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Silence Becomes Louder: Institutional Determinants of Suicide Bombing

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Abstract

Despite empirical research showing that countries with higher level of voice and accountability are less prone to suffer from terrorism, it is not yet clear what type of terrorist activity is more likely to appear when vertical accountability is absent. This article investigates the effect of voice and accountability on suicide bombing attacks growth in countries with different institutional conditions. The results are obtained by using QOG and GTD databases for regression analysis. The results lend support to the two hypotheses tested: 1) voice and accountability has significant reductive effect on suicide bombing growth; 2) the effect of voice and accountability on suicide bombing is more profound than the effect on other types of terrorist attacks.

Keywords: terrorism, suicide bombing, voice and accountability, determinants of terrorism

Introduction

The economic impact of terrorism in Iraq in 2015 was 17.3% of GDP, 18.8% — for Afghanistan, 8.3% — for Syria. It was calculated that «the total economic impact of violence reached \$13.6 trillion in 2015, or 13.3 per cent of global GDP¹». 38.422 people were killed as a result of terrorism in 2015, while there were 6.311 deaths from terrorism observed in 2005. Many more were disabled, crippled, horrified and lost their dearest. Hence, research on terrorism has a great practical significance, because prevention may save a lot of lives and property, making life more safe and comfortable.

This paper is a logical continuation of my previous year research work «The Sound of Silence: Voice and Accountability as Determinant of Terrorism», where I found a statically significant association between voice and accountability and terrorism: increase in voice and accountability is accompanied with decrease in terrorist activity level. In consideration of previously obtained results, it would be reasonable to examine such connection for different types of terrorism.

The *objective* of the paper is to identify if the effect of voice and accountability on suicide bombing differs from the effect on terrorist activity in general and identification of the direction and strength of this difference if it would be observed. This research investigates both international and domestic acts of terrorism. The *tasks* are the following: 1) to improve the definition of terrorism and suicide bombing by determining obligatory factors to identify the attack as terrorism and as suicide bombing; 2) to examine the research that has been made in field of determinants of terrorism generally and suicide bombing specifically; 3) to construct a database to work with; 4) to pick out main factors

¹ Estimated using IEP's cost of violence methodology, GTD 2016

of interest; 5) to identify the most appropriate methods in regression analysis and to implement them.

The academic topicality of the research is based on lack of research on factors of different types of terrorism, conditional connection between terrorist activity rate and institutional and non-institutional factors. This paper makes a contribution to the theory of associative link between terrorist activity and voice and accountability level and provides a greater depth of knowledge about suicide bombing terrorist attacks. The findings are relevant for researchers specializing in international relations and terrorism studies.

This paper has three major parts. In the first part, review of latest research on different types of terrorism and their determinants is introduced, and the theoretical basis of terrorist rationality is presented. The second section is concentrated on data used in this research: describing used sources, specifying independent and dependent variables and controls and defining central concepts. Terrorist activity trends in 2002 - 2015 are represented in this section either. The third section outlines and discusses the main results.

Theoretical foundations & Evidence

Defining terrorism

The term «terrorism» is basically used by media, governments, and scholars to designate crucially different phenomena. This fact highlights that commonly accepted definition of terrorism does not exist.

Some scholars put their attention to different kinds of definitions. Research undertaken by Alex Schmid on definition of terrorism and difficulties that researchers and practitioners face while working with it is one of the strongest works in this field. Schmid provides four major reasons to explain why it is usually so formidable to define terrorism: 1) terrorism is «an essentially contested concept» that means contradiction between criteria of terrorism proposed in different spheres (politics, law, social science); 2) definition of terrorism is strongly connected with term of crime and legitimacy; 3) there are plenty of very different types of terrorist acts²; 4) the term exists for more than 200 years, and it experienced many modifications over time. Nevertheless, Schmid prosecuted attempts to identify terrorism and in 1980-s he undertaken a new research in company with Alex Jongman (Jongman & Schmid, 1984; Jongman & Schmid, 1988) and in 2011 he presented a list of 12 core components of terrorist action (Schmid, 2011). Assuming all mentioned it seems reasonable to highlight one more problem proposed by Ariel Merari (Merari, 2010) — «negative emotional connotation» of terrorism than influences both defining this phenomena and implementation policies to reduce it. Hence, it is crucially important to use technical approach to define and work with terrorism.

² Europol differentiate five types of terrorism according to ideology: religiously inspired, ethno-nationalist and separatist, left-wing and anarchist, right-wing, single-issue.

In this research, it is assumed that one of the most important aspects of defining terrorism is identification whether an action employed to produce fear and to influence non-direct victims. Moreover, suicide bombing is an exceedingly fearsome type of terrorism defined as «case where there is evidence that the perpetrator did not intend to escape from the attack alive.»³

Suicide bombing

The number of suicide bombings has been growing exponentially over the last twenty years, but the share of suicide acts among all terrorist attacks has been stable over the period, despite of dramatic increase in terrorism all over the world. Suicide terrorism is the most deadly type of terrorism: share of people killed by suicide bombings varies from 14% to 38% percent over 2002-2015, while the share of suicide acts among all terrorist acts varies from 3% to 8%. Furthermore, suicide terrorism is the most accurate and cheap tactic leading to more destructions than any other type of terrorism. Hence, it is reasonable to highlight that suicide bombing is the most dangerous tactic employed by terrorist organizations according to both victims among civilians and property destructions. Taking into account all mentioned it might be assumed that identifying factors that increase suicide bombing activity and reducing suicide terrorism level will provide less economic impact of terrorism and better quality of life.

Most scholars emphasize rationality of terrorist organizations and instrumental nature of suicide terrorism (Hafez, 2006) based on evidence that they employ suicide, not as a last resort, but just as an effective, relatively cheap and very accurate tactic⁴ (Lewis, 2012; Merari, Diamant, Bibi, Broshi, & Zakin, 2010).

