

Issues in Terrorism Risk Management

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Abstract

The concept of Insurance which started with covering Marine risks has been adapted to different risks. Terrorism is a new risk posing challenge for the insurance industry. The terrorist attacks which took place over the past two decades have significantly altered the economic and security settings world over. In this direction the insurance industry and Governments around the world are enduring to create and refine the risk management facilities and systems which would enable national and global business interests to persist with confidence regardless of the capricious and catastrophic nature of terrorism risks. In this paper, an attempt is made to study risk management issues of Terrorism Risk.

'Avoid strength, and attack weakness' -Legendary military strategist Sun Tzu

1. Introduction

The terrorist attacks which took place over the past two decades have significantly altered the economic and security settings world over. The insurance industry and Governments around the world are enduring to create and refine the risk management facilities and systems which would enable national and global business interests to persist with confidence regardless of the capricious and catastrophic nature of terrorism risks. This paper attempts to study the funding issues related to the occurrence terrorist attacks i.e. how a terrorist event is funded by the terrorist groups and how government, individuals, and insurance companies share the losses of such terrorist event.

Risk of Dying

Smoking 10 cigarettes a day	One in 200
All natural causes age 40	One in 850
Road accident	One in 8,000
Playing soccer	One in 25,000
Homicide	One in 100,000
Terrorism attack in 2001	One in 100,000
Hit by lightning	One in 10,000,000
Terrorism attack in 1990's	One in 50,000,000

Source: Lynn R. Goldman, MD, MPH, Johns Hopkins Bloomberg School of Public Health, Department of Environmental Health Sciences, "Health Effects Following Terrorism"

2. Terrorists attacks- world trade centre

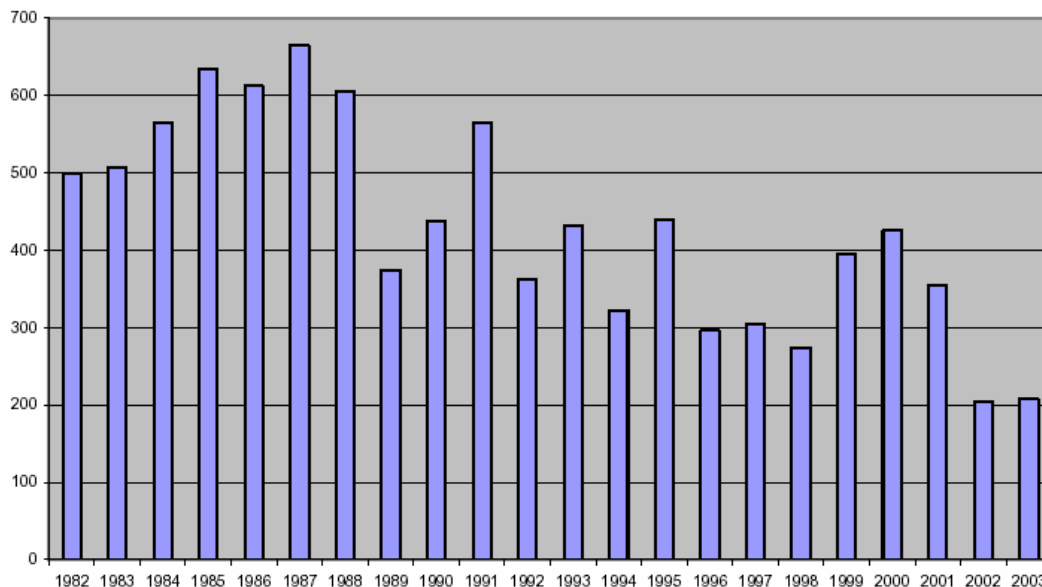
In the World Trade Centre (WTC) terrorist attacks (popularly known as 9/11), more than 3000 people from ninety countries were killed, and around US\$ 50billions losses incurred. Almost 150 insurance and reinsurance companies were liable for these losses, with the European reinsurance companies sharing the chief financial load.

Largest Insured Losses from Terrorism at International Level, 1970-2001 (losses in millions of 2001 dollars).

Event	Country	Victims	Insured Loss
Attack on World Trade Center and Pentagon (2001)*	U.S.A.	3,014	>\$40,000
Bombing in London's City (1993)	U.K.	1	\$907
Bombing in Manchester (1996)	U.K.	0	\$744
First World Trade Center bombing (1993)	U.S.A.	6	\$725
Bomb explodes in London's financial district (1992)	U.K.	3	\$671
Suicide bombing at Colombo Airport (2001)	Sri Lanka	20	\$398
Bombing at London's South Key Docklands (1996)	U.K.	2	\$259
Oklahoma City bombing (1995)	U.S.A.	166	\$145
PanAm Boeing 747 explosion at Lockerbie (1998)	U.K.	270	\$138
Three hijacked airplanes dynamited in Zerga (1970)	Jordan	0	\$127

* Estimates from Associated Press and Hartwig, "Impacts."
Source: Swiss Re.

