



# A Risk-Based Rationale for Extending the Terrorism Risk Insurance Act

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# 1. Summary

It has been three years since the enactment of the Terrorism Risk Insurance Act (TRIA). In many ways TRIA has achieved its objectives. Following a significant dislocation in insurance markets after the attacks of September 11, 2001, commercial terrorism insurance is now available via the private insurance market, the take-up of such coverage by businesses has increased significantly, and overall costs for such coverage have come down. Corporations, real estate owners, and construction companies have been able to obtain insurance even in areas perceived to be of high risk, enabling the national economy to recover after 9/11 without the constraints that would have ensued had businesses been unable to to insure their terrorism risks.

Despite this track record of success, this study concludes that the expiration of TRIA on December 31, 2005 will not lead to a sustainable private sector market for terrorism insurance.

The *raison d'être* of TRIA – the possibility for another large-scale terrorist attack against the United States – remains. The multi-faceted strategies employed by the U.S. in its Global War on Terror, ranging from offensive military operations and diplomatic efforts to counter-intelligence and homeland security, have reduced the probability of a successful near-term attack by Islamic militant threat groups within the U.S. However Al Qaeda and its affiliates have demonstrated a remarkable resilience and an ability to carry out complex terrorist operations, and remain implacably committed to perpetrating spectacular attacks within the U.S. homeland.

Over the past four years, Risk Management Solutions has developed a national database of potential terrorist targets and a series of analytical models to quantify not only losses to property, business interruption and human casualties from a wide range of terrorism attacks, but the probability of such attacks being perpetrated. Millions of attacks have been simulated, involving 32 types of attack modes, ranging from bombings, sabotage and aircraft impacts attacks through to Chemical, Biological, Radiological, and Nuclear weapons (CBRN), against thousands of targets that include government, transportation and industrial infrastructure, and commercial and population centers. Multiplicity of attacks, involving simultaneous strikes against several targets, are considered in these simulations.

From these attack simulations, RMS can observe that terrorism risk poses a set of unique challenges for the U.S. insurance industry, making it highly likely that a large majority of insurers will quit the market for terrorism insurance without TRIA in place:

1. Terrorist attacks capable of causing loss far in excess of that experienced on 9/11 are plausible, particularly from attacks involving CBRN weapons. Terrorist attacks can cause much greater insured loss than even the most severe earthquakes and hurricanes.
2. Insured claims could well exceed the total capital of the P&C insurance industry. Moreover, the nature of losses can concentrate claims in only a subset of the insurance industry, making it difficult for the market to efficiently diversify even more moderate losses across this total base of capital.
3. Geographic diversification of the risk is problematic – terrorism risk is highest in the places where there is the greatest demand for terrorism insurance and highest concentrations of value. Managing concentrations becomes even more difficult given that state regulations severely limit insurers' ability to control their exposures.

4. There are higher levels of uncertainties associated with terrorism risk than insuring other types of catastrophe perils, such as earthquake and hurricanes. These uncertainties will require insurers to build significant risk premiums into the rates they charge. Compounding the pricing challenge is that terrorism risk is a dynamic peril, and government itself is an active player in shaping the risk that insurers cover.

The Treasury has proposed a number of modifications to the existing structure of TRIA in considering its extension, mainly to give a greater share of terrorism risk to the insurance industry. These include raising the threshold of 'certified' events; raising insurance company retentions; increasing the industry co-share, and reducing the number of lines covered by TRIA.

In evaluating such modifications, it is important to note that under TRIA's current terms, the insurance industry currently retains most of the risk. RMS estimates that in over 90% of terrorist attacks, insurers will pay the majority of the losses. Overall, insurers bear over 80% of the risk associated with terrorist attacks within the United States; the Federal Government, through TRIA, bears only 20% of the risk. From its analyses, RMS concludes that TRIA protects the insurance industry principally in the case of extreme losses that could force them out of business. It provides the insurance industry with solvency, not subsidy, and in doing so enables the conduct of a viable market for the provision of terrorism insurance.

## About RMS

Risk Management Solutions, Inc (RMS), is an independent analysis and modeling company providing services to the insurance industry. RMS developed the first commercially available model of terrorism risk in the U.S. in 2002, a model that was widely acclaimed as ground-breaking. RMS reviews and updates its terrorism risk model each year, and maintains a team of advisors that includes some of the world's leading authorities on terrorism threat, asymmetrical warfare techniques, and security and intelligence issues. RMS was a co-founder with RAND of the RAND Center for Terrorism Risk Management Policy (CTRMP), a policy research think-tank to explore terrorism issues in government and private sector interaction.

RMS analyses have been used and cited in several studies published in the debate over TRIA, including:

- "Cost Estimate for H.R. 4634; Terrorism Insurance Backstop Extension Act of 2004"; Congressional Budget Office, U.S. Department of the Treasury; November 2004
- "Issues and Options for Government Intervention in the Market for Terrorism Insurance"; RAND Center for Terrorism Risk Management Policy, Sept 2004
- "TRIA and Beyond" Wharton Risk Management and Decision Processes Center, August, 2005

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## 2. The Nature of the Terrorism Threat in the U.S.

### **Global terrorism risk is increasing**

The number of terrorist attacks across the world has increased dramatically over the past few years. In the 12 months following the 9/11 attack there were approximately 100 major terrorist attacks<sup>1</sup> – such as a car bomb or worse – worldwide. This has increased each year, and in the last 12 months prior to September 2005 there were over 200 attacks of this scale worldwide (excluding Iraq, which saw an additional 300)<sup>2</sup>. The increase has predominantly come from attacks perpetrated by militant Islamic terrorist groups. Inspired by the attacks and rhetoric of Al Qaeda, these groups have proliferated around the globe, carrying out attacks in over 30 countries since 9/11. The country of greatest terrorist activity continues to be Iraq, and analysts warn that foreign insurgents operating there could unleash attacks in Europe and the U.S. in the future, in the way that the mujahideen resistance against Soviet forces in Afghanistan in the 1980s gave rise to an earlier generation of Islamic terrorism.

Attacks around the world have also become more deadly as terrorists have learned how to target concentrations of people to create mass-casualties. Car bombs in 2001-2002 averaged around 16 casualties per attack, but by 2004 we were seeing around 45 casualties per car bomb.

Since 9/11 there have been no successful terrorist attacks on U.S. soil. However, there have been several suspected attempts to prepare an attack (see below) and the threat of an militant Islamic attack in the U.S. homeland remains a real and present danger.

### **The United States and its allies are key targets for Islamic militant terrorists**

The rhetoric of the jihadist militants advocates the creation of fundamentalist Islamic states in the Middle East and Southeast Asia. The U.S. and its allies are seen as obstacles to that objective.

Islamic militants are critical of the existing governments in many of the countries in the Middle East and have actively tried to overthrow these regimes. Al Qaeda's initial focus was in the Middle East – in Saudi Arabia, Yemen, Libya, and Egypt. However, most of their attacks in these countries failed, and they concluded that they would make little progress towards their Islamic state goals because these regimes were being backed by the United States. Osama bin Laden compared the U.S. to a poisonous snake whose head is shielding and protecting corrupt Muslim rulers of Middle Eastern countries. He and his followers claim that it is essential to target the U.S. to force it to disengage and abandon its geopolitical alliances in the region.

The invasion of Iraq by the U.S. and its allies has been used as propaganda by Islamic militants to inflame anti-U.S. sentiment across the world.

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<sup>1</sup> RMS defines a major or 'macro' terrorist attack as one that can cause more than 20 fatalities or more than 100 injuries; or significant destruction to physical facilities, or mass disruption, for example a bomb with a yield of over 100 lbs of TNT.

<sup>2</sup> The RMS terrorism event catalog records attacks worldwide, compiled from a number of authoritative sources. It attempts to be complete for all 'macro' terrorist attacks (i.e. car bombs or worse).

## **Al Qaeda and associated groups remain an active threat, and are likely to attack the U.S.**

Following 9/11, the U.S. engaged the international terrorist threat through a 'war on terrorism' and spearheaded a multi-national effort to combat the groups responsible. Terrorist training camps and operational bases in Afghanistan were destroyed. Many operatives and leaders of Al Qaeda were killed or captured. The overt structure of the organization was dismantled, and constraints on its operations, finances and communications were put into place.

However, this resulted in a changed organization of Islamic militant groups and a continuation of terrorist attacks through different means. Groups sharing their ideology have become more decentralized and autonomous. Al Qaeda no longer chairs a council of terrorist groups, trains their members, or coordinates their operational attacks; instead, a depleted leadership acts as an inspiration to groups and provides the rhetoric and incitement for attacks through its public pronouncements and occasional active operations.

The movement that Al Qaeda initiated is now capable of continuing without central power. It has rallied many sympathizers, recruited new converts to the jihadist cause, and inspired several to carry out attacks in imitation of it. So far, the attacks that have been carried out by its associated groups without direct involvement by senior Al Qaeda members have been smaller in scale, perhaps lacking the ambition, expertise and resources of the core Al Qaeda organization. But the techniques that Al Qaeda used and espouses have been adopted by their supporters and are likely to be seen in increasingly competent and ambitious attacks.