³ Global Terrorism Database, 2016

⁴ «From the perspective of terrorist organizations, the rationality of using suicide bombers should seem basically no more problematic than the rationality of using any other weapon» (Kacou)

Furthermore, it was observed (Merari, Diamant, Bibi, Broshi, & Zakin, 2010; Pape, 2005), that larger, stronger and better-organized groups are more likely to adopt suicide bombing, such groups are definitely not significantly affected by emotions.

It seems a conventional wisdom among ordinary citizens that terrorism and especially suicide bombing are mostly a product of Islamist groups, nevertheless researchers agree that «Islam is not the factor that explains suicide terrorism and treating it as such is misleading» (Pedahzur, 2005; Spataro, 2008; Fish, Jensenius & Michel, 2010; Underwood, 2013).

Arguments on terrorism and rationality

Despite abuse of doubts in rationality of terrorist groups, it is often said that persons who decide to become suicide terrorists are crazy (Merari, 2010). Being «crazy» here could be understood as representing irrational behavior. Doubts in suicide terrorist's rationality are mainly based on religion. In this paper, I assume that all terrorists are rational actors.

For purposes of this research, minimal rationality assumption is that «people have goals and attempt to realize those goals through their actions» (Morrow, 1994), which means that decision are logically consistent with interests of perpetrator. Wider rationality definition requires stable, coherently ordered interests of suicide bombers, «which they seek to satisfy by logically ordering their choices accordingly whenever possible given their environments» (Kacou, 2013). Nevertheless, all mentioned criteria do not exclude the possibility of making errors, but according to rationality assumption amount of that errors tend to decrease over time.

It was argued that only expenses exist for those individuals who sacrifice their lives because they are not able to enjoy any of benefits of attack if they are not alive anymore (Hafez, 2006; Mearsheimer, 2001). Hence, suicide can be identified as irrational action in case when personal benefits that may be achieved in the future exceed benefits achieved before death and by death. This conclusion suits neorealist theory normally assuming that the main interest of any rational actor is his own survival. However, putting these controversies aside, the argument of terrorist's irrationality may be taken as groundless because it seems perfectly reasonable that terrorists might obtain their maximum possible reward in the preparation and performance of their act (Kacou, 2013). In fact, the joy that suicide bombers are reported to feel before the attack could be so intense that it beats out all feasible benefits that perpetrator could expect to obtain (Glucklich, 2009; Merari, 2010). It was reasonably noticed that actors might achieve «goals that they value more highly than survival» (Waltz, 1979). All arguments put forward against rationality of suicide bombers could be considered as weak, if it is assumed that they can rationally expect their act to lead them to an afterlife in paradise: «the vast majority of researchers have gone to great lengths to stress that suicide terrorists are not irrational» (Moghadam, 2006).

Psychological profile of suicide bomber

Based on interviews with families and closest friends of suicide bombers it was concluded that perpetrators displayed «ordinary» psychological profile and do not perform suicidal tendencies or mental illness (Brymm & Araj, 2012). However, it was also observed, that would-be martyrs normally present significantly lower than normal level of «ego strength» (Merari, 2010). Considering all mentioned results, it is critically important to stress difference existing between rationality and strength of character: lower strength of character should not be associated with lower rationality according to the

common definition of rationality. Would-be suicide terrorists mostly have medium and higher social and economic status (Horowitz, 2015), they are intelligent and tend to be active because suicide missions are complicated and deserve higher level of initiative and intelligence. Also, it seems a common practice to associate suicide terrorism with religious fanaticism, but at the moment scholars tend to agree that being a religious fanatic «is neither a necessary, nor a sufficient condition for suicide terrorism» (Merari, 2010). Moreover, suicide terrorists usually have higher levels of education: 2.2 percent of Palestinian suicide bombers have partial elementary education or no education at all comparing to 28.5 percent in general, 5.6 percent for elementary education versus 26.1 percent in general, 46.7 percent for partial university education among suicide bomber versus 17.6 percent in general, 6.7 percent for suicide bombers with university degree versus 4.9 percent for population of Palestine population general (Merari, 2010).

Conventional wisdom in research on terrorism is that almost 90% of all terrorist attacks take place under the condition of violent conflicts or political terror⁵ (brutal human rights violation such as disappearances, extrajudicial killings). Nevertheless, amount of terrorist acts differs in countries engaged in the same types of conflicts. Hence, it seems reasonable to examine, what else may be associated with terrorism.

Human rights violation and terrorism

Does policy of respect for human rights have a reductive effect on suicide bombing? Existing research on this field may be divided into two major bodies. The first one mostly concludes that democracies experience more terrorism than autocracies (Charters, 1994; Chalk, 1998; Gurr, 2003; Walsh, 2013; Conrad, & Walsh, 2014). The rights that are essential for democracies provide with larger

⁵ GTD Report, 2016

spectrum of freedoms both civilians and terrorists, help terrorist organizations to promote their views and recruit members. Moreover, according to latest articles, newly established democracies are more likely to experience terrorism than old democracies or autocracies do (Cortright, Greenberg, & Stone, 2016).

The second line of understanding holds the idea of an inverse relationship between terrorist activity and human rights. A considerable amount of valuable work has been done to link together the policy of restricting rights and reducing terrorist activity policies (Bell, Clay, Murdie, & Piazza, 2014; Norris, Kern, & Just, 2013). States that do not implement any limitations to human rights (especially freedom of assembly and of the press) become unable to monitor terrorist activity and catch terrorist perpetrators or their sympathizers. Broad freedoms help terrorists to publicize their grievances.