Total Number of International Terrorist Attacks, 1982-2003



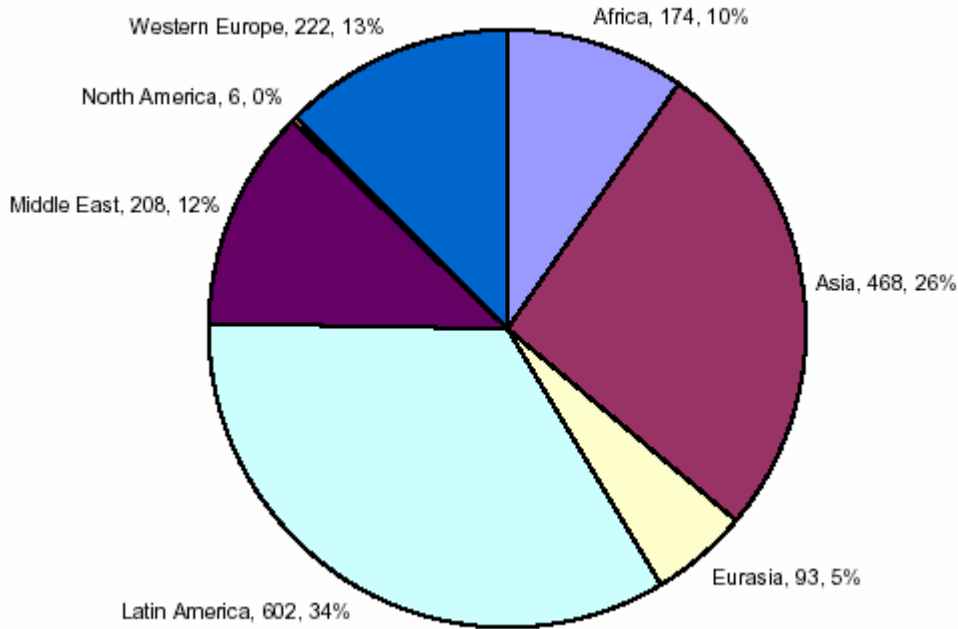
Source: Appendix G, Patterns of Global Terrorism, 2003 Report, Released by the Office of the Coordinator for Counterterrorism, June 22, 2004 (<http://www.state.gov/s/ct/rls/crt/2003>).

3. Terrorism-a new risk

The 9/11 terrorist attacks, have defined a new risk i.e. 'Terrorism Risk'. Terrorism is not a current phenomenon, and is apparently a multifaceted phenomenon falling between the nexus of war and peace. Terrorist attacks have earlier taken place, in US and at various parts of the world like the Oklahoma city bombings in the year 1995, and terrorist attacks on World Trade Center in the year 1993, but it was only after 9/11 WTC attacks, terrorism was given status of a potential risk capable

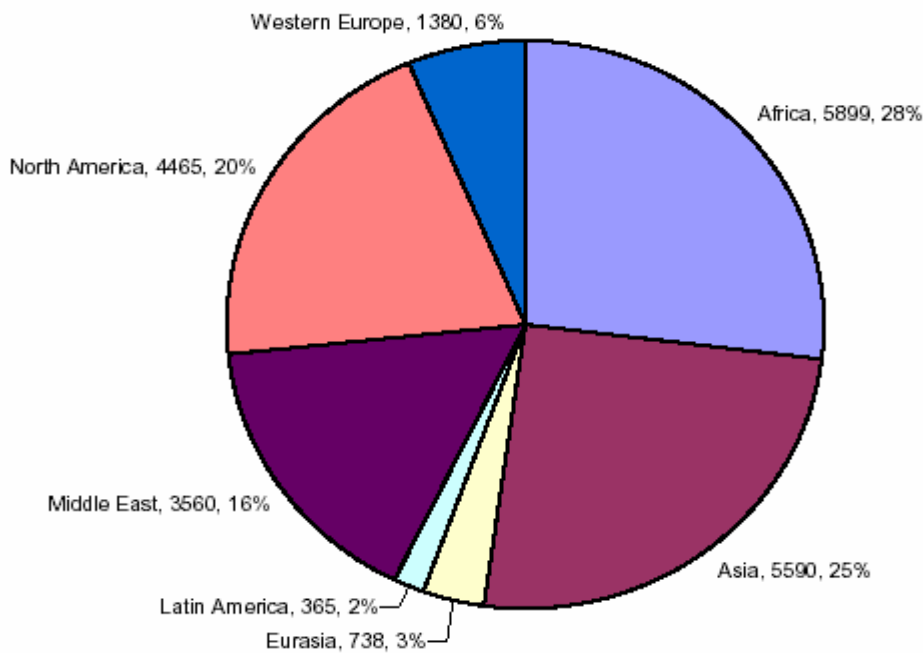
of large scale destruction. For this underestimation of terrorism risk, many insurance companies had to pay huge price, and quite many went bankrupt.

