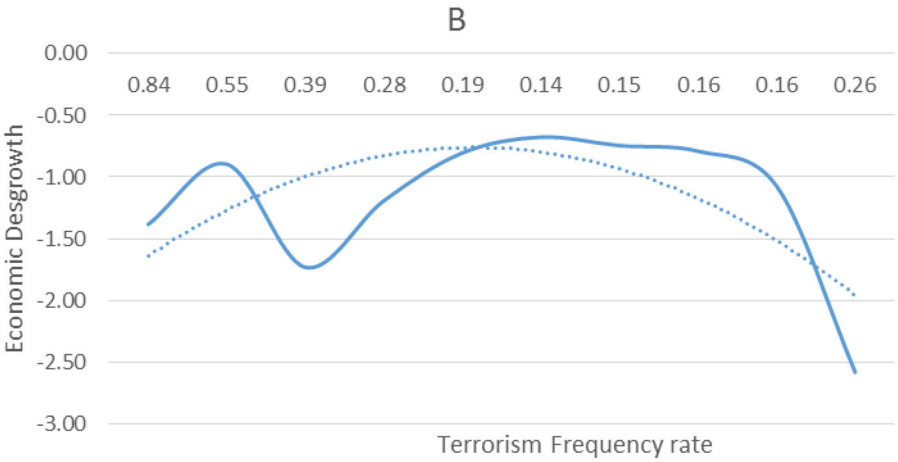

Fig. 15 The graphical representation of Economic desgrowth and terrorism frequency rate

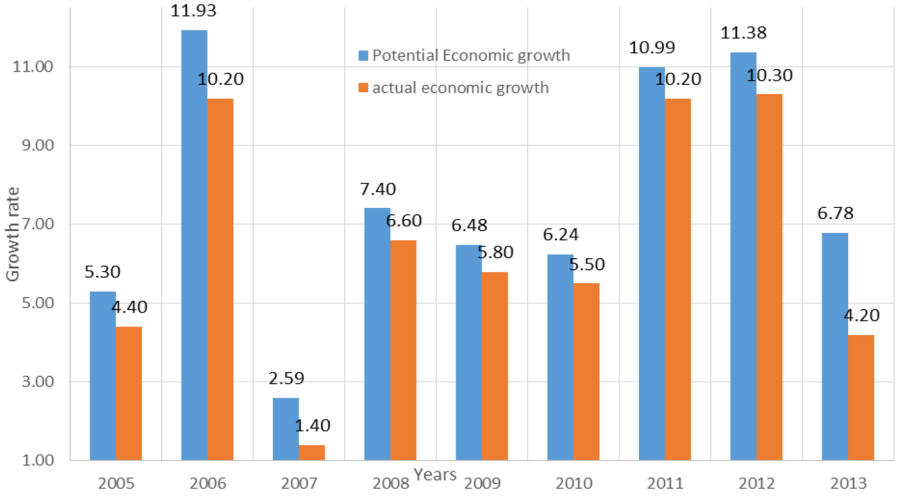

Fig. 16 Actual and potential economic growth rate of Iraq economy

the actual and the potential economic growth rate (see Figs. 16, 17, 18, 19 and 20; Tables 1 and 2).

8 Conclusion and policy recommendation remarks

This research study evaluates the impact of terrorism on economic performance in Islamic States of Iraq and Syria (ISIS) from the year 2004 to 2013. The ECM-model is applied for the analysis of the study. The results of the study conclude that the economic desgrowth

