

Economic Risks of Terrorist Attacks and Specific Features of their Assessment

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Abstract — The article studies the features of relatively new risks of a reducing socio-economic sustainability level of a state due to terrorist attacks and discusses approaches to their assessment and prevention. It reveals specific features of these risks connected with an unlimited scope of activities and methods used by terrorists, the non-obviousness of their motives, etc., which predetermine high levels of uncertainty in estimates of probabilities, damages and other consequences of their manifestation. The damage structure has been systematized with identification of direct and indirect losses in various spheres of the national economy and the population of the world community. Unique characteristics of terrorist threat risks distinguishing them from other types of economic risks and predetermining the need to develop specific measures in terms of composition of the measures used and prevention strategies are identified.

Keywords — *terrorist attacks, risks, uncertainty, social and economic consequences, indicators*

I. INTRODUCTION

Terrorism as one of the specific socio-political phenomena has existed since ancient times. However, many scientific papers say that modern terrorism originated in the XIX century in Russia. Actively changing, modernizing the old forms and acquiring new ones, terrorism has travelled a long way throughout history and at the end of the 20th – the beginning of the 21st century became one of the most important global problems, which has also been quite acute in modern Russia.

The globalization process taking place in the world today has had a significant impact on the increase in terrorist activity. If, until the beginning of the 1980s, local terrorism was most prevalent, then later on it moved to the international level. Today, international terrorism is represented by networks of organizational structures that possess modern technologies and means of destruction, their own bases for the training of militants, weapons and ammunition depots, shadow companies, special funds and banks used to finance the operations. At the same time, the main objective of terrorists is to inflict maximum damage to society and the state, by creating an atmosphere of fear and panic among the population, changing political attitudes in society, destabilizing the economy in order to deteriorate the image of institutions, influence governments and international organizations [1]. Moreover, terrorists recruit and mobilize supporters through terrorist attacks, demonstrating their strength and high vulnerability of state

institutions. While being aware of the terrorist threat, states seek to counteract its development by creating conditions that reduce tensions between different social groups of the population, and by making certain efforts to prevent unlawful acts of a terrorist nature. In this activity, the specialists in one way or another proceed from the content of the term “terrorism”.

II. MATERIALS AND METHODS (MODEL)

The methodological foundations and the relevance of the need to counter terrorism in Russia are expressed in Russia’s National Security Strategy adopted by Presidential Decree No. 683 as of December 31, 2015, where in Clause 43 terrorism is qualified as one of the main threats to the state and public security of the country. Antiterrorist activities should largely take into account the existing level of terrorist threat or terrorist risk assessment, which is stipulated in the strategic document defining Russia's antiterrorist strategy – “Concepts of Countering Terrorism in the Russian Federation (approved by the President of the Russian Federation on 05.10.2009)” [2]. According to paragraph 31 of this Concept, such assessments are an integral part of the information and analytical support for the system of terrorism analysis having a structure that includes:

- a) a study of the main factors determining the nature and state of the terrorism threats;
- b) a forecast of probable trends and patterns in the development of terrorism threats, the development of proposals for making management decisions to neutralize them;
- c) analysis of information on manifestations of terrorism, as well as on political, socio-economic and other social processes in Russia, which have a negative impact on antiterrorist measures.

As for countering terrorism, paragraph 39 of the Concept on terrorism suggests concentrating financial and technical resources on the most prioritized areas, creating an up-to-date infrastructure for building an accessible information network, encouragement by government agencies of investments and innovative policies to enhance the anti-terrorism protection of facilities, and more importantly, further developing the system of insurance protection for the population against terrorist risks. At the same time, the

following areas are highlighted as the main areas of countering terrorism:

d) improvement, through the introduction of modern information and communications technologies (ICT), of the information and analytical support for coordinating counter-terrorism activities of federal executive authorities, anti-terrorist commissions of entities and operational headquarters, local governments, civil society institutions, conducting for these purposes case studies of terrorist risks with the help of experts;

e) development of databases and information banks, information networks, hardware and software systems using advanced information technologies and their maintenance;

f) systematic improvement of professional training of analysts in the field of countering terrorism.