All International Terrorist Attacks, By Geographic Location, 1998-2003



Source: Appendix G, Patterns of Global Terrorism, 2003 Report, Released by the Office of the Coordinator for Counterterrorism, June 22, 2004 (<http://www.state.gov/s/ct/rls/crt/2003>).

Casualties in International Terrorist Attacks, 1998-2003



Source: Appendix G, Patterns of Global Terrorism, 2003 Report, Released by the Office of the Coordinator for Counterterrorism, June 22, 2004 (<http://www.state.gov/s/ct/rls/crt/2003>).

Terrorism risk in this form is new not only to the United States, but for the entire world. This risk is not well defined, and also there is very inadequate experience or actuarial statistics on it. With this the insurance companies started customarily excluding or limiting coverage for terrorist acts in the policies issued. And wherever the terrorism insurance was provided, it was quite pricey, with difficult to find required coverage and impracticable to obtain. Thus the individuals as well as businesses are either compelled to accept additional costs of insurance or are incapable to carry out business owing to financing necessities to bear terrorism insurance. Also businesses are now taking considerably added risk exposure that elevates apprehensions concerning the possible economic impact of disastrous terrorist attacks.

Terrorism primarily affects the economy in following four ways* :

1. It adversely affects the capital stock (i.e. human and physical) of the country,
2. Terrorist threat induces higher levels of uncertainty,
3. It promotes increases in counter-terrorism expenditures, drawing resources from productive sectors for use in security, and
4. It is known to affect negatively specific industries such as aviation, insurance, tourism, etc.,

4. Components in terrorism risk

Experts have jotted down three major components in Terrorism risk, namely:

1. Threat,
2. Vulnerability, and
3. Consequence.

4.1 Threat

A terrorist threat to a city or region has the direct impact on occurrence of an attack on the city, and hence increases the possibility of loss due to terrorist attack. For example, if one city were known in the course of gathered intelligence or previous history to be the favored target for terrorist attacks, this observation would hold a claim that this city has a large intensity of terrorism risk in future. Terrorist groups pose a threat when they have the objective and competence to entail harm to a country. It may be noted that mere objectives without competence or competence without objectives acts as threat. Hence, both are compulsory for existence of Threat from a terrorist group. For the governments to allocate domestic security resources to safeguard significant infrastructure or cities necessitates quantifying the threats posed to the targets or specific nature of attacks. One needs to study the scope of threat in terms of a specific set of targets, a specific set of attack types, and a specific time period, to apply probability which could be used as a measure of the likelihood of a terrorist attack. Threat could be measured in terms of the probability that a specific target is attacked in a specific way during a specified time period, i.e.

Threat = Probability (terrorist attack occurs).

As the measure for threat is uncertain, it represents probability distribution and not a point estimate. This probability measures terrorist threat of a precise type of attack on specified targets. It requires a comprehensive description of the each mode of terrorist attack on a specific target individually. Practically it would be sufficient to focus on significant kinds of attacks viz. chemical, biological, radiological, or nuclear (CBRN) and explosive. Likewise, focus could be restricted to a limited number of target region(s).

Terrorism Threat Agents[†]

* Alberto Abadie (Harvard University and NBER) and Javier Gardeazabal (University of the Basque Country) "Terrorism and the World Economy", August 2007.

- Conventional explosives (mass trauma events)
- Chemical
- Biological
- Nuclear
- Economic
- Cyber

4.2 Vulnerability

Vulnerabilities within a region also represent logical targets for terrorism due to its close relation with the infrastructure of the city. Say if a city has an atomic or nuclear power plant, it is obvious that the city could be more targeted for the terrorist attacks. The threat of terrorism is a dynamic one as it acclimatizes to conditions that affect the possibility of attack achievements. We use Probability to measure the likelihood that vulnerability will show the way to damage when terrorist attacks occur. Measure (Vulnerability) could be defined as the probability that damages involving fatalities, injuries, property damage, or other consequences occur, given a specific attack type, at a specific time, on a given Target. i.e.