Al Qaeda has taught its associated groups the value of careful and deliberate planning of spectacular attacks. It has demonstrated how to provoke political reaction and debate around its own agenda through attacks that target the economic and social well-being of Western societies.

Spectacular attacks in the Islamic militant cause have been successfully carried out in London and Madrid, demonstrating Al Qaeda's ability to strike in the heart of Europe and against U.S. allies in the war on terror. Recent attacks have also been successfully and repeatedly mounted against U.S. and Western interests throughout the world, for example against U.S. embassies, troops and representatives overseas. U.S. commercial interests have been targeted, including U.S.-branded international tourism facilities and hotel chains, the employees of American companies, and oil and gas facilities serving U.S. energy interests.

The bombings in Spain and the U.K. suggest that the threat in Western countries is increasingly coming from their own militant Islamic nationals, sometimes with resources and expertise from abroad. Some have argued that society within the U.S. is significantly different and the Muslim communities in U.S. cities are more integrated, less radicalized and unlikely to spawn the home-grown Islamic militants seen elsewhere. However this is not the view of U.S. security officials or independent terrorism analysts. Most expect that a future terrorist attack within the U.S. would involve U.S. nationals in the support and possibly in the implementation of the attack.

## **Since 9/11, plans for numerous attacks on U.S. soil have been interdicted**

The existence and interdiction of several apparent attempts over the past four years to plan, prepare or carry out an attack within the U.S. are a matter of public record. Some of these incidents are summarized in Table 1. Security officials within the U.S. have made public statements that tens of terrorist events (including meetings and reconnaissance exercises) are

detected and prevented each year<sup>3</sup>. Although several of these may be false alarms, it is evident that there are many different groups and individuals who are able and may be willing to carry out attacks in the U.S.

**Table 1. Reported observations of alleged active terrorist activity within U.S. since 9/11/2001**

1	Arrests connected with discovery of target lists in Los Angeles area	Aug-05
2	Alleged plot to assassinate George Bush	Feb-05
3	New York subway bombing arrests	Aug-04
4	Washington & New York financial districts alerts	Aug-04
5	Alleged surveillance of skyscrapers in Charlotte, NC	Jul-04
6	Alleged plot to blow up a shopping mall, Columbus, Ohio	Jun-04
7	Dirty bomb attack alert	Dec-03
8	Aircraft threat alert	Dec-03
9	SAM missile sting	Aug-03
10	Albany Muslims arrest	Aug-03
11	Security forces preparation for attack on Brooklyn Bridge, New York	Jun-03
12	Breakup of alleged Portland cell	Oct-02
13	Breakup of alleged Lackawanna cell	Sep-02
14	Breakup of alleged Detroit cell & alleged Disneyland plot	Aug-02
15	Seattle training camp	Aug-02
16	Security forces preparation for dirty bomb attack	May-02
17	Shoe bomber attack on aircraft en-route to U.S.	Jan-02
18	Alleged plot to blow up power grid in Carmel, Indiana	Jan-02

## The U.S. has become significantly more secure

Since 9/11, there has been a major improvement in security within the United States. RMS monitors and rates the counter-terrorism environment in several areas: intelligence and law-enforcement, frontier security, legal environment, international cooperation and public cooperation. The counter-terrorism environment (CTE) in the U.S. has improved in all these areas. RMS models CTE scores for 200 countries around the world on an annual basis.

The capability and orientation of U.S. security operations have improved across a large number of areas. Counter-terrorism activities have been consolidated into a Department of Homeland Security, which now has twice the annual budget that its component parts had in 2001. A major reorganization and reorientation of intelligence and policing has begun. Substantial progress has been made on improving checks on immigration, border security, and in monitoring potential trouble-makers living in the communities here. The legal apparatus to monitor and convict potential terrorists has been strengthened.

Individual measures have been taken to protect major facilities thought to be at risk. Airport procedures have been overhauled, major government buildings have implemented new access controls and anti-truck bomb barriers, protection measures have been increased around critical facilities and infrastructure. The private sector has also taken measures to protect itself, increasing spending on security and making changes to operational procedures.

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<sup>3</sup> For example FBI Director Robert Mueller, said that “tens of attacks (in the U.S.), probably close to a hundred around the world” had been stopped in the 15 months prior to Dec. 14, 2002.

These measures have improved our overall CTE rating for the U.S. from a relatively low level (3.5 'Restricted') prior to 9/11 to a strong capability (4.1 'Highly Restricted') in 2005<sup>4</sup>. The significance of this CTE rating is that it relates to the chances of interdicting an attempted terrorist attack: the higher the index rating the fewer attempted attacks are likely to succeed.

However, significant challenges still remain in improving U.S. security. Programs such as US-VISIT are growing in effectiveness but will take several more years before they achieve their full potential in deterring and catching the entry of foreign terrorist operators. Land borders remain a major weakness providing a potential alternative route in for operatives and terrorist materials. Cargo shipments have higher rates of inspection and better targeted selection, but significantly reducing the possible success rates of terrorist shipments will take time. Penetration of local jihadist communities by intelligence sources is an important goal, but reorientation of the security forces to operate effectively against this threat could take another five years<sup>5</sup>.

Overall security improvements in the U.S. have contributed to a major reduction in the risk of terrorism. However, this is a long-term project, and planned improvements are likely to take many years.

## **Higher security levels means fewer successful attacks, but not elimination of attacks**

The measures taken to make the U.S. more secure make it harder for the terrorist to succeed in perpetrating an attack. It makes more ambitious attack plans more vulnerable to detection and deters the less-committed attackers. But it cannot prevent all attacks. Countries where counter-terrorism is more effective than the U.S. (having a smaller population to monitor, shorter and more secure borders, and a longer experience of anti-terrorism operations than the U.S.) still experience attacks. Israel's counter-terrorism forces are independently assessed to have the most effective capability of any country,<sup>6</sup> and they claim to interdict 95% of all attempted attacks.<sup>7</sup> Yet Israel continues to experience deadly and destructive terrorist attacks. The United Kingdom has been battling IRA terrorism since the 1970s and is another of the world's leading counter-terrorism intelligence communities. It is now focused on Islamic militant terrorism, and has managed to prevent eight plots in the past three years<sup>8</sup> but was unable to prevent the July 7, 2005 London bombings.

Statistics suggest that a country with the resources and focus of the U.S. may be able to interdict around four in five of all major terrorist attack plans. With better security measures this ratio could be higher, and with good breaks the security measures now in place could succeed in preventing many attacks for some time. However, determined terrorists are likely to succeed

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<sup>4</sup> RMS works with Jane's Information Group, an independent defense and security analysis company, which rates the counter-terrorism environment of all countries worldwide on an index of 1 to 5.

<sup>5</sup> In testimony to the Sept 11 Committee in April 2004, CIA Director George Tenet estimated that it would take "at least five years work to have the clandestine service our country needs to combat Al Qaeda". At Senate nomination hearings to succeed Tenet in September 2004, Porter Goss stated "I don't believe five years is enough."

<sup>6</sup> Janes Information Group assesses Israel's Counter Terrorism Environment index as 4.4 'Very Highly Restrictive', the highest score of any country.

<sup>7</sup> Data from Israel Security Agency, 2004

<sup>8</sup> Statement on attacks interdicted in the U.K., Lord Stevens, ex-Commissioner, Metropolitan Police after July 7th, 2005

eventually. IRA terrorists once notoriously put out a press statement<sup>9</sup> saying “We only have to be lucky once. You have to be lucky every time.”

## **The greatest short-term threat to the U.S. is an attack using conventional weapons**

It is likely that a future attack on the United States will use the expertise and capabilities developed by Islamic militants worldwide. Of some 200 major terrorist attacks carried out by Islamic militants across the world in the past 12 months, 89% of them used improvised explosive devices such as terrorist bombs in cars, trucks, backpacks, or roadside packages. Expertise in bomb-making has become widespread in the Islamic militant movement, taught extensively in Al Qaeda training camps and now increasingly disseminated through the practical application of mounting attacks. Their bomb-making techniques have become increasingly proficient and sophisticated, from the mixing of chemicals to obtain military-quality explosives, to the timing devices and detonation techniques deployed. Furthermore, the materials to make a powerful bomb are readily available within the United States, a relatively low level of expertise is required to build an effective device, and an attack can be mounted with a small team and minimal equipment. It is difficult for security forces to detect a bomb attack in preparation or to defend a target against it easily. Because of the amount of destruction, death, and horror that can be achieved with a bomb, it remains the terrorist weapon of choice for many attacks.

Other conventional weapons are also favored by terrorists. Conflagration attacks using tankers of gasoline set on fire have been used in several highly-destructive attacks. Surface to air missiles (SAMs) are inexpensive, easily obtained and an attack on an aircraft could cause massive economic damage to the airline industry. Even small firearms could be used to perpetrate a mass-casualty attack, particularly in a hijacking or sabotage attack.