An alternative line of understanding holds that respect for human rights reduces threat of terrorist activity: permitting such liberties as freedom of association and expression reduces terrorism. (Walsh, 2013). States that respect human rights are winning by support of the population. Scholars investigated the relationship between human physical integrity rights protection and terrorism and found evidence that different types of physical human rights violations have different effects on terrorism (Piazza and Walsh, 2010). It was observed, that there is no statistically significant connection between tortures and terrorism. Nevertheless, such predictors as political imprisonment, disappearances, extrajudicial killings have significant and negative effect on level of terrorist activity. For example, «states that improve protection against extrajudicial killings yields the most dramatic reduction in terrorist attacks» (Conrad, & Walsh, 2014). While the debate over institutional determinants of suicide terrorism seems to gain popularity it has not had much impact on controversial nature of terrorist activity under different conditions. Since democracies provide

at least minimal guarantees of freedom of expression across the board, it is plausible to suggest that there may be other reasons besides voice and accountability for the existence of terrorism under democracies.

This research contributes to the second line of thinking. Considering the fact that democracies are less prone to suffer from terrorism, it should not be ignored that such countries as the United Arab Emirates and Afghanistan, Saudi Arabia and Pakistan are autocracies, but first ones practically never meet with terrorism, and the latter are one of the most highly terrorized countries in the world. According to this point, it is highly important to identify other possible factors of terrorist activity growth. Moreover, despite empirical research identifying determinants of terrorism in common, it is not yet clear under what conditions countries are prone to suffer from suicide bombing and whether there is the difference between determinants of suicide and non-suicide terrorism.

This article is based on the assumption that freedom of speech and ability to participate in selecting government have reductive effect on suicide bombing as most dissonant type of terrorism: in contrast, when majority is not able to be heard by officials and cannot change anything in work of institutions, people tend to use terrorism to obtain their goals. This being said, the reasons for terrorism and their remedies can be different across different regime types. The aim of this research is to explore the determinants of such type of terrorist activity as suicide bombing under different institutional conditions to see if there are differences in reasons for non-suicide and suicide terrorism.

Hypotheses & Data

In previous research on association between voice and accountability and terrorism I identified, that *ceteris paribus*, voice and accountability has significant reductive effect on terrorist activity: one point increase in voice and accountability (scaled from -2.5 to 2.5) is associated with approximately one point decrease in terrorist activity level measured as GTI scaled from 0 to 10.

These findings support the line of thinking that connects terrorist activity growth with human rights violations: extra-judicial deaths, torture and imprisonment without trial (physical integrity rights violations) and political rights violations such as restricting freedom of media, speech, right to select officials and to run for office. Taking into account all mentioned, it seems reasonable to test if such association exists between voice and accountability and suicide bombing. This research is a logical continuation of scholarly works assuming and testing associations and connections between human rights violations and terrorism. Restrictions on freedom of speech and inability of citizens to be heard by their representatives are examples of voice and accountability violation. Hence, hypotheses of this research are the following:

Hypothesis 1

Increasing voice and accountability has significant reductive effect on suicide bombing.

Proceeding from the fact that decreasing level of voice and accountability is associated with increasing level of terrorist activity, it may be reasonably suggested that rights violations could lead mostly to increase in suicide bombing terrorist activity.

Suicide attacks usually need at least two sides to be realized: bomber to make suicide and terrorist organization providing him with all needed. Hence, it is required to be explained why both future bombers and terrorist organizations are prone to produce more attacks under the condition of low level of voice and accountability.

Personal motivation is based on psychological aspect of human being. Experiencing any difficulties or facing crucially inappropriate conditions of life people tend to express their mind through social media and networks or through appointments with their representatives. Hence, if a citizen's access to media, networks and decision makers is restricted and he finds himself in unresolvable situation (highly dangerous for lives of his family and friends), he deserves government's attention, participation, and help, but obtains nothing. Under such conditions expense of personal life becomes significantly lower and thirst for revenge is growing. Hence, it is assumed that being under specific life conditions with no ability to change the situation through media, networks, and representatives people tend to become suicide bombers. Since theoretical motivation of suicide bombers is identified, it is important to highlight the motivation of terrorist organizations to employ suicide bombings. They employ suicide not as a last resort, but just as an effective, relatively cheap and very accurate tactic (Lewis, 2012; Merari, Diamant, Bibi, Broshi, & Zakin, 2010).

Nevertheless, I have not found out any reasons for organizations to increase share of suicide bombings under lack of voice and accountability conditions⁶. Hence, increase in share of suicide bombing attacks may be associated with increase in number of volunteers to become a suicide bomber. Assuming all mentioned above, the second hypothesis of this work is the following:

⁶ Future research may be concentrated on identifying conditions that may influence share of suicide bombings employed by terrorist organizations.

Hypothesis 2

The effect of voice and accountability on suicide bombing is more profound than its effect on other types of terrorist attacks in general.

Data

Time Series Cross-Section data including 175 countries for 13 years period (2002-2015) was used in this research. The database represents integrated data⁷ from Quality of Governance Indicators Database (QOG) and Global Terrorism Database (GTD). GTD is a unique dataset including acts of both international and domestic terrorism, that point is extremely important for testing the hypotheses of this research.

Dependent variables

Using data from Global Terrorism Database (GTD)⁸ the following dependent variables were programmed:

- 1) number of attacks for each country by year;
- 2) suicide attack;
- 3) successful attack.

Incident should not violate GTD criteria to be included in the database as terrorist attack: 1) «the nature of incident must be intentional and perpetrated by rational choice decision»; 2) «the incident must include violence or threat of violence»; 3) «the perpetrator is not a state» (acts of state terrorism are not represented in GTD). Moreover, at least two of the following criteria must be presented either: 1) «the goals of attack is associated with change in social,

⁷ Programmed in Excel using GTD

⁸ GTD includes information for 163 countries, covering 99.7 per cent of the world's population

economic, political or religious policy»; 2) «attack is a message to a broader audience than actual victims»; 3) «attack is outside the parameters permitted by international humanitarian law».