Vulnerability = Probability (attack results in damage | attack occurs).

The vulnerability of a target can be expressed as the probability that an attack of a given type will be successful once it has been launched and, as articulated, measures vulnerability to specific types of damages only (i.e., there would be separate vulnerability assessments for deaths, injuries, and property damage).

4.3 Consequence

Terrorists aim to create maximum loss to the target city or region in terms of men and material. Hence the possible consequences of terrorist attacks need to be taken into account when quantifying terrorism risk. Consequence can be defined as the extent and type of damage resulting from successful terrorist attacks. In order to measure the consequence, we need to quantify the expected magnitude of damage (e.g., deaths, injuries, or property damage), given a specific attack type, at a specific time, that results in damage to a specific target or.

Consequence = Expected (damage | attack occurs and results in damage)

Consequence can be computed by taking into account the damages, fatalities, injuries, economic losses. This list is not exhaustive, and we can take other aspects of consequences also. For the practical purposes, we limit our focus to mortality, morbidity, and economic loss at the point of attack in order to demonstrate an approach to risk estimation in a way that is transparent yet appropriate to real-world policy decision making.

4.4 Terrorism Risk as a Function of Threat, Vulnerability, and Consequences

Terrorism risk can be defined as the anticipated consequences over some period of time to a distinct set of targets, consequential of a definite set of threats. Therefore we can see that threats, vulnerabilities, and consequences play a considerable part in the overall terrorism risk to which a country is exposed. Terrorism Risk can be measured as the expected consequence of an existing threat, for a given target, attack mode, and damage type. Terrorism risk is the product of threat, vulnerability and consequence (Terrorism Risk= Threat X Vulnerability X Consequence).

[†] Lynn R. Goldman, MD, MPH, Johns Hopkins Bloomberg School of Public Health, Department of Environmental Health Sciences, “Health Effects Following Terrorism”

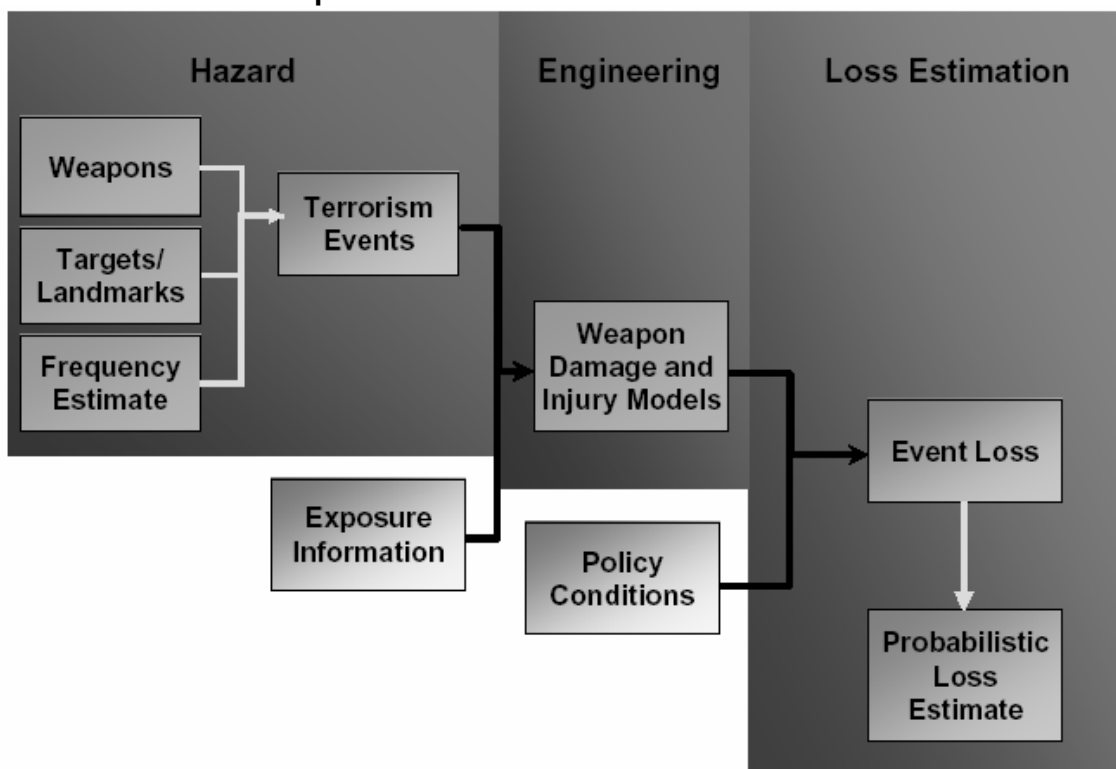
Terrorism Risk= Probability (attack occurs) X Probability (attack results in damage | attack occurs) X Expectation (damage | attack occurs and results in damage).