Aircraft impact attacks, as used on 9/11, remain a threat because successful attacks are often imitated. They would be much harder to repeat on U.S. passenger airlines given new security measures and passenger awareness but terrorists might use new variants of attack technique to get around these improved security measures.

The attacks of 9/11 used our own technology as a weapon – in that case fuel-laden aircraft. Other attacks could potentially use our infrastructure and equipment against us. Sabotage attacks on industrial sites, particularly those storing flammable, explosive or other hazardous materials could cause massive casualties and destruction in surrounding areas. Hazardous materials being transported through populated areas could be sabotaged to release their agents and cause harm. Sabotage attacks on nuclear power stations, although difficult to achieve with current defences in place, could potentially cause widespread contamination through release of radiological materials.

To carry out a major attack however requires resources, planning and dedicated personnel. Some types of attack need more resources than others. To estimate the likelihood of one form of attack over another, RMS has developed a model of the ‘logistical burden’<sup>10</sup> of each of 32 types of

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<sup>9</sup> IRA statement following the 1984 bombing of the Conservative Party Conference at Brighton in which 2 died, several cabinet members were injured and the Prime Minister, Margaret Thatcher, narrowly escaped being killed.

<sup>10</sup> The RMS measurement of ‘Logistical Burden’ represents a monetized score for the resources required. Four parameters are quantified: number of personnel, skill level required, capital costs for acquiring key materials and weaponry, and time. Logistical burden scores have values such as ‘10’ for a small-scale arson attack, ‘120’ for a car bomb, and up to values in the thousands for certain major CBRN attacks.

weapons systems and modes of attack, ranging from vehicle bombs to chemical, biological, radiological, and nuclear devices. Logistical burden measures the complexity of an attack in terms of the requirements of weapons procurement, skilled technology and expertise, manpower, financial resources, and time.

The greater the logistical burden of an attack, the greater the chance of its failure due to technical, logistical or security reasons. With the prudent assumption, based on Al Qaeda's past activity, that terrorists will plan rationally to optimize the impact of their attacks against their chance of success, we can model the likelihood of one form of attack over another. Terrorists will seek to cause the maximum destruction ('the utility to the terrorist') for the least 'logistical burden'. Using similar measures RMS can quantify the types of attacks that terrorists may be able to mount and compare them with the amount of damage they can do. Attacks like bombs cause very high casualties and economic loss compared with their logistical burden. Conventional weapons provide an attractive 'Return On Investment' for terrorists.

## **Insured losses from a conventional attack could reach billions of dollars in a range of U.S. cities**

RMS models can quantify the casualties and costs resulting from different types of attacks against potential targets across the United States. These include vehicle bombs of various different types and payloads being detonated at many different sites in the largest cities and urban areas in the U.S. Other conventional attack modes, like conflagration attacks, aircraft impact attacks, stand-off weapons (like SAM missiles), sabotage attacks are also modeled against many of their potential targets and the resulting casualties, direct property damage and business interruption in the damaged buildings are estimated for each attack.

An example of a highly destructive conventional (non-CBRN) attack mode would be a semi-tractor-trailer used to deliver 10 tons (TNT equivalent) of explosive yield<sup>11</sup> within the security perimeter of a commercial campus or in a dense urban environment such as a central business district. Such a device can generate blast pressures severe enough to cause partial collapse to high-rise engineered structures and complete failure to less-well engineered buildings in the vicinity of the explosion. A single attack with such a weapon can cause insured property and workers compensation losses exceeding billions of dollars in many of the cities of our nation. RMS modeling shows that a loss of over a billion dollars can be caused in each of the largest 30 cities in the U.S., and in the densest concentrations of high value property in Manhattan, losses could exceed \$15 billion.

The losses are greatest where commercial values are highest, buildings are densely packed, and employee occupancies are maximized. Areas like Manhattan represent attractive targets for terrorists because of their very high density of peak commercial property value. Other city centers also represent major loss potential, although property values may be lower and total commercial floor area less densely packed. Although losses of this severity are significant, we expect most of them to be borne by insurers without a major contribution from TRIA. In TRIA terms, most of the conventional attacks that we are likely to see in the U.S. are not likely to cause losses sufficient to trigger TRIA unless there are 'swarm' attacks (see below) or a few small companies take a disproportionate share of the loss.

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<sup>11</sup> This would be comparable to the bomb used by Hizballah to attack the Khobar Towers military housing complex in Saudi Arabia in 1996. A bomb of this size could also be delivered via a large cargo container or railroad car.

## **Terrorists are likely to maximize the impact of attack through simultaneous, coordinated attacks**

Simultaneous and coordinated multiple strike attacks ('swarm' attacks) are an Al Qaeda trademark.

Multiple coordinated strikes were seen on 9/11, in the London bombing of July 7, 2005, the Madrid bombing in 2004, the East African embassy bombings, the attacks in Mombasa, Kenya, a thwarted bomb swarm in Singapore in 2002, and many other examples around the world.

The advantage to the terrorist of carrying out swarm attacks is that it leverages the element of surprise and causes confusion and maximizes the panic and terror of the event itself. It spreads the resources of the emergency responders and can compound the total losses. After an attack, security is heightened and the opportunity for a terrorist group to carry out a second attack is reduced for a while, so carrying out multiple attacks at one time makes tactical sense for terrorists.

Swarm attacks can also generate catastrophic losses with relatively small yield explosive devices, as seen in the London and Madrid train bombings.

Given these tactical motivations, it is likely that future attacks will be swarm attacks. The number of simultaneous strikes (the 'multiplicity' of the attacks) will depend on the capabilities and resources of the terrorist group and the type of attack chosen. Modeling shows that swarm attacks of truck bombs could cause losses that trigger TRIA, assuming that such a multiple strike attack is considered as a single event by the Terrorism Risk Insurance Program.

The fact that swarm attacks are likely makes it more difficult for insurers to diversify their losses. Not only does terrorism risk follow where the exposures are concentrated, but swarm attacks correlate risks in cities across the country in a way that other perils, like earthquakes and hurricanes, do not.

## **Longer-term, it is likely that Al Qaeda will obtain and try to use CBRN weapons against the U.S.**

Much more severe losses could be inflicted if Islamic militant groups were able to mount a terrorist attack in the U.S. using a weapon of mass destruction, such as a chemical, biological, radiological, or nuclear agent (CBRN weapons). Several Islamic militant groups have expressed a strong interest in acquiring such weapons, and intelligence sources have monitored a debate within the Islamic militant movement about the morality of using such weapons to cause mass-casualties. This debate apparently concluded two years ago with a fatwa – a religious treatise – by an eminent cleric aligned to bin Laden, setting out a religious justification for the use of weapons of mass destruction against a population in a Western country such as United States.

Documents and materials discovered during the search of more than 40 sites used by Al Qaeda in Afghanistan in 2001 demonstrated "an appetite for weapons of mass destruction."<sup>12</sup> Statements made by members of the Al Qaeda network themselves have expounded a rhetoric of justification for using weapons of mass destruction on their enemies and threatened "the death of up to 4

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<sup>12</sup> Statement by Defense Secretary Donald H. Rumsfeld, 2002.

million Americans” through the use of chemical and biological weapons.<sup>13</sup> Al Qaeda are known to have made several attempts to research, develop, and acquire various CBRN agents. They have attempted to purchase Uranium on the black market, possibly for use in a dirty bomb, gas experiments on dogs were captured on video, and an extensive program of anthrax research was discovered after the capture of Khalid Shiekh Mohammed.

Al Qaeda is not the only terrorist group with the interest and lack of moral restraint to use CBRN weapons. The CIA has identified over 33 terrorist organizations that have expressed interest in using CBRN weapons.<sup>14</sup>

Thankfully, acquiring and deploying CBRN weapons is very difficult. The technology is complex and large resources and high skill levels are needed to develop and deploy them successfully. In Japan in the 1990s, Aum Shinrikyo, an apocalyptic terrorism group with large financial and technical resources, tried hard to develop chemical, biological and possibly even nuclear weapons, but had only limited success in achieving a mass-casualty event. The group was broken up after they mounted a sarin gas attack on the Tokyo subway that killed 12 people<sup>15</sup>, but police found industrial scale chemical production facilities and hundreds of graduate researchers in their organization. The complexity of developing chemical, biological and nuclear weapons has thwarted even nation states with considerable resources: Iraq spent a decade unsuccessfully attempting to build a nuclear weapon. The chances of a clandestine terrorist group developing a back-room workable nuclear device are thus very small.

Counter-terrorism analysts most fear the scenario of a terrorist group acquiring a CBRN weapon on the black market, from stockpiles of failed states or corrupt regimes. However, once the agent has been acquired, the logistics of transporting it internationally, smuggling into the country, and deploying a weapon successfully at a target in the U.S. without being detected are still formidable. The deployment of a chemical weapon, the effective dispersal of a biological agent, or the priming and detonation of a nuclear weapon are complex operations requiring very skilled people and a large logistical support team.

Nevertheless there is clear intent to carry out such an operation, and over time a determined group may be able to overcome these difficulties and evade our detection.