GTD provides researchers with plenty of information about most of terrorist attacks taking place all over the world. One of the key aspects of analyzing terrorism is identifying what type of terrorism is represented. GTD divides all attacks into eight types: assassination, kidnapping, barricade incident, bombing/explosion, armed assault, unarmed assault, facility/infrastructure attack. Any of the types mentioned may be identified as suicide bombing. Suicide bombing is defined as «case where there is evidence that the perpetrator did not intend to escape from the attack alive.»

The success or failure of attack is not a question of large damage: terrorist attack is coded as successful if it actually took place. A bomb exploded in a building would be identified as a successful attack just if the bomb was exploded, not taking into account measure of made damage. Hence, in defining success of each attack, the type of incident is considered.

Independent variable and controls

Variable from Quality of Governance Indicators (QOG) project by World Bank used in this research as independent variables is voice and accountability index. This measure is scaled from -2.5 to 2.5, where higher scores represent more voice and accountability. For this variable observations are distributed approximately normally with small deviation in direction of less voice and accountability: the mean and the median differ by no more than 0.3 points, nevertheless values of highest cores (1.7-1.8) are significantly lower than values of lowest scores (about -2.2). the highest level of voice and accountability was observed in the following countries: North Korea, Turkmenistan, Eritrea,

Uzbekistan, Libya. Denmark, Norway, Sweden, Canada, New Zealand, Iceland were identified as countries with highest freedom of speech and participation.

The following variables are taken as controlling factors:

1) *Level of democratization* measured by imputed Polity score in 0-10 scale.

Observations with minimum of 0 and maximum of 10 points are represented in the database: highest level of democratization (10 points) was observed in Denmark, Norway, Germany, Switzerland, Netherlands, lowest scores (0 points) — in Saudi Arabia, North Korea, Turkmenistan, Uzbekistan. Over a half of all observations has higher Polity scores than 7.58, one tenth of observations are identified as full democracies with a score of 10. Amount of full democracies appeared in the database greatly exceeds amount of full autocracies (10% vs. 1%) and the median of 7.58 outreaches the mean of 6.64;

2) *Interaction between imputed Polity and voice and accountability.*

The purpose to include the interaction between democratization and voice and accountability is associated with previously obtained results: it was observed that level of democratization might influence the connection between voice and accountability and terrorist activity level. For GTI as a dependent variable, the effect of voice and accountability at the level of terrorist activity fades and may be changed by factor of political stability with increase in level of democratization. Hence, it is significant to control for this potential factor while running models for number of terrorist attacks.

3) *Level of economic development* measured by GDP per capita.

Economic development is commonly accepted predictor of terrorist activity level among scholars (Efraim Benmelech, Claude Berrebi & Esteban F. Klor, 2012; Abadie, 2006; Krueger & Malechova, 2003; Piazza, 2006), most of the studies including the latest ones show that there is no strong significant association between economic development and terrorism (Alesina, 1996; Kahn & Weiner, 2002; Collier & Hoeffler, 2004; Choi, 2014). Nevertheless, some scholars deny any association or causal mechanism between poverty and terrorism (Krueger & Laitin, 2003; Piazza, 2004). In this research, I use level GDP per capita as a controlling factor to fix level of economic development.

4) *Land area* of a country in sq. km;

It was observed in previous studies that works by James Piazza, where he identifies that *ceteris paribus*, larger countries experience less terrorism than smaller ones do (Piazza, 2004).

5) *Population* of country

Assuming that share of potential suicide bombers is constant over countries, it appears to be statistically logical that there are more potential terrorists in bigger countries. Hence, controlling for populations seems reasonable.

6) *Urban population share*

Urban population share «refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population

estimates and urban ratios from the United Nations World Urbanization Prospects»⁹;

7) *Trade* measured as «sum of exports and imports of goods and services as a share of gross domestic product»;

8) *Ethnolinguistic fractionalization*

Ethnolinguistic fractionalization is measured as probability that «two randomly selected people from a given country will not belong to the same ethnolinguistic group,»¹⁰ hence ranges from 0 to 1, where higher value represents higher level of fractionalization. The most fractionalized countries (with scores about 0.93) are Cameroon, Nepal, Chad, Laos, UAE, etc., the least (with scores less than 0.15) — Israel, Papua New Guinea, Guinea-Bissau, Panama, Netherlands. Most of the sample represents comparatively low level fractionalisation: a half of observations has scores less than 0.33, 1% — more than 0.89.

Table 1: Summary statistics for independent variable and controls.

Variable	Number of observations	Mean	Deviation	Min	Max
Polity	1492	6,64	3,08	0,00	10
Voice and accountability	1593	-0,07	0,99	-2,28	1,82
GDP per capita	1557	14291	32961	1	86608
Land area	1592	665594	1542311	320	9327490
Population	1593	4,19e+07	1,49e+08	1,53	1,35e+09
Urban population share	1593	19600	29958	8,69	98242
Trade	1530	405	5685	21	121697
Fractionalization	1433	0,39	0,28	0,01	0,93