So, terrorism risk indicates the expected consequences of attacks considering the possibility of the occurrence and success of the terrorist attacks. In terms of probability, a terrorism risk from an attack of a certain type is the unconditional expected value of damages of a certain type. Formulating terrorism risk helps in providing an approach for comparing and aggregating terrorism risk, and also provides a clear mapping between risk and approaches to managing or mitigating terrorism risk.

4.5 Estimating the Components of Terrorism Risk

In practice threat, vulnerability, and consequences are all conditional on significant uncertainties, and hence the task of estimating each component becomes daunting. To aid risk estimation function, one needs to understand the different sources of these uncertainties which affect terrorism risk. Variability and error in estimating all the components and, ways to value different types of consequences are two important sources of uncertainty in estimating terrorism risk.

Terrorism Model Components



Source: www.air-worldwide.com Catastrophe Modelling Seminar 6 July 2006 Bill Churney

Terrorism Risk Models are developed to assess impacts in terms of property loss, economic losses, injuries and fatalities, confidence level and feelings of security of citizens and businesses, and innumerable additional potentially pertinent effects. Risk can similarly be articulated in terms of any one, or a combination, of these consequences. Here value judgment (depending upon relative importance of different consequences) is adopted to evaluate each type of consequence in terrorism risk. Each type of risk can be combined mathematically into a single-dimensional aggregate risk.

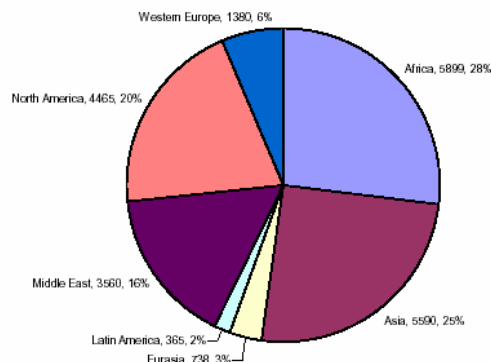
An approach to tackling the terrorism risk quantification task has been outlined, from which the following principal observations may be drawn[‡]:

1. The frequency and severity of planned attacks will depend critically on the network architecture of the terrorist organization.
2. Pressurized increasingly by counter-terrorist forces, terrorist organizations may adapt to form emergent swarm clusters. These rapidly forming virtual cells, communicating via internet, will be very hard to detect and stop.
3. Emergent networks will facilitate the execution of more frequent, but less ambitious and generally less damaging, planned attacks.
4. An event-tree may be constructed to estimate the probability that a planned attack will succeed, depending on the availability and usage of intelligence; the effectiveness of security barriers; and technical and logistical mishaps.
5. The loss severity distribution may be derived by mapping losses from realistic showpiece terrorism scenarios, and assigning a cost function to each. The cost function reflects practical logistical factors such as planning time, technical difficulty, and consumption of scarce resources.
6. The overall computation of a terrorism loss exceedance curve can be achieved, provided that the assignment of subjective input probabilities is made using the formal elicitation of expert judgement, such as has been invoked already by government security agencies.

5. Terrorism financing-low budget affair

As per the Presentation of the National Bureau of Economic Research insurance group meeting made in year 2003, the estimated budget of Al-Qaeda in the year 2003 was around US \$30 to US \$50 millions, which constituted 90% for Network infrastructure maintenance, and balance 10% for Operations. The Presentation further states that the terror operations are inexpensive; with the 9/11 attacks costed around US \$400,000 to \$500,000, the October 2002, Bali were less than US \$50,000, the March 2004, Madrid were around US \$10,000, and the July 2005, London arracks were few hundred pounds. While the direct costs of 9/11 were more than US \$100billions, covering life insurance, property damage, and loss of production, and same is the case with other terrorist attacks.

- **Figure: Casualties in International Terrorist Attacks, 1998-2003, US Department of State, Counterterrorism Office**



[‡] Dr. Gordon Woo, "Quantifying Insurance Terrorism Risk", RMS, National Bureau of Economic Research meeting, 2002 .