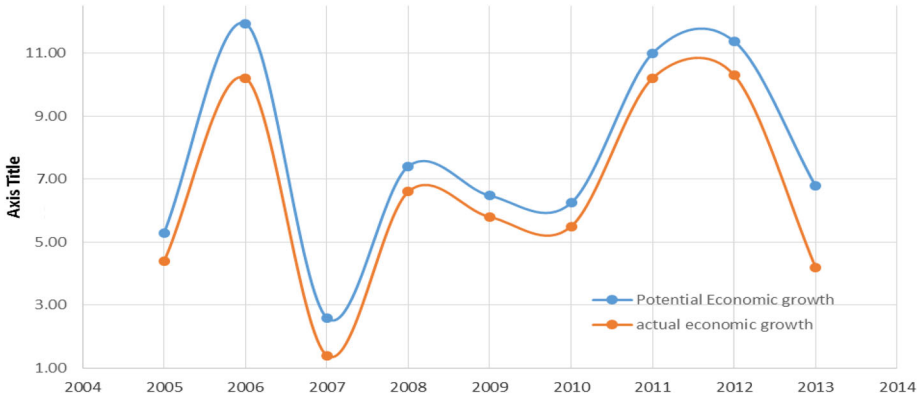

Fig. 17 Actual and potential economic growth of Iraq economy

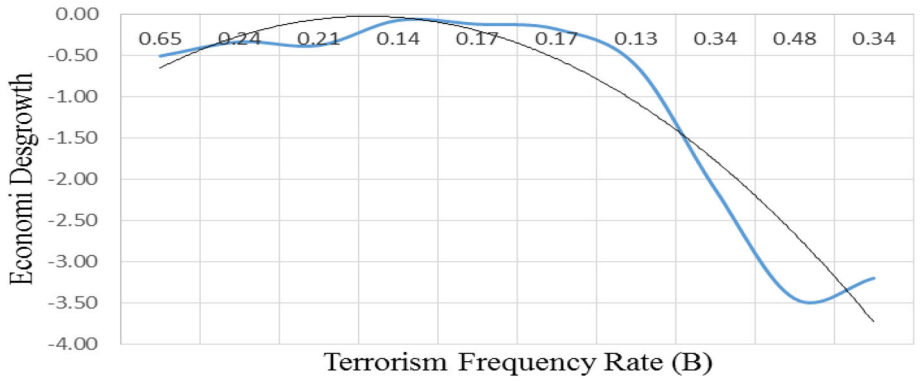

Fig. 18 Syria economy

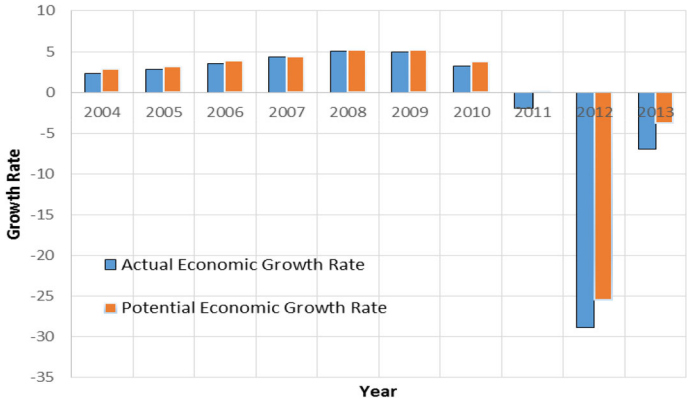

Fig. 19 Actual and potential economic growth rate of Syria economy

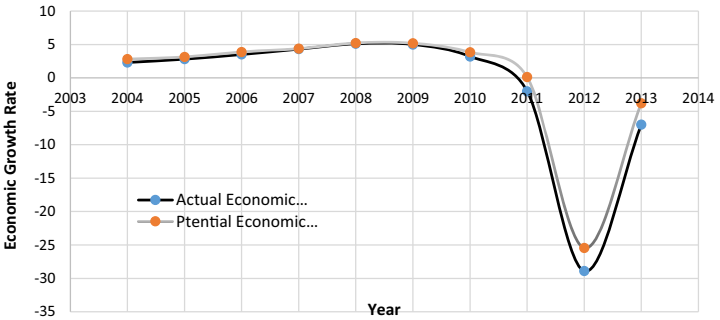

Fig. 20 Actual and potential economic growth rate of Syria economy

Table 1 Actual economic growth rate, economic desgrowth and potential growth rate of Iraq economy

Year	Actual economic growth rate	Economic desgrowth	Potential economic growth rate (zero terrorism)
2004	54.40	−1.38	55.58
2005	4.40	−0.90	5.30
2006	10.20	−1.73	11.93
2007	1.40	−1.19	2.59
2008	6.60	−0.80	7.40
2009	5.80	−0.68	6.48
2010	5.50	−0.74	6.24
2011	10.20	−0.79	10.99
2012	10.30	−1.08	11.38
2013	4.20	−2.58	6.78

Source WB World Bank, and authors estimates

Table 2 Actual economic growth rate, economic desgrowth and potential growth rate of Syria Economy

Year	Actual economic growth rate	Economic desgrowth	Potential economic growth rate (zero terrorism)
2004	2.3	−0.51	2.80
2005	2.8	−0.34	3.13
2006	3.5	−0.38	3.88
2007	4.3	−0.08	4.37
2008	5.1	−0.12	5.22
2009	5	−0.18	5.18
2010	3.2	−0.62	3.82
2011	−2	−2.12	0.12
2012	−28.9	−3.45	−25.44
2013	−7	−3.20	−3.79

Source WB World Bank, and authors estimates

caused by terrorism in Iraq during 2013 is −2.58 %, while in Syria the economic des-growth during the same period is −3.20 %. These statistics show how much both the economies were badly affected by terrorism during the last decade.

The study suggest the world community, especially Europe and United States of America to think about the root causes of terrorism in both of these economies. Instead of fighting against terrorism it is vital to identify the causes of terrorism first and then to overcome these issues which raise terrorism especially in Iraq and Syria. The developed world would review terrorism policy about the situation of ISIS that why this terrorist group numbers is increasing day by day? Why the people join this terrorist group? These are some serious questions which may need to find their answers. If we want to win the war against terrorism, it is required to eradicate poverty, inequality and religious discrimination to increase the opportunity cost of terrorism.

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