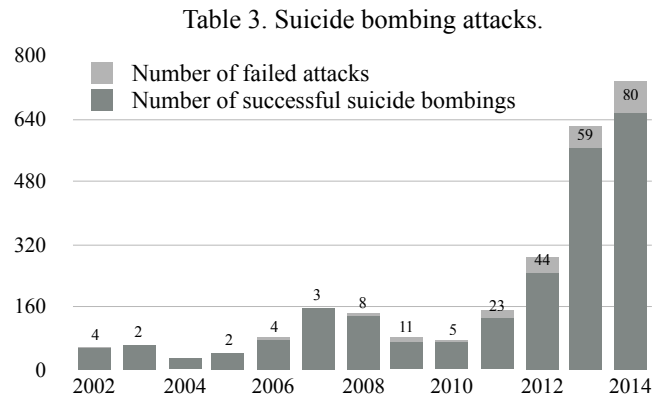
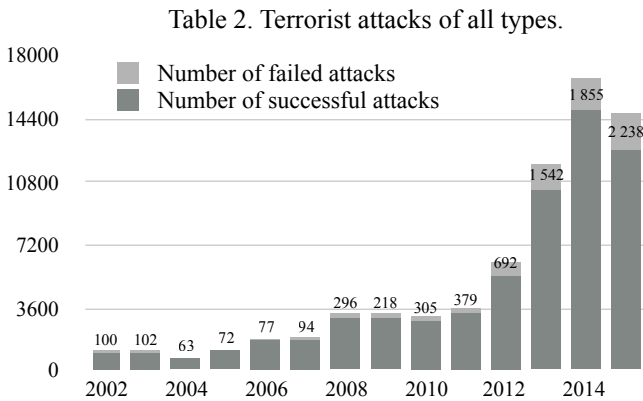
⁹ QOG Codebook, 2015

¹⁰ QOG Codebook, 2015

Terrorist activity trends in 2002-2015

Main statistic trends in terrorist activity and suicide bombing implementation in 2002-2015 are the following:

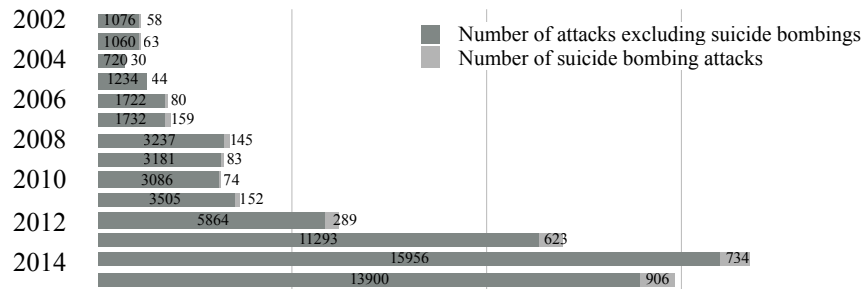
1. *Dramatic increase in amount of terrorist attacks over the period.* In 2002 only 1134 attacks were identified as acts of terrorism, in 2015 this figure increased more than 13 times to 14.806 attacks per year;



2. *In 2015 attacks are less successful, but more deadly than they were in previous years.* Nine out of hundred attacks were failed in 2002. Share of successes were increasing from 2002 to 2007 (from 91% to 95% of successful attacks), but started to decline in 2008 and in 2015 only 85% of attacks were not failed. Number of people killed in terrorist attacks 8 times increased over past 14 years: 2014 was the most deadly year — 43.550 people were killed comparing to 22.226 deaths in 2013 and 4.799 deaths in 2002;

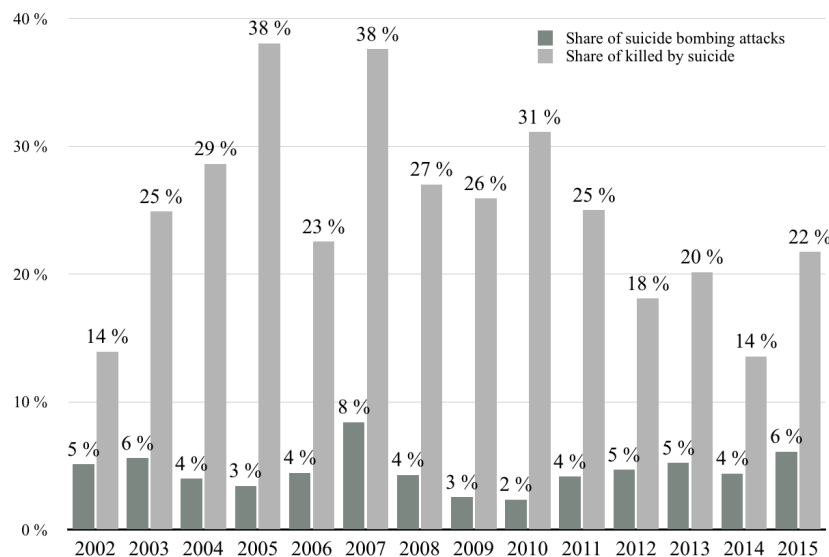
3. *Share of suicide bombings among all terrorist attacks were slightly varying around 5% over the period. In 2007 increase in share of suicide bombings by 3% took place, but in 2015 in decreased again to 6%;*

Table 4. Number of suicide bombing attacks by year.



4. *Suicide bombing is more successful than other typer of terrorist attacks. Seven out of hundred suicide bombing attacks were failed in 2002. In 2003-2007 share of successes was not less than 95%, but started to decrease after that period;*
5. *Suicide terrorist acts are more deadly than other types of attacks. Share of people killed by suicide bombings varies from 14% to 38% cent over observed period, while share of suicide acts among all terrorist acts varies from 3% to 8%.*

Table 5. Share of suicide bombing attacks and share of killed by suicide terrorism



Common terrorist acts statistics is shown on Table 6.

Table 6: Terrorist acts statistics.