Source: Appendix G, Patterns of Global Terrorism, 2003 Report, Released by the Office of the Coordinator for Counterterrorism, June 22, 2004 (<http://www.state.gov/s/ct/rls/crt/2003>).

As per the empirical evidence published in 'Terrorism and the world Economy' by Harvard Education in October 2005, an augment in terrorist risk of one standard deviation stimulate a 5% drop in the net foreign direct investment (FDI) position of the affected country. Some of the chain effects as a result of the terrorist attacks are: increase in operating costs due to increased expenditure on security, and higher insurance premiums. In addition the higher insurance premiums may lead to rise in interest rates, decrease in equity prices, and fall in capital stocks.

6. Activities to curb terrorism financing

The new challenges of terrorism financing have brought together the regulators, and businesses and insurance industry to work in the direction of finding best possible solutions. Consequently, new terrorism insurance facilities have come out from the private sector, the public sector and both.

From the time when the 9/11 terrorist attacks took place, there has been noteworthy attention paid in terrorist financing. US administration initially combated terrorist financing through freezing terrorist assets. And in next few months after 9/11 attacks large funds were frozen globally.

Designation and Freezing of Assets: Since September 11, 2001

At United States	At International Level
<ul style="list-style-type: none"> • 1439 accounts, containing more than \$136.7 million in assets, frozen worldwide – including \$36.6 million in the U.S. • More than \$60 million in additional terrorist related assets seized by authorities globally. • 315 individuals and organizations listed as Specially Designated Global Terrorists (SDGTs) under Executive Order 13224. • Countless millions in additional funds prevented from flowing to terrorists by disruption of terrorist financing networks, deterrence of donors, and international efforts to secure the world financial system from the financing of terror. • Several major sources of terrorist financing dismantled: <ol style="list-style-type: none"> a. In August, 2003, Sec. Snow announced the U.S. designation of several charities funding Hamas and several members of Hamas' senior leadership. In the weeks since, the EU has now reached consensus to designate the 	<ul style="list-style-type: none"> • 209 countries have offered their support in the financial war on terror. • 173 countries have issued blocking orders freezing terrorist assets. • 100 countries have passed new laws, strengthening their safeguards against terrorist financing. • 80 countries have established Financial Intelligence Units to share information on terrorist financing. • The UN Security Council has approved Resolutions 1372 and 1390 that compel action by member states to combat terrorist financing. • The Financial Action Task Force (FATF) has issued 8 Special Recommendations on Terrorist Financing and revisions to the 40 Recommendations on Money Laundering, incorporating international standards to prevent terrorist financing.

<p>political wing of Hamas. Several other jurisdictions, including the Palestinian Authority and the U.K., have also taken action to freeze assets of Hamas related charities.</p> <p>b. In support of previous action by European partners, the U.S. designated the Al-Aqsa International Foundation, a major source of funding to Hamas in April of 2003, helping to shut-down the German based charity.</p> <p>c. The Somali based al-Barakaat network once provided funding and transferred money too and from al-Qaida. The U.S. and our international partners took action to designate al-Barakaat and close down their operations in November of 2001.</p> <p>d. O Three major U.S. based charities providing funding to terrorists, the Global Relief Foundation, Benevolence International Foundation and Holy Land Foundation for Relief and Development were designated and shuttered in December of 2001.</p>	
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Source: Progress in the War on Terrorist Financing, September 11, 2003

- Till the end of year 2004, the programs related to targeting assets of international terrorist organizations resulted in the blocking of almost US\$ 10 million in US. The following are some of the legislations initiated in the direction of curbing money laundering and terrorism financing activities:
- The US government laid the foundations of the federal anti-money laundering (AML) framework through passage of the **Bank Secrecy Act** (BSA) in 1970 to target money laundering[§]. The said act subsequently underwent many changes; a major among them was the criminal and civil sanctions meant for the people involved in money laundering. However the US government owing to the threat created by the terrorist groups was compelled to bring terrorist financing, which is regularly funded by means of legally derived finances within the array of actions liable to be punished by the laws of federal money laundering.
- The **International Emergency Economic Powers Act** (IEEPA) was enacted in the year 1977, which gives the President broad powers pursuant to a announcement of a national emergency relating to a threat to the national security, foreign policy, or economy of the United States. Among the powers, President of US also has powers including seizure of

[§] Money Laundering in simple means a process to make illegal money disguised to lawful.

foreign assets under U.S. jurisdiction, in order to forbid any transactions in foreign exchange, to forbid payments between financial institutions involving foreign currency, and to ban the import/export of foreign currency.