In testimony to Congress, CIA Director Goss concluded: “It may be only a matter of time before Al Qaeda or another group attempts to use chemical, biological, radiological or nuclear weapons.”<sup>16</sup>

## **The potential magnitudes of insured losses from CBRN attacks are catastrophic**

A sizeable CBRN attack on a major city in the U.S. could cause tens of thousands of casualties and destroy or contaminate large areas of town. If people were at work when the attack happened

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<sup>13</sup> In an audiotape released to Al Jazeera TV network in June 2002, Sulaiman Abu Gheith an ‘Al Qaeda spokesman’ warned of the death of up to 4 million Americans through the use of chemical and biological weapons. Similar statements have been issued on militant Islamic websites such as alnaeda.com.

<sup>14</sup> Director of Central Intelligence, Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, November 2004.

<sup>15</sup> In terms of the apocalyptic mass casualties that Aum Shinrikyo were aiming for, the Tokyo subway attack was a failure: ‘only’ 12 people were killed, and 6,000 injured. The volatility and impurity of the sarin gas used saved many lives.

<sup>16</sup> Testimony by DCI Goss to the Senate Intelligence Committee, February 2005.

(a likely scenario, as with the World Trade Center attacks) then potentially thousands of people would be covered under workers compensation laws. Many hundreds of billions of dollars of property could be affected, and where insurers have not implemented specific CBRN exclusions, these would result in major insurance claims.

RMS models the losses of a range of sizes and types of CBRN weapons deployed on U.S. cities. The following are estimates of potential losses for an attack on Manhattan.

**Table 2. Examples of potential losses to property and workers compensation from CBRN attacks**

	<b>Combined P&amp;WC Loss (\$Bn)</b>	<b>Property Loss (\$Bn)</b>	<b>Workers Comp Loss (\$Bn)</b>	<b># of Fatalities</b>
Sarin gas attack (1,000 kg ground dispersal)	<b>\$28</b>	\$21	\$7	7,000
Dirty bomb (15,000 curies of Cesium-137)	<b>\$62</b>	\$62	\$0.2	Few
Anthrax attack (1 kg anthrax slurry)	<b>\$61</b>	\$35	\$26	40,000
Anthrax attack (10 kg anthrax slurry)	<b>\$171</b>	\$112	\$59	90,000
Anthrax attack (75 kg anthrax slurry)	<b>\$340</b>	\$266	\$74	120,000
Sabotage attack on a nearby nuclear power plant	<b>\$217</b>	\$202	\$15	1,000
Nuclear bomb (battlefield 1 kt)	<b>\$240</b>	\$140	\$100	130,000
Nuclear bomb (tactical 5 kt)	<b>\$450</b>	\$250	\$200	300,000

These losses point to the types of events that would exceed the current industry retention level of TRIA and also show sample events that could exhaust the TRIA limit of \$100 billion. There are more severe events that could be imagined, for example larger yield nuclear weapons, and there could be potentially multiple attacks on several cities simultaneously that would cause even larger losses.

### **Insured losses are only a fraction of the total economic impact of a terrorist attack**

In addition to the injuries caused to people and the destruction of property, terrorist attacks also cause a wide range of other economic loss. These include suspension of business activity, disruption of travel, loss of consumer confidence, decrease in worker productivity, impact on tourism, increased costs of heightened security, stock market uncertainty and other costs. Estimates suggest that the total economic loss resulting from the World Trade Center attacks in 2001 exceeded \$190 billion, of which the total insured losses were around \$30 billion<sup>17</sup>. After the July 7 London bombing, insured losses were minimal but studies by economists estimated the cost to the British economy of \$4 to \$6 billion.<sup>18</sup>

These general economic losses are much more difficult to estimate as they depend on the type of attack, the location and business sectors targeted, the speed and effectiveness of how the emergency is handled, and other factors.

<sup>17</sup> 2001 economic impact in the U.S. per GAO review of economic studies: 5/29/02

<sup>18</sup> Estimate by World Markets Research Centre of cost to the UK economy, which also projected a fall in growth of up to 0.2% over the following quarter, although suggested it would rebound the following quarter, as it did after September 11 and the Madrid bombings.

These other economic losses are less likely to be recovered from insurers. Some compensation for business interruption for companies in damaged buildings is recoverable from insurers under property policy terms, but the large majority of economic downturns resulting from terrorism-related disruption is not insured. Some of the financial impacts may have long lasting consequences for the economy as a whole.

## **Targets are selected with the greatest potential for economic loss, mass casualties and symbolic value**

Terrorists carefully plan their attacks. Al Qaeda and its associate groups have developed a highly systematic approach to selecting their targets. As more attack case studies emerge, we see a process of research and evaluation for targets that fit the terrorists' strategic and tactical objectives. Terrorists aim to hit locations with the potential for substantial political impact, and increasingly, they are aiming for mass casualties and large scale economic disruption. The attacks by Al Qaeda are ruthless in seeking to maximize their impact: they patiently research and carry out reconnaissance to find the optimum location and target for their attack.

Debriefings of captured operatives and indictment evidence for terrorism prosecutions document the detail of the preparation for attacks, including alternative targets considered and criteria by which targets were selected. Captured video footage of reconnaissance shows what features interest them. Even for lesser scale attacks, such as individual suicide bombings, the mind-sets of the bombers and the direction provided by their support team has emerged from interviewing failed bombers and forensic analysis of attacks that succeeded. Empirically, about a quarter of Islamic militant attacks worldwide have been against government buildings and important centers of legislative and executive power, the highest tier of target importance to them. The next most important tier is commercial and economic targets: a further 20% of attacks are against targets such as major commercial buildings and business districts, airports, hotels, casinos, and commercial aircraft. A wide range of other targets constitute the remaining 55% of attacks, and their prioritization can be seen in how often they are attacked relative to other types of assets.

Documenting the targeting process has provided an understanding of the 'utility' of a target to an attacker. The prioritization of targets comes from the amount of damage, life loss, and disruption that would be caused, along with how well that target symbolically represents the cause of the terrorist's grievance. By identifying similar targets to those that have been attacked in the past and by finding the locations where attack consequences would be worst, it is possible to analyze this targeting methodology and estimate its consequences in terms of what losses are possible, and which targets are most likely.

The city where a target is located is an important consideration for a foreign terrorist that is motivated by anti-national sentiment. The strategy of conducting spectacular attacks on the economic engines of U.S. prosperity and symbols of U.S. nationhood and leadership strongly prefers attacks in major cities. Size, economic prosperity, political importance and iconic stature determine the prioritization of a city to the terrorist, as can be seen in their targeting patterns. Islamic militant terrorists have been linked to more than 500 major attacks (car bombs or worse) in over 30 different countries during the past four years – 42% of these have been in the premier city of the country attacked and another 29% in a major (top-five largest) city in that country. Reported observations of alleged active terrorist activity within U.S. since 9/11 are listed in Table

1: 40% of all of the suspected targets were in New York and Washington D.C., and three quarters of them were in seven major cities.<sup>19</sup>

RMS assesses the importance of targets in terms of their ‘utility’ to the terrorist. U.S. cities are rated using an index of its population, gross metropolitan product, historical targeting and name recognition within the global Islamic community, and open source evidence of terrorist interest in targets within the city. RMS models the likelihood of strikes in U.S. cities using eight tiers, prioritized by the targeting preferences of Al Qaeda and its associates.

## **The threat of terrorism is variable and evolves over time**

Terrorism is a conflict between an attacker and a defender. It is in the very nature of this conflict that the risk is not constant, but changes and evolves. As one side learns and tries to anticipate the move of its antagonist, the other changes its tactics to counter. RMS models this dynamic using game theory. To maximize the chances of beating the defender, it makes sense for an attacker to vary their attacks, and while retaining their objectives, to be as unpredictable as possible.<sup>20</sup>

The fact that the historical pattern of terrorism risk may not be a dependable guide to the risk in the future poses an additional challenge to the insurance industry. Instead insurers need to anticipate shifts in the broad nature of that risk, and this adds to the uncertainty. Historians show that there have been periodic shifts and sudden changes in terrorism technique: the invention of dynamite was one such moment, the hijacking attack of 9/11 was another, and the possible use of CBRN weapons could constitute a future one.

It is possible to observe changes in tactics and developments of techniques even over the past few years: targeting mass casualties and civilians has become more common than attacking iconic targets and military personnel. It is possible that economic disruption and financial impairment could be an emerging new trend. Others have predicted shifts in terrorists’ tactics towards social disruption or targeting the food supply chain or communication infrastructure.

The dynamic nature of terrorism risk adds to the uncertainty of managing the risk into the future.

## **Understanding the nature of terrorism threat is vital to making decisions about TRIA**

Understanding the true nature of the threat posed by terrorism in the United States is key to managing the risk arising from it. The June 30, 2005 Treasury Department report<sup>21</sup> was complimentary about the role of modeling in developing a terrorism insurance market by embodying this understanding in decision-support tools.