	Number of acts	Share of successes	Number of suicides	Share of suicides	Success in suicide	Share of suicide successes	Number of killed	Share of killed by suicide
2002	1 134	91 %	58	5 %	54	93 %	4 799	14 %
2003	1 123	91 %	63	6 %	61	97 %	3 271	25 %
2004	750	92 %	30	4 %	30	100 %	5 713	29 %
2005	1 278	94 %	44	3 %	42	95 %	6 311	38 %
2006	1 802	96 %	80	4 %	76	95 %	9 363	23 %
2007	1 891	95 %	159	8 %	156	98 %	12 836	38 %
2008	3 382	91 %	145	4 %	137	94 %	9 093	27 %
2009	3 264	93 %	83	3 %	72	87 %	9 271	26 %
2010	3 160	90 %	74	2 %	69	93 %	7 720	31 %
2011	3 657	90 %	152	4 %	129	85 %	8 198	25 %
2012	6 153	89 %	289	5 %	245	85 %	15 432	18 %
2013	11 916	87 %	623	5 %	564	91 %	22 226	20 %
2014	16 690	89 %	734	4 %	654	89 %	43 550	14 %
2015	14 806	85 %	906	6 %	N/A	N/A	38 422	22 %

Results

Regression analysis with fixed effects (FE) was used to estimate value of suicide bombing under different institutional conditions controlling for other potentially influential factors. The central reason of using such type of model is that a unique sample is used in this research and there is no need in extrapolating results (conditional inference). The aim of this work is not to predict some future values of terrorism under conditions but to describe the situation that took place in the world over the period from 2002 to 2015. Unbiased and efficient estimators will be obtained by using OLS regression, if null hypothesis of Durbin-Wu-Hausman test is not rejected.

In previous research on association between voice and accountability it was identified, that *ceteris paribus*, voice and accountability has significant reductive effect (at 1 percent significance level) on terrorist activity: one point increase in voice and accountability scale is associated with approximately one point decrease in terrorist activity. Estimation results for GTI as a dependent variable are presented in Table 7.

Table 7: GTI as Dependent Variable

Variable	Coefficient	(Std. Err.)
Voice and Accountability	-0.932**	(0.226)
Political Stability	-0.001	(0.001)
Polity	-0.009	(0.064)
GDP per capita (ppp)	0.000	(0.000)
Population	0.000**	(0.000)
Urban population share	0.000	(0.000)
Trade	0.000	(0.000)
Ethnic fractionalization	-0.249	(0.284)
Intercept	8.758	(6.128)
Number of observations		1152
R ²		0.037
F _(130,1021)		4.34
Significance levels : † : 10% * : 5% ** : 1%		

In previous research the estimation was conducted by using *Global Terrorism Index* as an estimation of terrorist activity level as dependent variable. Value of terrorist activity level used in this research is estimated as *a number of terrorist acts* of different types (attacks excluding suicide bombing acts for Model 1 and suicide bombing attacks for Model 2). According to results of implemented Durbin-Wu-Hausman test, unbiased and efficient estimators are obtained by using FE-regression models. All needed pre-estimation were realized: model is tested for heteroscedasticity with visualizations and formal tests (Breusch-Pagan and White's tests).

Model 1 — non-suicide bombing acts

$$y = \beta_0 + (\beta_1 \times \text{Voice and Accountability}) + (\beta_2 \times \text{Polity}) + (\beta_3 \times \text{Polity} \times \text{Voice and Accountability}) + (\beta_4 \times \text{GDP}) + (\beta_5 \times \text{Land Area}) + (\beta_6 \times \text{Population}) + (\beta_7 \times \text{Urban Population Share}) + (\beta_8 \times \text{Trade}) + (\beta_9 \times \text{Fractionalization}),$$

where «y» is the number of attacks excluding suicide bombings.

Table 8 presents estimation results for total number of attacks excluding suicide bombings as a dependent variable. The results support the hypothesis about

Table 8: Estimation results for total number of attacks excluding suicide bombing

Variable	Coefficient	(Std. Err.)
Voice and Accountability	-143.580**	(22.414)
Interaction Polity*Voice and Accountability	-28.418**	(2.886)
Polity Score	-16.579**	(4.512)
GDP per capita	0.000	(0.000)
Population	0.000**	(0.000)
Urban Population Share	0.000	(0.000)
Trade	0.000	(0.000)
Fractionalization	5.051	(13.345)
Intercept	88541.292**	(6767.759)
N		834
R ²		0.489
F (120,713)		75.817

Significance levels : † : 10% * : 5% ** : 1%

significant reductive effect of voice and accountability on terrorism tested in previous research. According to the results showed in Table 8, *ceteris paribus*, one point increase in voice and accountability is associated with 143,5 non-suicide attacks by year decrease.

Hence, voice and accountability has significant reductive effect on non-suicide bombing growth. Interaction variable between level of democratization and voice and accountability is also significant. One point increase in democratization level, keeping constant level of accountability, is associated with a decrease of 28 acts in a country by year. Democratization variable itself appears to have significant reductive effect on number of terrorist attacks: one point increase in Polity, *ceteris paribus*, is associated with approximately 17 attacks by year decrease for country. Population and land area controls are identified as statistically significant. According to obtained estimations, larger countries experience less terrorism. These findings support results obtained in many works by James Piazza, where he identifies that *ceteris paribus*, larger countries experience less terrorism, than smaller ones do.

Model 2 — suicide bombings

$$y = \beta_0 + (\beta_1 \times \text{Voice and Accountability}) + (\beta_2 \times \text{Polity}) + (\beta_3 \times \text{Polity} \times \text{Voice and Accountability}) + (\beta_4 \times \text{GDP}) + (\beta_5 \times \text{Land Area}) + (\beta_6 \times \text{Population}) + (\beta_7 \times \text{Urban Population Share}) + (\beta_8 \times \text{Trade}) + (\beta_9 \times \text{Fractionalization}),$$

where «y» is the number of suicide bombing attacks.

FE estimation results for suicide bombing rate are shown in Table 9. According to the significance level and the direction of connection between voice and accountability and suicide bombing rate it is reasonable not to reject Hypothesis 1. Keeping all other predictors constant, one point increase in voice and accountability is associated with 12 suicide bombing attacks by year decrease.