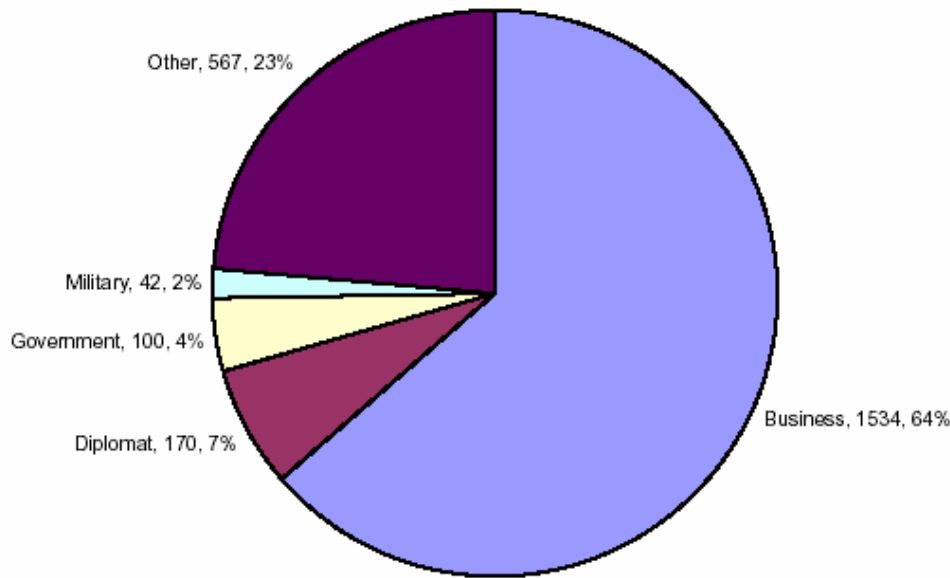
- The **Money Laundering Control Act** was enacted in the year 1986 to curb criminalized money laundering. This act made three particular types of money laundering illegal i.e. domestic money laundering, international money laundering and attempted money laundering uncovered as part of an undercover sting operation.
- The **Money Laundering Suppression Act**, was introduced in the early 1990 's it authorizing various exemptions from reporting requirements in an effort to reduce the number of Cash Transactions Receipts filings by 30%.
- **Title III of the USA PATRIOT Act**, was passed in the wake of the terrorist attacks of 11th September 2001, and specifically intended to combat terrorist financing. Since the funds used to finance terrorist actions are not usually derived from unlawful activities, and additionally the trial for funding terrorist activities under the pre-USA PATRIOT Act and money laundering laws was complicated.
- As per the section 362 of the **USA PATRIOT Act**, the Secretary of the Treasury was required to set up within FinCEN a "highly secure network" to process BSA reports and to make available information to financial institutions concerning patterns of doubtful actions gleaned from them. Through the passage of the Intelligence Reform and Terrorism Prevention Act of 2004 (IRTPA), Congress approved the appropriation of \$16.5 million for the development of FinCEN's "BSA Direct" program.

7. Financing terrorism risks

Terrorist attacks in our country and around the different parts of globe, elevate significant issues related to the economic blow of terrorism on individuals, businesses, governments, and insurance companies. Of the all the prominent issues are efficient means to recuperate from the economic losses and the cost sharing of major terrorist attacks. Ever since the September 11 terrorist attacks that hit the US, the conditions on terrorism insurance markets have enhanced considerably.