The processes of anti-terrorism policy, countering and combating modern terrorism is largely determined by its complex social, political and economic nature. This determines the particular features of the forms and methods of countering terrorist manifestations. In general, terrorism can be called a “new kind of problem” when the stakes are high, and the uncertainty is huge, and special attention should be paid to the danger that terrorism poses to modern society [3]. According to a number of researchers, in order to successfully counter the threat of terrorism, it is necessary to have an idea about the origin of this multidimensional phenomenon, about the mechanism of its origin, occurrence, formation, development and implementation, about the factors that determine terrorism and favor the implementation of terrorist acts.

III. RESULTS AND DISCUSSION

In most Russian and foreign studies, it is believed that terrorist attacks are a very special kind of risk that has some specific features.

Firstly, the scope of terrorist action is in no way limited geographically; any objects can be subjected to an attack or an explosion practically anywhere in the country.

Secondly, the methods by which a terrorist attack can be carried out, and the possible objects of attack are extremely numerous.

Thirdly, the maximum damage from the terrorist attack cannot be accurately predicted.

Fourthly, the terrorist attacks and their consequences are not subject to any distribution law – they can follow one after another with subsequent quiet periods and can also consistently occur once a quarter. And this distribution varies considerably from decade to decade, so that in the long run, statistics turn out to be useless.

Fifthly, the huge losses and the risk of carrying out concerted attacks across all regions of the country reduce the possibility of risk diversification.

In general, risk assessment and risk management in the field of terrorism is characterized by the following circumstances:

1. High level of uncertainty. It is connected with the limited information about the real motives and intentions of

terrorists, about their organizational and technical intellectual resources, about the pursued goals and partially about the system of their values.

2. Fragmented character and secrecy of data. The vast majority of information obtained from various open sources is heterogeneous: expert assessments, official and unofficial statistical information, as well as information obtained from the intelligence agencies [4].

3. Dynamism of terrorist manifestations. It is characterized by the mobility of changes in the nature and extent of terrorist threats. These circumstances require the development of techniques for not only qualitative, but also a quantitative assessment of terrorist risks.

The works devoted to the insurance of terrorist risks to a certain extent systematize the features that distinguish them from other insurance risks (Table I) [5].

TABLE I. MAIN FEATURES OF TERRORIST RISKS

Requirement	Description of terrorist risk features
Frequency	<ul style="list-style-type: none"> - Limited statistical base - Lack of domestic research in modeling terrorist risks - Lack of qualified resources to create comprehensive terrorist risks assessment models
Scale of damage	<ul style="list-style-type: none"> - The size of the estimated losses for the events is hard to predict - Accumulation of risks, devastating losses, threatening the financial stability of insurers - Impossibility to exclude risk coverage from a number of insurance contracts (for specific types) by force of law
Diversification of risk	<ul style="list-style-type: none"> - High geographical concentration of risks including by individual sectors of the economy - Unfavorable distribution of risks (losses) associated with uneven demand for insurance by industry
Random character of risk / probability distribution of damage	<ul style="list-style-type: none"> - High subjectivity in the realization of terrorist risks - Strategies and tactics that terrorists have to prevent the possibility of predicting events - Political reasons for increasing frequency and increasing the scale of terrorist risks

A reasonable assessment of the damage caused by terrorist risks is an important problem in the assessment of those risks. In 2004 Russia saw the adoption of the Interagency Method of Assessment of Damages from Emergency Situations of Technogenic, Natural and Terrorist Nature, As Well As the Classification and Accounting for Emergencies [6]. This methodology is of advisory nature and is the starting point for developing private methods for assessing indicators of the socio-economic consequences of anthropogenic, natural and terrorist emergencies in economic sectors. To some extent, this methodology can be useful in fundamental approaches to the assessment of damages from terrorist attacks.

The following types of damage are identified based on the object exposed to the impact of negative factors:

1) damage to the life and health of specific people (biomedical), which is determined by the specific problems with their health, leading for some of their community (the population of the country, society) to social losses and, as a result, a reduction in the average life expectancy;

2) damage to the socio-economic system (socio-economic), which consists in the loss of a certain type of property, the costs of relocating people, the payment of compensation to victims, loss of profits from non-concluded and terminated contracts, disruption of the normal business process, deterioration of living conditions of people, etc.;

3) damage to the state (social and political);

4) damage to the natural environment (ecological), which means the deterioration of the natural environment or the cost of its restoration, the loss of the national economic value of the territories or the cost of their rehabilitation.