It recognized that modeling has greatly improved the ability of insurers to identify and quantify the severity of an event, enabling them to better assess their accumulations of risk and to more effectively underwrite coverage. The science of modeling attack frequency has also evolved

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<sup>19</sup> New York, Washington, Chicago, Los Angeles, San Francisco, Miami, and Las Vegas.

<sup>20</sup> “If a defender’s move is unvarying, then the variety in outcomes will be as large as the variety in the attacker’s moves; only variety in the defender’s moves can force down variety in the outcomes.” Ashbey’s Law of Requisite Variety.

<sup>21</sup> ‘Assessment: The Terrorism Risk Insurance Act of 2002’; The United States Department of the Treasury, Report to Congress, June 30, 2005;

through four years of experience and better information about numbers of attack attempts and interdiction rates by the security forces.

Views of terrorism risk however, differ. Some view the elements of variability seen in terrorist strikes as evidence that terrorism is a random process, or that terrorists are madmen acting irrationally. RMS believes differently. RMS believes that the terrorists that are capable of organizing the spectacular large-loss attacks are highly rational and although they vary their attack moves to surprise the defenders, their objectives demonstrate a clear picture of terrorism risk.

RMS measures terrorism risk by the likelihood of different levels of loss being caused, either to property, business interruption or in the number of people hurt. This can be translated into insurance loss through considering how much of the resultant loss is covered by insurance.

This view of risk provides some insights into the issue of TRIA and its value to insurers, and to the nation, in helping to provide a market for terrorism insurance.

These are discussed in the next two sections.

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### 3. Insurability of Terrorism Risk

#### **Terrorism poses unique risk management challenges**

Terrorism has a number of characteristics that make it radically different from other perils normally covered by insurance. These present unique risk management challenges. They are described in the following sections, but in summary they are:

1. Terrorism can potentially cause much greater insured loss than from other perils and claims could potentially exceed the capital the insurance industry has available
2. Diversification of risk is problematic – terrorism risk is highest in the places of where there is the greatest demand for terrorism insurance and insured value
3. State regulations impact insurers ability to price and control their exposure
4. There are higher levels of uncertainties associated with terrorism risk than insuring other types of natural catastrophe perils
5. Government is an active player in shaping the risk covered by insurers

#### **Terrorism can potentially cause much greater insured loss than from other perils**

Although most terrorist events seen worldwide are relatively small in their costs and casualties, it is clear that terrorism has the potential to create massive losses, larger than anything previously seen in insurance claims. Natural catastrophes, including earthquakes and hurricanes, can be extremely costly because they can cause damage over a large region: it is estimated that the strongest category of hurricane (CAT 5) making landfall over the most populated parts of Florida

would cause a gross loss to the insurance industry of \$150 to 180 billion<sup>22</sup>. Earthquakes could cause similar levels of loss: some potentially large magnitude events occurring on seismic sources where they would impact concentrations of high value but less earthquake-resistant property in locations like Connecticut, New Madrid and other regions, would cause losses up to \$150 billion<sup>23</sup>.

These extreme natural catastrophe events however could be dwarfed by some types of catastrophic terrorist attacks. The Department of Homeland Security has published its “National Planning Scenarios” that include 12 potential terrorist attacks that it urges states to prepare for as possible catastrophe scenarios. Two of these scenarios – a 10 kiloton nuclear bomb detonated in a major city and an anthrax attack on five cities – could cost the insurance industry more than \$500 billion in claims if a large proportion of the affected commercial properties had terrorism insurance and their employees all had Workers Compensation cover<sup>24</sup>.

The scale of these potential losses make terrorism insurance a uniquely perilous exposure for an insurance company. Without reinsurance, a Federal Government backstop or other way of limiting their liability for loss, insurers cannot legitimately underwrite terrorism insurance beyond their ability to pay.

***Extreme terrorism losses could significantly exceed the capital the insurance industry has available***

The losses from the most likely forms of conventional terrorist attacks can be absorbed by the insurance industry. Our estimates show losses up to the tens of billions resulting from vehicle bombs, sabotage attacks, and aircraft impact attacks. These losses, though painful and with the potential to ruin some insurance companies, would not threaten the viability of the insurance industry. Losses from large scale attacks with CBRN weapons – such as those given in Table 2 - could reach hundreds of billions and readily exceed the levels of total industry capital, putting most insurance companies out of business.

In 2004 the surplus dedicated to commercial lines insurance was \$155 billion. This contrasts with a surplus for the entire Property and Casualty insurance industry of \$394 billion and a surplus for Life and Health lines of \$219 billion.<sup>25</sup>

A large loss does not have to exceed the available capital of a company to cause it significant financial impairment and to threaten its viability. A large loss (somewhere in the region of 15 to 20% of its capital) may cause an insurer to be downgraded in its credit rating. For example just 16 days after the World Trade Center losses occurred, AM Best downgraded their rating of eight companies who had suffered loss in the event, put another eight on “under review with negative implications,” and 11 “under review with developing implications.” Once a company is downgraded, it may have difficulties attracting new customers, and in some circumstances the downgrading can lead to a deteriorating spiral that drives a company out of business.

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<sup>22</sup> RMS U.S. Hurricane model 2005.

<sup>23</sup> RMS U.S. Earthquake model 2005.

<sup>24</sup> RMS U.S. Terrorism model 2005.

<sup>25</sup> Insurance Information Institute 2004

### ***Insurers have not added capacity for terrorism coverage***

The expected returns on terrorism coverage are not adequate to drive insurers to increase their capacity for providing terrorism coverage. The capital that an insurer has available is set by regulators, shareholders, and managers to provide an adequate means of paying losses from a collection of perils traditionally covered, including routine and catastrophe perils arising from accidents and natural hazards. September 11, 2001 signaled that terrorism had become a risk requiring active management and pricing – previously terrorism losses were relatively minor. Insurers felt that without significant additional capital to cover this new development they could not expose their company to risk of failure and sought to limit their exposure by excluding terrorism coverage. TRIA was introduced to bridge that capital inadequacy and ensure continued coverage. In the past three years insurers have not added new capital to cover this additional peril for the following reasons:

- They have not earned attractive returns on offering terrorism coverage (highly regulated industry suffers from inadequate pricing compared to potential losses) and so have not attracted new shareholder investment
- Regulations and taxation rules hinder insurers' ability to set aside terrorism premium to cover future losses to build new reserves – premium gathered in one year to cover an event that may occur in the future is treated as a taxable profit in that year

The June Treasury Report concluded that TRIA was hindering the creativity of the private insurance market in devising new solutions and attracting new capital. The problem of attracting new capital to the insurance market to cover terrorism is however deeper than TRIA and would require a sweeping change of state regulation, pricing restrictions, reserving rules, and other radical changes to alter the economics of capital adequacy for terrorism coverage.

Without additional capital to pay for future large losses, most insurance companies are unable – by statutory regulation as well as prudent financial management – to offer terrorism insurance without the Federal Government backstop. The expiration of TRIA is likely to see insurers exiting from the terrorism market.

### ***There is only limited terrorism capacity currently available in the reinsurance market***

Insurance companies have traditionally leveraged their capital through risk transfer in the reinsurance market. For many of the reasons discussed in this report, reinsurers have not been attracted to participate in the U.S. terrorism market except where they can tightly constrain their exposures and charge appropriately.

There is currently an estimated \$4 to \$6 billion of private terrorism reinsurance available, compared to an estimated \$60 to \$80 billion of natural catastrophe reinsurance<sup>26</sup>. Most of the terrorism reinsurance that is available has exclusions for CBRN attacks, and thus does not provide insurers with protection against the larger attacks that threaten their viability.

The pricing of terrorism reinsurance is high, typically at rates that are multiples of natural catastrophe reinsurance.

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<sup>26</sup> Testimony of Franklin W. Nutter, President of Reinsurance Association of America to Committee on Banking, Housing and Urban Affairs, Oversight of the Terrorism Risk Insurance Program, April 14, 2005.

It is possible that in the absence of TRIA, an increased demand for private reinsurance may attract additional capital to the marketplace. However the initial retreat from terrorism coverage by reinsurers happened before TRIA was put into place, and TRIA was a response to the absence of reinsurance coverage leading to the withdrawal of the primary insurance market. Reinsurers may venture back into the market over time, as they develop confidence that the risk can be quantified and managed, but the expiration of TRIA itself is not going to trigger a major return to the market by reinsurers.

Indeed reinsurers could be scared away from the market for an extended period of time in the event of another terrorist attack. A sizeable attack would likely reduce reinsurance capacity even further, increase pricing and possibly prompt additional exclusions.

Reinsurance coverage is not yet sufficiently available to enable insurers to obtain protection and leverage their capital using the private reinsurance market.

***The capital markets are unlikely to be major sources of additional terrorism risk capacity***

There is a hope that capital markets may be a significant alternative source for risk capital. The capital markets have successfully placed numerous catastrophe bonds for natural perils over the past 10 years, but significantly provides less than 5% of the risk transfer capital involved for natural catastrophe. Capital markets could play a role in terrorism risk transfer but is similarly unlikely to provide the bulk of the capacity needed.