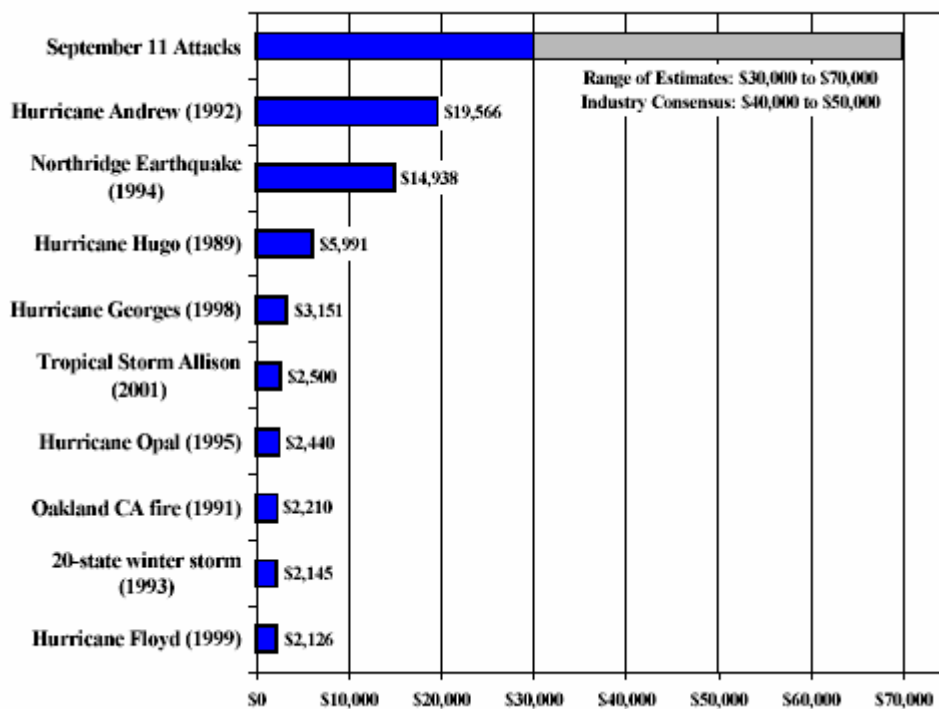
Insurance Information Institute (III) opines that the threats of terrorist attacks continue to be basis of terrific uncertainty for the US economy, with effective negative costs for both business interests and employment. Dr. Hartwig the president of III, briefed that the terrorist attacks not only killed around 3000 individuals but also severely affected the economy of US. The claims totaling \$31.6 billion were settled by the insurers related to 9/11.

Facilities Struck by Terrorist Attacks, By Type, 1998-2003



Source: Appendix G, Patterns of Global Terrorism, 2003 Report, Released by the Office of the Coordinator for Counterterrorism, June 22, 2004 (<http://www.state.gov/s/ct/rls/crt/2003>).

Insurance Costs of United States- Disasters till 2001 (in millions dollars)



Source: Hartwig, "Impacts"; U.S. General Accounting Office; Insurance Information Institute; and Council of Economic Advisers.

The basic issue about the responsibilities of the public and private sectors in tumbling the terrorism risks and making available adequate financial coverage to victims of the large-scale terrorist attacks arose as a consequence of the 9/11 attacks. In comparison to the few options that were available pre 9/11 for those looking to insure the vague terrorism exposures, currently there are quite a few

avenues that can be adopted individually and collectively integrated to create logical and customized insurance solutions to cover terrorism risks.

The Terrorism Risk Insurance Act of 2002 (TRIA), has created US\$100 billion U.S. federal reinsurance mechanism. With this terrorism risk transfer capacity of the US insurance industry that had nearly faded away consequently following 9/11 attacks has progressively full-fledged. TRIA was based on was a private-public risk-sharing arrangement that provides up to \$100 billion of commercial coverage against terrorism losses perpetrated by foreign interests in U.S. was a temporary three-year national program. The new TRIA aimed to provide a long term program for terrorism risk financing.

As per the Policyholder Disclosure Notice of Terrorism Insurance Coverage issued under section 102(1) of Terrorism Risk Insurance Act of 2002 ("TRIA") the policyholders are provided coverage in insurance policies for losses caused by certified acts of terrorism through partial reimbursed by the United States (under a formula established by federal law, and as per the formula, the United States pays 90% of covered terrorism losses exceeding the statutorily established deductible paid by the insurer(s) providing the coverage) for an additional premium. The policy holders have two options i.e. either purchase coverage for acts of terrorism for a prospective premium or to have coverage for acts of terrorism excluded from insurance policy. The TRIA has been aimed to give US adequate time to analyze the issues meticulously and settle on an appropriate long-term terrorism financing program. The debate of renewing of TRIA has been largely stuck between the government and the insurance industry. A long term program should apart from taking into account issue related to insurance, but should also address preparedness and recovery from attacks.

8. Conclusion

Terrorism is a new risk posing challenge for the insurance industry. The terrorist attacks which took place over the past two decades have significantly altered the economic and security settings world over. In this direction the insurance industry and Governments around the world are enduring to create and refine the risk management facilities and systems which would enable national and global business interests to persist with confidence regardless of the capricious and catastrophic nature of terrorism risks. Though there have been numerous initiatives undertaken to prevent new attacks around the world, the financial upshot of one more extra-large terrorist attack needs to be critically well thought-out. As per the OECD reports, there are continuing shortfalls in the risk coverage, which could be only revealed by another large-scale attack. It is here that the insurance industry could play a key role in contributing to the social and economic continuity of the country should a large-scale terrorist attack occur, through converting the risk into opportunity.

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