Table 9: Estimation results for suicide bombings

Variable	Coefficient	(Std. Err.)
Voice and Accountability	-11.729**	(1.691)
Interaction Polity*Voice and Accountability	-1.490**	(0.218)
Polity Score	-0.459	(0.340)
GDP per capita	0.000	(0.000)
Population	0.000	(0.000)
Urban Population Share	0.000	(0.000)
Trade	0.000	(0.000)
Fractionalization	0.190	(1.007)
Intercept	3249.478**	(510.721)
<hr/>		
N		766
R ²		0.166
F (120,713)		15.814
<hr/>		
Significance levels : † : 10% * : 5% ** : 1%		

Coefficient of interaction between democratization and voice and accountability showed significant reductive effect of number of suicide bombing acts (direction is the same as it was in Model 1, but absolute value is less): one point increase in democratization level, keeping constant level of accountability, is associated with approximately 1.5 acts decrease in county by year. And vice versa — one point increase in voice and accountability, keeping constant level of democratization and all other factors, is associated with approximately 1.5 acts decrease in county by year. Land area controls are identified as statistically significant.

To test Hypothesis 2 there was calculated a share of terrorist attacks increase associated with one point voice and accountability increase (according to estimates obtained in Models 1 and 2) in all amount of terrorist attacks all over the world by each year — for suicide bombings and non-suicide bombing attacks separately. It was observed, that the effect of voice and accountability on suicide bombing is more profound than the effect on other types of terrorist attacks in general.

Table 9 introduces calculated shares of change in amount of attacks for country per year associated with change in level of voice and accountability. It is showed, that for any observed year the share of change for suicide attacks exceeds the share for non-suicide terrorist attacks (excluding 2007). The shares for non-suicides and suicides are becoming smaller through observed period by reason of dramatic increase in total number of terrorist attacks by year and constant change in number of attacks associated with one point decrease in voice and accountability obtained in regression analysis.

Table 9: Calculated share of change in attacks associated with change in voice

Year	Attacks total	Suicide bombings	Acts excluding suicides	Share for non-suicides	Share for suicides
2002	1134	58	1 076	13,4 %	20,7 %
2003	1123	63	1 060	13,6 %	19,0 %
2004	750	30	720	20,0 %	40,0 %
2005	1278	44	1 234	11,7 %	27,3 %
2006	1802	80	1 722	8,4 %	15,0 %
2007	1891	159	1 732	8,3 %	7,5 %
2008	3382	145	3 237	4,4 %	8,3 %
2009	3264	83	3 181	4,5 %	14,5 %
2010	3160	74	3 086	4,7 %	16,2 %
2011	3657	152	3 505	4,1 %	7,9 %
2012	6153	289	5 864	2,5 %	4,2 %
2013	11916	623	11 293	1,3 %	1,9 %
2014	16690	734	15 956	0,9 %	1,6 %
2015	14806	906	13 900	1,0 %	1,3 %

Conclusion

The implemented research is based on theoretical foundation about rationality of terrorist groups and terrorists (including suicide bombers) and previous research showing association between human rights violations and terrorist activity. The evidence presented in this paper provides support for tested Hypothesis 1 that increase in Voice and Accountability is significantly associated with decrease in number of suicide bombing attacks and Hypothesis 2 that influence of Voice and Accountability on suicide type of terrorism is larger than influence on other types of terrorist activity. The obtained results are robust and controlled by social, economical and political factors to shift the difference in conditions.

The theory and findings of this work differ from existing scholarly research in the field of terrorism. Numerous attempts in this sphere have been made to link together terrorist activity rate and institutional factors such as respect for different kinds of human rights and civil freedoms. This paper is an attempt to discover an unexplored relationship between voice and accountability and suicide bombing as a specific type of terrorism and to compare it to previously obtained results in this field.

Future researchers may continue examining difference among factors that determine different types of terrorism. Suicide bombing was the only type of terrorist activity observed in this paper, nevertheless it would be exceedingly important to research different types as assassination, hijacking, kidnapping and others. Moreover, future researchers may concentrate on testing the results obtained in this research and try to controvert provided evidence and theoretical assumptions.

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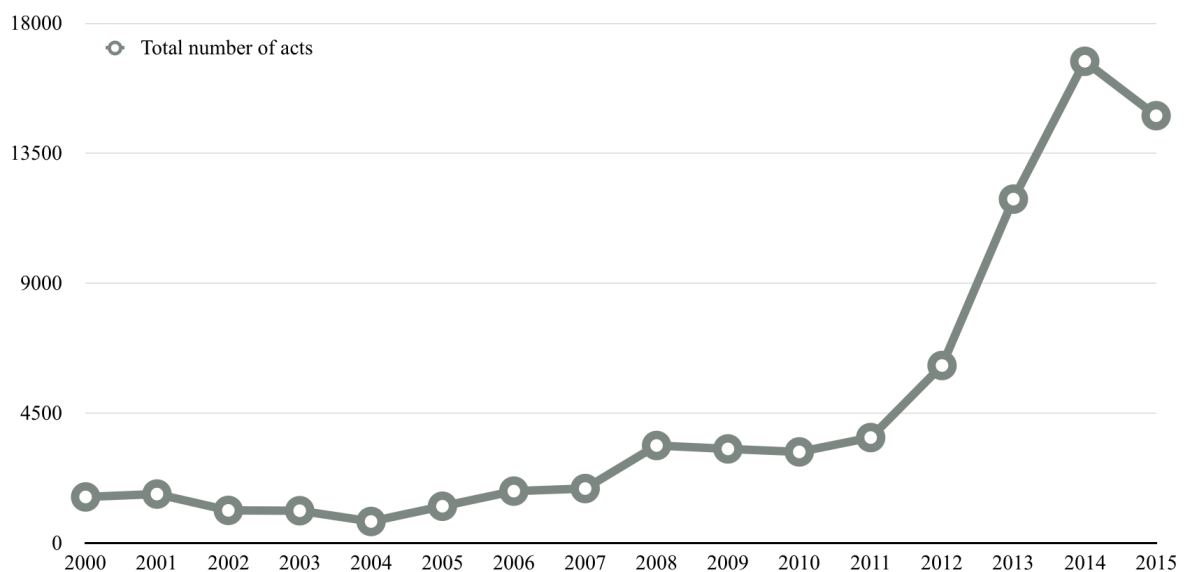
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Appendix A

In Appendix A one could find terrorist attacks statistics per year from 2002 to 2015: total number of attacks, number of suicide bombing attacks, share of suicide bombings among all attacks, number of successfully realized suicide bombings, share of successful attacks among suicide bombings, total number of people killed, number of people killed by suicide bombing and non-suicide attacks, share of people killed in suicide bombings. Also, numbers of deadly victims of each type of terror for observed period (2002-2015) are presented.