The past two years has seen the first issuance of catastrophe bonds involving terrorism coverage. The first was Golden Goal Finance Ltd, which covers the cancellation risk of the 2006 FIFA World Cup from terrorism and some lesser hazards. The second was Vita Capital, which covers Swiss Re for excess mortality risk from pandemics as well as terrorism and natural catastrophes. No successful securitizations of terrorism risk to U.S. property have been performed to date.

As with the securitization of natural catastrophe risks, the capital markets mainly provide an alternative means of risk transfer that serves as a regulator for insurance pricing. The volume of issuance of catastrophe bonds depends crucially on insurance pricing. If insurance prices hardened substantially, there would be an increase in issuance. The higher the cost of terrorism insurance, the more attractive a securitization would become.

If TRIA were not renewed, the scarcity and cost of insurance cover would encourage the issuance of some additional terrorism bonds, but not on a scale to make a major difference. There is likely to be some amount of capacity within specialized hedge funds for such investments. This capacity is estimated at present to be about a billion dollars, but, depending on the risk-reward profiles of other investments, this capacity may increase over time. Terrorism risk is unlikely to be suitable for retail investors, so the overall capacity will be limited to professional investors.

Pricing for the uncertainty associated with terrorism risk makes bonds prohibitively costly and there is reportedly some investor discomfort with terrorism as new asset class because of the potential for moral hazard (terrorists could attack deliberately to sabotage an investment vehicle).

Most significantly, catastrophe bonds have mainly had a role in diversification of investment portfolios. However terrorism bonds are likely to be highly correlated with other with mainstream investment vehicles: major attacks can have deleterious effects on stock markets and consumer confidence, and this high correlation is unlikely to make terrorism bonds an attractive investment alternative.

Capital markets are unlikely in the short term to fill the large gap in the capacity deficit for terrorism insurance risk.

## **Diversification of terrorism risk is problematic – the risk is highest in the places of highest insured value**

The insurance industry works on the principle of diversification of risk – spreading the risk over sufficient numbers of policy-holders to cover the losses that occur to the few.

Because of the nature of terrorism risk, with terrorists seeking to maximize losses, the risk is highly correlated with concentrations of insured value. Major cities are the highest priority targets, particularly for the spectacular large scale attacks that Islamic militant threat groups seek to perpetrate. The fact that Al Qaeda tends to carry out multiple, synchronized attacks makes diversification across different cities also problematic – it is still possible to experience losses in several cities simultaneously.

Major cities and the business district in city centers are where most of commercial value is concentrated, and where the demand for terrorism insurance is the greatest. Commercial insurers cannot build a significant book of business without including a high proportion of exposures in these areas. Insurance companies find that many of the lines they write: commercial property, workers compensation, liability, fine art and many others are also closely interlinked with these areas of high risk.

Adverse selection can exacerbate this, with strongest demand for terrorism insurance coming from those most at risk in the major cities but with much more price sensitivity and lower take-up rates outside those areas. In this way terrorism insurance has similarities to flood insurance, where those in the river plains are most in need of coverage but insurers are unable to get sufficient diversification of the risk by selling coverage more generally. Flood insurance has been a federally subsidized program since 1968.<sup>27</sup>

### ***Terrorism losses are likely to be concentrated in the hands of a relatively small number of insurers***

When a terrorist attack occurs, the footprint of its effects is usually measured in terms of hundreds of feet not miles. An attack is highly concentrated in small geographical area and a severe attack can cause very high levels of damage and in some cases total losses to individual buildings. These high levels of loss in small concentrated areas are very punishing to the insurers who have policies on those particular buildings.

This is unlike the damage patterns from an earthquake or a hurricane that tends to cause widespread loss across several counties, over which insurers are able to manage their accumulations sufficiently to ensure that losses are shared over a mix of different insurance companies.

For example the U.S. hurricanes of 2004 cost the insurance industry \$27 billion. This was spread widely across the industry and the 10 insurance companies with the largest losses accounted for

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<sup>27</sup> The Federal Insurance Administration, a department of the Federal Emergency Management Agency (FEMA), administers the National Flood Program, administered under both the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

only 27% of the total. By contrast the insured losses from the World Trade Center attack in 2001 were similar in magnitude, at \$33 billion, but much more concentrated: the 10 companies with the greatest losses accounted for 46% of the total.

Insurance policies are written for buildings and companies in buildings ('locations'). Large and high value buildings may be split between several insurers ('facultative') but most locations are written by a single insurer, so if the building is destroyed that insurer takes a high loss and other insurers take none. The concentration of terrorism loss in a few buildings means that large losses are likely to be concentrated in a relatively small number of insurers, rather than shared across the industry, increasing the likelihood of ruin for an insurer and requiring larger capital margins.

***The insurance industry assumes the first dollar loss, and in over 90% of the time, it pays the majority of the loss; the costs to the Federal Government of TRIA are low, and recoverable***

The Terrorism Risk Insurance Program has been constructed to cover the more rare and costly terrorist attacks. The large majority of terrorist attacks that are likely to occur will cause losses below the retention level of most participating companies and are unlikely to cost the program anything.

RMS analysis of the likely distribution of terrorism losses suggests that for more than 90% of expected attacks, the insurance industry will pay the majority of the losses.

An analysis of the costs of extending TRIA<sup>28</sup> suggests that the expected average annual loss subject to coverage under TRIA would be about \$1.5 billion. On an expected-value basis, the Congressional Budget Office estimates that enacting an extension to TRIA would increase direct spending by about \$1.1 billion over the 2005-2009 period and by \$1.3 billion over 10 years. The Treasury Department would recoup some or all of those costs through surcharges, which would increase governmental receipts by about \$70 million through 2009 and \$480 million over 10 years. Because surcharges can be imposed for many years, CBO expects that the increase in spending would eventually be offset to a greater extent than that.

In terms of the benefits to the nation of continuing stability in the commercial property market and the functioning of a viable insurance market, the extension of TRIA represents good value to the taxpayer.

## **State regulations impact insurers' ability to control their exposure**

In the absence of TRIA, insurers will exit the terrorism market if they cannot control their exposure to terrorism risk. There are several regulatory restrictions that limit the ability of insurers to control their exposure to terrorism risk.

No exclusions are permitted on workers compensation policies. This means that the extreme losses that are possible from CBRN and other mass-casualty attacks, which are likely to be specifically targeted on the employees driving our economic growth, are part of the exposure faced by writers of workers compensation insurance.

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<sup>28</sup> Congressional Budget Office, Cost Estimate for H.R. 4634, Terrorism Insurance Backstop Extension Act of 2004 (November 19, 2004). This estimate used modeling carried out for it by Risk Management Solutions.

Separate regulation of insurance by each state means that there are many variations of rules and requirements in each state. Several states prohibit the exclusion of CBRN from property insurance, forcing insurance companies to consider their own viability if they continue to write property coverage in those states.

State regulators control pricing of insurance. Insurance remains one of the few remaining free market industries to retain price controls and this limits the ability of insurers to respond flexibly to a market dynamic. Compounding the inefficiencies is the need to file terrorism insurance rates with each state, which insurers have found to be a major logistical challenge in establishing a new nation-wide market in terrorism insurance. Taking a national approach to pricing and trying to build a diversified portfolio may mean subsidizing the high risk of New York with the lower risk of Iowa, but justifying these prices in each state is a complex challenge.

Some states also limit the interpretation of exclusion clauses covering losses from a fire that might arise following a terrorist attack. This means that in some states, insurers providing fire insurance without terrorism coverage, and without the ability to collect additional premium to compensate them for that risk, may still be liable for losses arising from a terrorist attack.

The development of a terrorism insurance market is a national problem, but it is hindered by different regulatory environments in each of the 50 states. State regulation is an added complexity that is limiting the ability of insurers to control their exposure and more likely to lead to withdrawal from covering terrorism if TRIA expires.

## **There are higher levels of uncertainties associated with terrorism risk than insuring other types of natural catastrophe perils**

Terrorism has higher levels of uncertainty associated with it than many other perils. Terrorism does not have a long historical claims history to guide insurers. Estimation of terrorism risk involves estimation of the severity and frequency of future events. Many elements of terrorism risk analysis have higher uncertainties on them than comparable perils. Insurers add loadings to their pricing to account for uncertainty. The large uncertainties could lead to high loadings which could make terrorism insurance very costly.

The potential severity of terrorism events impacts solvency risk for insurers. Insurers have much lower risk tolerance for writing subjectively uncertain exposure when solvency is an issue. This uncertainty forces high capital costs for insurers trying to write terrorism business.

Full recognition of all the uncertainties in insurance price loadings could lead to very high insurance rates which may be prohibitively expensive for potential consumers.

## **Government is an active player in shaping the risk that insurers cover**

Another fact makes terrorism a different, perhaps unique, peril to insure. Unlike the hazard of an earthquake or the occurrence of a hurricane making landfall, terrorism risk is not an absolute or a natural phenomenon. It can be changed by the actions of the government and the shape of the risk can also be altered by the owners of buildings likely to be attacked.