The American researcher on the economics of terrorism P. Krugman says that the economic costs of terrorism can be divided into three categories [7].

1. Direct economic damage caused by terrorist attacks (buildings and infrastructure destroyed, productive life ceased).

2. Budget expenditures on governmental anti-terrorist measures (funds spent on national defense and national security in order to prevent future terrorist attacks).

3. Transaction costs. The cost of people's reactions to fears about terrorism includes expenses such as, for example, the cost of additional waiting time in a queue when passing through the airport security service, or an increase in the cost of ensuring the safety of transported goods.

Apart from the direct victims of terrorist attacks – killed and wounded citizens – terrorism causes economic damage. It is obvious that terrorist attacks can affect both the macroeconomic indicators of the attacked country and the global economy as a whole. The International Monetary Fund estimates that the total direct losses from the terrorist attacks of 9/11 amounted to \$21.4 billion, while P. Navarro and A. Spencer estimated the loss of human capital at \$40 billion, and the loss of property at \$10-13 billion [8]. Terrorist attacks create uncertainty, reduce trust and increase risk perception and, consequently, risk premiums, which leads to lower rates of investment, trade and economic growth.

A. Reducing the efficiency of using budget funds

The indirect effects of terrorist attacks, that is, changes in risk, transaction costs, demand, public finances and growth, may actually outweigh their direct consequences [8]. Moreover, the scale of the consequences of terrorist attacks may depend on such factors as the nature of the attack, the type of counter-terrorism policy and the level of market development of a particular country. Researchers B. Brock, G. Hess and A. Orphanides believe that the reduction in investment caused by terrorist attacks is accompanied by an increase in government spending directed to less socially oriented industries [9]. Moreover, other phenomena that increase the expenditure side of the budget need to be mentioned: the need for compensation, insurance payments, restoration work on damaged facilities, the development and implementation of new security tools, etc.

B. Production

Production efficiency drops as a result of a decrease in activity in other areas of the economy following terrorist attacks. For example, from 1950 to 2004, Israel's defense expenditures increased steadily [10]. During the intifada (2000-2003), the costs of security and defense increased from 9 to 12%, while per capita productivity declined annually by 3%.

According to the calculations of the International Council on Competitiveness, the costs of commercial firms for the introduction of technical means to improve safety have steadily increased. After 2001, approximately 53% of Western companies significantly increased their security costs. In turn, the Congressional Budget Office report said that the cost of providing security in 2002 cost the private sector over \$20 billion (about 0.3% of the country's GDP). At the same time, a constant decrease in the impact of production factors by 0.03% could be observed, due to the diversion of material resources because of the terrorism threat. J. Barth presents the results of a study of the impact of terrorism on economic growth and capital accumulation using annual panel data from 1970 to 2003 [11]. It was identified that terrorist attacks have a significant negative impact on economic growth. In particular, the type of the most part of the attacked targets was of particular importance for the economic situation in the region. Terrorist attacks on private enterprises and small businesses have a devastating effect on growth and capital formation.

C. Changing the behavior of producers and consumers

Terrorism affects aggregate demand and personal savings of the population [12]. According to estimates, in case of an increase in terrorist activity, the level of consumption is reduced by 7%. At the same time, a trend of increasing (more precisely, doubling) savings rate with the complete cessation of terrorist attacks was revealed. In turn, Z. Eckstein and D. Tsiddon, using quarterly data from the Israeli economy from 1950 to 2003, revealed a direct negative impact of terrorism on per capita consumption [10]. In particular, the attacks reduced annual per capita consumption by about 5%. Another manifestation of the loss is the psychological or behavioral effect, which is due to the fact that the attacks can have a significant impact on investor sentiment. It is obvious that the investor's "feeling" of possible losses at a certain point in time is likely to affect his behavior. Behavioral economics says that negative investor sentiment can influence investment decisions, which, in their turn, can affect asset prices and, therefore, the stock market as a whole. In this regard, many studies have argued that terrorist attacks can have a significant impact on the investment climate in capital markets [13].