Number of killed by type of attack

Type of attack	Number of killed
Assassination	11 916
Kidnapping	15 456
Barricade incident	2 024
Bombing/Explosion	110 267
Armed Assault	92 875
Facility/Infrastructure Attack	2 071
Unarmed Assault	670
Hijacking	3 231



Terrorist acts statistics

	Total number of acts	Number of successes	Delta	Share of successes	Number of suicides	Share of non-suicide bombings	Share of suicide bombings attacks	Success in suicide	Delta	Share of suicide successes	Delta total - suicide	Killed	Killed by suicide	Killed by not suicide	Share of killed by suicide
2002	1134	1034	100	91 %	58	95 %	5 %	54	4	93 %	1076	4799	669	4130	14 %
2003	1123	1021	102	91 %	63	94 %	6 %	61	2	97 %	1060	3271	815	2456	25 %
2004	750	687	63	92 %	30	96 %	4 %	30	0	100 %	720	5713	1636	4077	29 %
2005	1278	1206	72	94 %	44	97 %	3 %	42	2	95 %	1234	6311	2402	3909	38 %
2006	1802	1725	77	96 %	80	96 %	4 %	76	4	95 %	1722	9363	2111	7252	23 %
2007	1891	1797	94	95 %	159	92 %	8 %	156	3	98 %	1732	12836	4830	8006	38 %
2008	3382	3086	296	91 %	145	96 %	4 %	137	8	94 %	3237	9093	2457	6636	27 %
2009	3264	3046	218	93 %	83	97 %	3 %	72	11	87 %	3181	9271	2404	6867	26 %
2010	3160	2855	305	90 %	74	98 %	2 %	69	5	93 %	3086	7720	2403	5317	31 %
2011	3657	3278	379	90 %	152	96 %	4 %	129	23	85 %	3505	8198	2051	6147	25 %
2012	6153	5461	692	89 %	289	95 %	5 %	245	44	85 %	5864	15432	2792	12640	18 %
2013	11916	10374	1 542	87 %	623	95 %	5 %	564	59	91 %	11293	22226	4480	17746	20 %
2014	16690	14835	1 855	89 %	734	96 %	4 %	654	80	89 %	15956	43550	5908	37642	14 %
2015	14806	12568	2 238	85 %	906	94 %	6 %	N/A	▲	N/A	13900	38422	8353	30069	22 %

Appendix B

Full list of all observed countries:

Afghanistan	Ghana	Papua New Guinea
Albania	Greece	Paraguay
Algeria	Guatemala	Peru
Angola	Guinea	Philippines
Antigua and Barbuda	Guinea-Bissau	Poland
Argentina	Guyana	Portugal
Armenia	Haiti	Qatar
Australia	Honduras	Republic of the Congo
Austria	Hong Kong	Romania
Azerbaijan	Hungary	Russia
Bahamas	Iceland	Rwanda
Bahrain	India	Saudi Arabia
Bangladesh	Indonesia	Senegal
Barbados	International	Serbia
Belarus	Iran	Serbia-Montenegro
Belgium	Iraq	Sierra Leone
Belize	Ireland	Singapore
Benin	Israel	Slovak Republic
Bhutan	Italy	Slovenia
Bolivia	Ivory Coast	Solomon Islands
Bosnia-Herzegovina	Jamaica	Somalia
Botswana	Japan	South Africa
Brazil	Jordan	South Korea
Brunei	Kazakhstan	Spain
Bulgaria	Kenya	South Sudan
Burkina Faso	Kosovo	Sri Lanka
Burundi	Kuwait	St. Kitts and Nevis
Cambodia	Kyrgyzstan	St. Lucia
Cameroon	Laos	Sudan

Central African Republic	Lebanon	Swaziland
Chad	Lesotho	Sweden
Chile	Liberia	Switzerland
China	Libya	Syria
Colombia	Lithuania	Taiwan
Comoros	Luxembourg	Tajikistan
Costa Rica	Macau	Tanzania
Croatia	Macedonia	Thailand
Cuba	Madagascar	Togo
Cyprus	Malawi	Trinidad and Tobago
Czech Republic	Malaysia	Tunisia
Czechoslovakia	Maldives	Turkey
Democratic Republic of the Congo	Mali	Turkmenistan
Denmark	Malta	Uganda
Djibouti	Martinique	Ukraine
Dominica	Mauritania	United Arab Emirates
Dominican Republic	Mexico	United Kingdom
East Timor	Moldova	United States
Ecuador	Montenegro	Uruguay
Egypt	Morocco	Uzbekistan
El Salvador	Mozambique	Vanuatu
Equatorial Guinea	Myanmar	Venezuela
Eritrea	Namibia	Vietnam
Estonia	Nepal	Wallis and Futuna
Ethiopia	Netherlands	West Bank and Gaza Strip
Fiji	New Caledonia	Western Sahara
Finland	New Zealand	Yemen
France	Nicaragua	Yugoslavia
French Guiana	Niger	Zaire
French Polynesia	Nigeria	Zambia
Gabon	North Korea	Zimbabwe
Gambia	Norway	
Georgia	Pakistan	
Germany	Panama	

Appendix C

In Appendix C one could find box plots for main variables of interest: Global Terrorism Index, Voice and Accountability and Polity (transformed).