Government action, through the resources and direction it provides to law-enforcement agencies and to counter-terrorism intelligence operations, can reduce the threat of terrorism by catching

terrorists, making it harder for terrorists to operate and by interdicting increasing numbers of the plots they devise. Improved counter-terrorism effectiveness reduces the overall risk.

Less palatable to discuss is that governments can also affect terrorism risk through their foreign policy and political actions: terrorism is political violence, directed at changing policy. This is not to argue that we should change any of the policies that terrorists seek to influence, only to observe that this is a political interaction between opposing ideologies.

There are certainly constraints on the degree that government can reduce terrorism risk: civil liberties, budgets, operational issues, and their democratic mandate all limit what is possible but it retains a role of decision-making and prioritization of the use of resources that affect the risk. Insurance companies are insuring a risk that government action has some role in determining the degree of the peril.

Most Western democratic societies faced with a significant terrorism risk recognize the partnership between the private sector and the public sector and have some degree of government participation in the private insurance market, from the full recovery of terrorism losses offered by Israel, to government pools set up in several countries, such as United Kingdom, Australia, France, Spain, Germany, the Netherlands and other countries.

## **Insurance is not an effective mechanism to encourage private mitigation of terrorism risk**

The debate around TRIA has prompted discussion of the insurance industry's role in encouraging the owners of buildings and facilities to do more to protect themselves. There are three main reasons why, for terrorism risk specifically, insurance is not an effective mechanism to encourage private mitigation:

1. Hardening targets pushes risk from one place to another – it does not reduce the chance of an attack
2. The cost of increasing security is disproportionate to any incentives that insurers can offer
3. Reduction of terrorism risk is most effectively achieved by the government, not individuals

These reasons are discussed in the following sections.

### ***Hardening targets pushes risk from one place to another – it does not reduce the chance of attack***

The nature of the risk can be affected by the owners of buildings and facilities likely to be targeted. A variety of measures can make a target harder to attack and so less attractive to the terrorist. Measures such as improved access controls to buildings, stand-off barriers to keep vehicle bombs away, positioning of security guards and so on, can deter an attack.

When terrorists carry out their reconnaissance they look for targets that are easiest to attack – a 'hardened' target can cause a terrorist to choose a softer target instead. Like a lion hunting a zebra pack, the terrorist will seek the most vulnerable prey of a variety of candidate targets. As some buildings improve their security, they may become safer but they make other buildings more likely to be attacked. Investment in hardening targets pushes attack likelihood from one location

to another, rather than reducing the overall likelihood of an attack. To an insurer with a portfolio of properties there may be little value in target hardening by only some of its policy-holders.

If all the most valuable targets were made harder to hit, then by pushing the attack likelihood to less valuable targets the overall losses will be reduced and this would benefit society as a whole, and insurers with large portfolios. However, in practice what has occurred over the past few years is that the major investment in security has been carried out by government, mainly on its own facilities and buildings, and this investment has not been matched by the private sector in improving security at commercial properties. As discussed above, government facilities are high priority targets but commercial targets are also attractive. As government buildings have been made increasingly harder to attack, RMS modeling suggests that this has pushed the risk onto commercial targets, which tend to be insured. This can be seen in attacks abroad, where as U.S. embassies and consulates have become increasingly hardened, attacks have instead been carried out on softer targets of U.S.-branded hotels, banks and commercial targets. Government investment in protecting its facilities appears to be increasing the risk carried by the private sector and private insurance markets.

Some types of investment in security at a target make an attack less damaging, for example better fire-suppression systems, blast-resistant glazing or biological filters on an air-conditioning system. These types of improvement are helpful in reducing losses overall, but deterrence measures do not reduce the risk for an insurer that covers several potential targets – or for society as a whole.

***The cost of increasing security is disproportionate to any incentives that insurers can offer***

Some have advocated that insurers should offer discounts on insurance premiums to policy-holders that implement improvements to their terrorism security. These suggestions underestimate the economics of anti-terrorism security compared to terrorism insurance premiums.

The types of measures required to protect a building from a terrorist attack range from procedural, for example instigating preparedness plans, to additional equipment and manpower, such as cameras and security guards, through to engineering measures such as installation of blast barriers and structural reinforcement. Most security specialists recommend a blend of protection measures to achieve a constant standard of security everywhere and eliminate vulnerabilities which attackers can exploit.

These measures can be very expensive to implement. The costs far exceed the cost of terrorism insurance premiums, which average around 5% of the fire insurance premium. Insurers are very reluctant to forego any part of their premium income, but even if the premium were to be discounted substantially, it would not be an attractive economic incentive to a building owner. Insurers find it easier to offer other incentives than surrendering income, such as decreased deductibles in the event of a loss, but again this may not be attractive against the financial costs of implementing substantial security improvements.

Insurers do not have a large infrastructure to verify mitigation measures or inspect insured properties. To implement an incentive scheme could involve additional costs of site inspections that would add to the costs of premiums and drive up the cost of terrorism insurance generally.

***Reduction of terrorism risk is most effectively achieved by the government, not individuals***

High value iconic buildings and critical facilities need high levels of anti-terrorism security. It is also important to encourage all property owners and companies to maintain high security alertness and to maximize their own security. But encouraging high levels of spending across a more general class of property, perhaps hundreds of thousands of buildings, would be an unproductive use of resources.

The ‘hardening’ of large numbers of buildings could potentially reduce the losses from terrorism, either by target substitution to less valuable targets, or by reducing the damage that results from a direct attack. However the total costs of security spending would far exceed likely losses from terrorism and the overall social cost could be extensive. Adding significant security costs to private sector businesses would be detrimental to economic productivity.

A more cost-effective way of reducing terrorism risk to society as a whole is to invest in counter-terrorism intelligence and law enforcement. Reducing the source of the threat is more effective than trying to mitigate its effects on all its potential targets. The private sector has little ability to contribute to removing the source of the threat, other than through its taxes and the occasional bounty-hunter.

Terrorism risk reduction is most efficiently and cost-effectively achieved by the Federal Government.

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## **4. Is TRIA vital to a functional market for terrorism insurance?**

### **The existence of TRIA has created a relatively stable, viable market for terrorism insurance**

By providing rules and limiting the absolute levels of risk faced by insurance companies, TRIA has created available capacity and a competitive marketplace. It has allowed three years of experience to be gained, to test out market appetites and to explore potential opportunities.

The rules helped establish the common ground for offering a standard product and a framework for the industry to provide insurance coverage. TRIA frames the total risk to the industry by setting out limits and establishing a loss-sharing mechanism with the Federal Government.

The limits that it sets for risk to insurers allows reinsurers to provide coverage within risk tolerances. The stability over the three years has been assisted by the fact that no terrorism loss has occurred and this has helped provide perspective for insurers who are considering the likely frequency and severity of future terrorism losses.

This market would not have become established without TRIA.

## **With TRIA in place, terrorism insurance take-up rates have increased and prices have decreased**

Most analysts agree that TRIA has been successful in establishing a viable market. The metrics of the viability of the market are take-up rates and pricing, both of which have been the subject of considerable scrutiny and concern during the lifetime of TRIA. Insurers were allowed to set their own pricing, subject to state rate filing. The first pricing exercise for the statutory cover in November 2002 was carried out under considerable time pressure: insurers had only weeks to devise pricing tariffs and send out offering letters to customers. In subsequent years, insurers had more opportunities to adjust pricing and to explore the elasticity of demand.

The take-up rates for terrorism insurance have increased from just over 20% at the beginning of 2003 to around 60% at present.<sup>29</sup> Average prices have moderated from around 5% of property premium (median pricing) to around 3.7%, although at least a portion of this reduction likely reflects the expansion in coverage purchased outside of major risk areas

Insurers have generally been seeking price points that maximize volume of business and generate a diversified portfolio rather than a profitable risk-loaded premium. The tripling of take-up during the three years is evidence of the successful matching of the product pricing with consumer demand.

## **TRIA provides the insurance industry with solvency, not subsidy**

TRIA protects the insurance industry from the extreme losses that could force them out of business rather than contributing towards the costs of more likely and lower magnitude losses. It covers a relatively small portion of insurers' risk.

In the event of an attack, there is less than 10% chance of a loss reaching the level of the industry retention for TRIA. There is the chance in any sizeable attack that a small number of insurance companies will take a loss that exceeds their retention and that they will make a recovery from the program, but a loss in any given year that exceeds the retention level for the whole industry is a low probability.

The insurance industry bears over 80% of the overall terrorism risk, measured in expected loss.

## **If TRIA sunsets, many insurance companies will reduce their presence or exit the terrorism insurance market altogether**

This report has argued that terrorism risk is an exposure that can threaten the viability of insurance companies, and that without TRIA many insurance companies will be unable to continue offering terrorism coverage. Some larger and specialist insurance companies will offer coverage but capacity will become scarce, and prices will rise.