D. Reducing the level and composition of investments

Military conflicts and widespread terrorist attacks directly affect the amount of investment. An analysis by G. Becker and K. Murphy showed that the decline in investment in the United States due to the continuing terrorism threats in certain periods was approximately 0.2% of GDP [14]. Moreover, terrorism affects not only the level, but also the composition of investments. According to P. Collier, investments in real estate, are seriously affected during political instability. The level of such investments

may significantly decrease as compared to investments in machine tools and equipment if the level of political instability increases [15].

E. Transport

Frequent terrorist attacks on transport can be explained by several reasons: comparative availability and the ability to attract media attention, public response due to the possibility of destroying large numbers of people in one place [16]. It should be especially emphasized that attacks on public transport have a cascade effect on other sectors of the economy. For example, H. Ito and D. Lee concluded in a study that terrorist attacks reduce the income of the transport industry and logistics firms by about 10% [13].

F. Tourism

Researcher T. Roule analyzed the impact of terrorism on various industries and concluded that airlines, travel agencies, hotel business, restaurant business, postal and insurance industries are particularly sensitive to the increased risks of terrorism [17]. Moreover, the economic regions in which these industries are concentrated are most likely to suffer the most from a reduction in production and employment. This conclusion was also supported by assessments given in a number of articles that examined the relationship between terrorism and the tourism industry [18]. These works show that in countries such as Spain, Greece, Austria, Turkey and Israel, terrorism has a significant negative impact on the tourism industry. In this situation, it is highly likely that for the economy and the tourism industry of the Russian republics of the North Caucasus, incessant terrorist activity is a serious risk factor.

G. Trade

Terrorist attacks can also affect national and international trade. Frequent terrorist attacks increase trade costs ranging from 0.5% to 4% of the cost of goods offered [19]. A research by G. Karolyi and R. Martell also studied the impact of 75 terrorist attacks in the United States that happened throughout the eight years and targeted specifically trading firms [20]. Using event analysis, the authors found a statistically significant negative reaction in stock prices – 0.83%, which is equivalent to an average loss of \$401 million per company for each attack. These attacks had different consequences depending on the country. A much greater negative reaction was found in rich and democratic countries. The authors also found that the loss of human capital, such as the abduction of company executives, is associated with a greater negative impact on the stock price than the loss of material resources.

H. Financial system

A negative, albeit brief, impact of terrorism on financial markets has been identified [12]. For example, R. Eldor and R. Melnick say that there is no evidence that the market eventually becomes insensitive to terror [22]. At the same time, R. Johnston and O. Nedelescu concluded that the accurate, timely and flexible response of the authorities to the consequences of the attacks is important for financial markets to be effective in absorbing terrorist attacks. At the same time, terrorism affects the economy, undermining investor confidence and reducing the incentive to spend

rather than save [23]. K. Drakos studied the impact of terrorist activity on stock market returns in a sample of 22 countries [24]. He found that terrorist events are negatively related to the functioning of the stock market. The negative effects of terrorism are exacerbated in cases where terrorist attacks cause aggravated psychosocial tensions. The article by K. Arin, D. Ciferri, and N. Spagnolo explored the impact of terrorism on the financial markets of six countries (Indonesia, Israel, Spain, Thailand, Turkey, and the United Kingdom) [25]. It was found that terrorism has a significant negative impact on the volatility and profitability of financial markets. However, the effects of terrorist shocks vary from country to country, with a greater negative impact on emerging markets. The modern literature focuses on the financial consequences of a very limited number of major terrorist attacks (especially 9/11, attacks in Madrid in 2004, and bombings in London in 2005). In general, G. Karolyi concludes that little is known still about the economic and financial consequences of terrorism [26]. Although stock prices and the dynamics of stock market indices are still a good source of information about the economic damage of terrorism, since they reflect both the expectations of companies' profits and the likelihood of investors reaching them [27].