Rating agencies are likely to become more wary of companies voluntarily writing terrorism coverage and penalize their credit ratings. Insurers seeking to protect solvency margins, credit ratings and reduce unmanageable liabilities will exit from those states that prevent CBRN

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<sup>29</sup> AON, 'Terrorism Risk Management & Risk Transfer Market Overview', December 2004.

exclusions and, without the ability to create a balanced portfolio, may quit some lines of business altogether.

Large workers compensation accounts may become uninsurable as regulatory requirements preclude exclusions and these exposures represent potential CBRN losses of unmanageable scale. Capacity for other lines, particularly those offering CBRN coverage, will become scarce. As prices rise this will attract some level of new participants in the market, providing specialist coverage at premium pricing. It is unlikely to attract widescale new capital to the insurance market.

The argument has been made that the absence of TRIA will prompt creativity in the provision of new capital for insurance solutions. RMS has argued (above) that alternative solutions for risk transfer, such as terrorism catastrophe bonds, are likely to remain very specialized vehicles rather than become a more common class of investment asset, because of investor discomfort, high costs and correlation with investment portfolios.

The established insurance companies remain the main vehicle for carrying terrorism risk for the foreseeable future and ensuring their capital adequacy to continue to provide coverage should be the primary concern of Federal Government involvement in terrorism insurance.

## **Proposed changes would reinforce TRIA's role as a solvency backstop**

The Treasury has proposed a number of modifications to the structure of TRIA in considering its extension, mainly to leave a greater share of terrorism risk to the insurance industry.

These include raising the threshold of 'certified' events; raising insurance company retentions from the current level of 15% of commercial lines premiums; increasing the co-share, and reducing the number of lines covered by TRIA. These changes will ensure that insurers cover an increased portion of the short-term risk and reinforce the role of TRIA in preventing company failures, rather than subsidizing costs. However, the level to which the company retention is raised and the co-share arrangement can have a material impact on the solvency of insurance companies and should be analyzed before making changes.

### ***Raising the threshold of certified events is sensible and is unlikely to have a significant impact on the insurance industry***

Raising the threshold for certified events from \$5 million to \$500 million is a practical measure that signals the scale of terrorism that TRIA is meant to address. The type of terrorist event that can cause a \$5 million loss is a small-yield package bomb, such as a suicide belt, or an assassination attack. The original fear was that following 9/11 the U.S. could be subjected to a wave of destabilizing suicide bombings or small-scale ('micro' terrorism) attacks with many attacks in a year, such as occurred in Israel at the height of its terrorism activity. This has not materialized and although still a possibility, most analysts think this is not a likely form of Islamic militant action in the U.S.

The higher threshold of \$500 million represents a significantly larger scale of terrorist attack, such as a sizeable car bomb, a mass killing or an act of substantial property destruction ('macro' terrorism) that remains the main concern for terrorism insurance in the U.S.

The proposed increase of threshold would make a relatively minor impact on the insurance industry: Attacks of up to \$500 million are likely to be shared largely by major insurers suffering losses below their high TRIA retentions.

***Raising the retention level would significantly reduce the chances of an industry-wide recovery under TRIA and leave a greater share of terrorism risk to the insurance industry***

Raising the individual company retention would have a more significant impact on the insurance industry. If the retention level was raised from 15% to 20% the industry retention would be just over \$40 billion. The types of terrorist attack that could cause an insured loss of over \$40 billion would be a multiple truck bombing, coordinated destruction of several buildings, large-scale hazmat sabotage or a major CBRN attack. According to RMS modeling, an increased retention would significantly reduce the likelihood that the industry loss would reach it in a given year, from 0.22 (a 'return period' of 450 years) for a 15% retention level to 0.17 (a 'return period' of 600 years) for a 20% retention.

***Increasing the co-share will increase the risk of ruin to some insurers***

The current co-share arrangement is for 10% of the losses from the retention level to the \$100 billion ceiling. Consideration is being given to increasing this co-share. This co-share payment would be required in the event of a large loss and could very significantly increase the loss payable by the insurers, potentially increasing their exposure to ruin. If the co-share were increased to 20%, for example, the insurance industry would pay an additional \$7 billion on a \$100 billion loss event. Depending on the distribution of the loss across insurance companies, this could be a very significant increase to their total loss cost for some insurers. If the objective of TRIA is to reduce the risk of ruin for insurers, this measure could potentially work against it.

## **Pre-attack, TRIA enables the ongoing functioning of the U.S. economy**

By ensuring a stable and viable market for terrorism insurance, TRIA has enabled commercial businesses to obtain coverage for terrorism loss. This ensures that shareholders are protected and continue to invest in American business. It enables managers of those businesses to allocate their capital more productively in their business rather than having to reserve finance for potential losses. For centuries, insurance has been recognized as the 'handmaiden of industry', an essential component of economic activity. This is as true for terrorism insurance today as it was with traditional industry in assisting companies leverage their capital.

Lack of terrorism insurance after 9/11 was seen as a particular problem for real estate business, the construction industry and property financing: banks were unwilling to provide finance for new construction projects without terrorism insurance to cover their loans, and this caused a slow-down in property development, with consequent knock-on effects on other parts of the economy. George Bush, in signing the TRIA bill into law in 2002, cited putting more construction workers back on the job as a major rationale for the bill.

## **Post-attack, TRIA ensures the viability of the financial services industry and a rapid national recovery**

In the event of a catastrophic terrorist attack, the insurance industry will play a vital role in the recovery afterwards. The insurance industry disperses claims payments rapidly and efficiently. Businesses receive funds for repair and rebuilding and victims receive compensation payments

administered through the experienced offices of insurance claims departments. Insurers are practiced at liquidating assets and can access very substantial funds for payouts at short notice.

The alternative to an insurance-administered claims process is likely to be a Federal Government-administered victims compensation scheme. These schemes can provide good quality of compensation but sometimes can also be slow and beaurocratic.

The speed of payments is important to a rapid recovery and in establishing the confidence of victims that they will be paid and dispelling potential uncertainties in the compensation process.

Others are also looking for stability after a terrorist attack. Investor uncertainty, consumer confidence and trading partners of those affected need reassurance. Part of that will be confidence that the insurance industry will remain intact to continue to provide coverage to areas and sectors unaffected by the attack. The protection that TRIA gives the insurance industry helps provide that reassurance.

## **RMS endorses the findings of the recommendation of the June report by the RAND Center for Terrorism Risk Management Policy**

RMS is a co-founder of the RAND Center for Terrorism Risk Management Policy (CTRMP) and supports the recommendations of the CTRMP June report<sup>30</sup>. These include:

- Expanding and improving the financial protections offered by Terrorism Risk Insurance Act (TRIA), instead of allowing the law to expire as scheduled in December.
- Requiring that terrorism insurance cover acts by domestic groups and attacks involving CBRN. Researchers acknowledged that the latter poses a challenge that may be most appropriately covered through a direct Federal Government insurance program.
- Making terrorism insurance mandatory for companies owning or operating systems vital to the nation's critical infrastructure.
- Creating a national board of governors that can assess the performance of TRIA or its successor.

## **TRIA needs to be renewed to ensure a viable terrorism insurance market**

It is in the best interest of our nation that TRIA be extended. The principle reason is that the chance of ruinous losses will otherwise force a large majority of insurers to quit the terrorism market.

If TRIA is not renewed, the Treasury expects that "removal of the reinsurance subsidy will result in short-lived disruptions in coverage and pricing..." but that "...over time, we expect that the private market will develop added capacity." It is possible that the fear of large scale potential terrorism losses on a scale that could sink the insurance industry is unfounded. If so, insurers may gradually gain confidence that terrorism coverage does not pose a threat to the viability of their companies and the private market will develop the additional capacity anticipated by the Treasury.

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<sup>30</sup> 'Trends in Terrorism: Threats to the United States and the Future of the Terrorism Risk Insurance Act', The RAND Center for Terrorism Risk Management Policy (CTRMP), June 17, 2005.

Ultimately the chances of substantial capital becoming available for a purely private market solution for terrorism risk depends on the perception of the likelihood of a ruinous loss for insurers. The view of RMS, based on the advice of world authorities on terrorism risk, is that this risk is currently fairly low, but significant enough to concern responsible insurance managers. The risk of large losses is also likely to increase over the next few years and may only dissipate when the current cycle of Islamic militant political violence ends, but this could be many years away.

Different insurance companies will have different views on the probability of large losses, and there will be some prepared to make capital available to take advantage of market opportunities. Other insurance companies will write terrorism coverage for customers they value and would otherwise lose. But insurance companies are by their nature conservative and most will not bet their business on a risk as unproven as terrorism.

There are many reasons why Federal Government should continue to participate in the terrorism insurance market, articulated above. TRIA was created in response to the reluctance of insurers to carry the risk of terrorism insurance alone. Three years later the insurance market has learned much more about terrorism risk, the market demand and pricing for it, and has become more sophisticated in assessing it. Most importantly there has not been a terrorism loss during this time. However the fundamental reason that insurers fled the market in 2002 has not gone away. Terrorism remains an unmanageable risk without a Federal Government backstop. There are many potential variations on the way that Federal Government might participate in the market but the most straightforward and practical in the legislative timescale required is to renew TRIA.