I. Economic slowdown

All the negative effects in various sectors of the economy following terrorist attacks are integral components of a slowdown in economic growth. According to B. Brock, prolonged terrorist activity slows economic growth by 0.3–0.57% [10]. This is confirmed, in particular, by the results of a study by A. Abadie and J. Gardeazabal, who used an event study methodology to study the economic consequences of terrorist attacks on firms and private enterprises in the Basque Country in Spain [28]. They document that the shares of firms, whose business is mainly conducted in this part of the country, showed a relatively positive trend when a truce was possible, and a negative one when there was no truce. They found that the GDP of the Basque Country per capita dropped by an average of 10% compared with neighboring regions that did not face the problem of terrorism. Subsequently, it was found that countries with higher levels of terrorist risks are associated with lower levels of net foreign direct investment. In general, the growth of terrorism in the country leads to political uncertainty, which negatively affects economic growth.

Among other things, terrorist attacks can destabilize the work of regional authorities or even the national government, reduce the effectiveness of state policy (including economic), since successful attacks reduce trust in political and state institutions, and in some cases generate protests and unrest among citizens. In general, acts of terrorism cause damage to society that is fundamentally different from that caused by crime or natural disasters. The main negative consequences arise not only directly as a result of a terrorist attack, but in the course of disseminating information about it.

IV. CONCLUSION

Theoretically, the terrorism risk assessment can be carried out on the basis of typical methods of probabilistic risk analysis, which numerically determine the ranges of

probability and consequences of terrorist [14]. However, they rely to a large extent on the features of traditional qualitative approaches.

Threat analysis is usually the most uncertain part of a national security risk analysis. It is different to such types of risks as equipment failures, human errors or natural disasters, where there is extensive historical experience that can be used to establish the frequency or probability range of various triggering events. Although, unfortunately, there is also an extensive history of terrorist and other violent acts, the nature of these events is constantly changing, so historical experience gives less guidance in trying to predict the future. The following characteristics make terrorist and other opposing threats unique compared to other risks:

1. Terrorist threats are targeted, not random. This is often described as “intellectual threats against random ones”. Accidents and natural disasters occur in random order, which is often statistically predictable. On the other hand, forecasting of the frequency range of a specific action of an adversary against a specific goal should be based not so much on historical data, but on an analysis of such factors as:

- the current political situation;
- goals and motives of adversaries who have access to the target or are close to it;
- the attractiveness of the target for adversaries;
- the number and type of adversaries who have sufficient access to the target for a threat;
- weapons and other options available to adversaries;
- local video surveillance;
- quality of intelligence information.

2. Unlike accidents and natural disasters, adversaries are able to adapt to changing circumstances. This is often described as “dynamic and static threats”. For example:

- strengthening the goal by improving countermeasures that adversaries are aware of may cause them to choose another goal;
- a change in the perception of the impact of damage on different goals and on the effectiveness of various types of attacks may lead to changes in terrorist and other opposition strategies;
- terrorists/adversaries, as a rule, try to accumulate more material and opportunities than the minimum necessary to achieve the desired results.

3. Even “failed” attacks can have significant consequences. For example, an attempt to shoot down a passenger plane can have a significant impact on airlines and the economy, even if the attack failed.

In contrast to natural or accidental man-made disasters, terrorists can adapt and change their tactics, methods, and procedures (for example, the strategy of attack) when applying countermeasures [8]. Moreover, when confronted with adaptive adversaries, human rights defenders also often have to work with a lack of resources, including limited information, to model the risk of terrorism. For example,

understanding and evaluating hostile behavior requires an understanding of motives, intentions, and capabilities, but it is difficult to obtain this information, since we can rarely collect information directly from terrorists. As a result, assessing the risk posed by domestic and international terrorist organizations and “lone wolves” operating outside of official groups is a difficult task for law enforcement and intelligence analysts. The ability to evaluate reasonable and justifiable events (or, at least, relative probabilities) associated with terrorism, which is currently called the problem of “reasonable adversary”, is an important area of research.

In general, the risk assessment of terrorist attacks primarily involves the need to determine and quantify indicators characterizing it. This is a rather complicated problem, due to the uncertainty and complexity of quantitative accounting of its components, which requires significant modification of statistical and expert methods of risk assessment that are usually used in risk analysis, for example, the Delphi method, as well as decision trees, game theory and Bayesian networks etc. To some extent, assessments of such risks can be obtained using models of binary and multiple choice, taking into account the dependence of terrorist attacks likelihood on indicators characterizing the intensity of the internal and external situation in a country, the vulnerability of its facilities, the activity of terrorist organizations, etc.

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