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Policy Brief

National Security Perspectives on Terrorism Risk Insurance in the United States

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Key findings

- Terrorism remains a persistent threat. Attacks using arson, conventional explosives, or firearms are most likely, though al Qaeda and other groups aspire to conduct more destructive attacks using unconventional weapons.
- Terrorism risk models based on historical events or theories of terrorist decisionmaking are limited: They cannot extrapolate to estimate the likelihood of future attacks from terrorist threats beyond those that have been already recognized.
- The $27.5 billion threshold for aggregate insured losses in TRIA ensures that the insurance industry, rather than the taxpayer, is ultimately responsible for paying for incidents that are within the realm of the industry's modeling capability.
- Terrorism insurance can contribute to making communities more resilient to terrorism events. Recovery from an attack will be more rapid and efficient when it is clear how much compensation will be available and how it will be distributed.
- To the extent that terrorism insurance is more available with TRIA than without it, renewing the legislation would contribute to improved national security.

Summary. When the tragic terrorism events of September 2001 took the world by surprise, insurance markets were caught unprepared. Terrorism risk insurance quickly became unavailable or, when offered, extremely costly. Congress reacted to the contraction of terrorism insurance markets by passing the Terrorism Risk Insurance Act (TRIA), which provided a government reinsurance backstop in the case of a terrorist attack by providing mechanisms for avoiding an immediate drawdown of capital for insured losses or possibly covering the most extreme losses.

Extended first in 2005 and again in 2007, TRIA is now set to expire at the end of 2014, and Congress is again reconsidering the appropriate government role in terrorism insurance markets. This policy brief examines the potential national security implications of allowing TRIA to expire.

To do so, we review the history of terrorism in the United States, counterterrorism studies, and experience with modeling and managing terrorism risk, focusing on three questions: (1) How has terrorism risk changed, and does it still warrant industry attention? (2) Can we model terrorism risk adequately to know how to administer terrorism insurance in a private marketplace? (3) Does access to terrorism risk insurance in and of itself make the nation more safe and secure? The answers to these questions provide insights into the need for terrorism insurance and how insurance markets influence U.S. national security.

Terrorism remains a real, albeit ambiguous, national security threat. The most likely attack scenarios involve arson or explosives being used to damage property or conventional explosives or firearms being used to kill and injure civilians. Al Qaeda and other groups may aspire to conduct more destructive attacks using cyber, chemical, biological, radiological, or nuclear attacks, but no group has so far demonstrated the combined intent and capability to do so.

Terrorism risk models are limited in the types of risk they can estimate. Risk models based on historical events or theories of terrorist decisionmaking can estimate terrorism risk if the future events are similar to those experienced in the past. These models can also describe how severe the consequences of terrorism could be for specified scenarios that deviate from our current experience. However, these models cannot estimate the likelihood of future terrorist attacks from terrorist threats beyond those that have been already recognized. The $27.5 billion threshold for aggregate insured losses in TRIA ensures that the insurance industry, rather than the taxpayer, is ultimately responsible for paying for incidents that are within the realm of the industry's modeling capability. At the same time, this threshold potentially eases the capital requirements for insurers, who under TRIA are required to cover losses from incidents involving deep uncertainty that cannot be adequately quantified using present modeling approaches.

Terrorism insurance can contribute to making communities more resilient to terrorism events. Terrorism insurance can support community resilience in several ways. Access to appropriately priced terrorism insurance can promote economic growth, making resources available to address national security threats or other social problems. Recovery and rebuilding will be more rapid and efficient when it is clear how much compensation will be available after a terrorist attack and how it will be distributed. To the extent that terrorism insurance is more available with TRIA than without it, renewing the legislation would contribute to improved national security.

As Congress evaluates the need and effectiveness of TRIA this year and in the future, it should weigh these observations against the costs and other benefits of the legislation.

The National Security and the Terrorism Risk Insurance Act

When the tragic terrorism events of September 2001 took the world by surprise, insurance markets were caught unprepared. Prior to these events, insurers and reinsurers generally included terrorism risk as part of coverage for business interruption, property, and liability insurance. The 9/11 attacks led to private insurers rethinking this practice.

Insured losses due to property damage from the September 11 attacks reached more than $23 billion (in 2012 dollars), placing the event among the largest insured catastrophes in U.S. history (see Table 1). Insurance markets struggled with how to respond to terrorism risks of this magnitude and unpredictability. First, nobody knew when or how terrorism would next strike the United States. Second, the insured losses in 2001 accumulated across a wide range of insurance markets—insurers hadn't anticipated the ways in which these losses would affect multiple policies simultaneously, and they were unsure of how correlations in losses might appear in the future. Third, insurers didn't know which properties were more likely to be targeted by terrorists or how businesses and property owners could best prepare themselves for terrorism to mitigate risks. In response to these uncertainties, terrorism risk insurance quickly became unavailable or, when offered, extremely costly.[1]

Table 1. The Ten Most Costly Catastrophes in U.S. History

Rank	Date	Event	Insured Property Damage (2012 $ billions)
1	Aug. 2005	Hurricane Katrina	$47.4
2	Sep. 2001	Fire, explosion: World Trade Center, Pentagon terrorist attacks	$23.9
3	Aug. 1992	Hurricane Andrew	$23.3
4	Oct. 2012	Super Storm Sandy	$18.8
5	Jan. 1994	Northridge, CA, earthquake	$18.0
6	Sep. 2008	Hurricane Ike	$13.3
7	Oct. 2005	Hurricane Wilma	$11.9
8	Aug. 2004	Hurricane Charley	$8.9
9	Sep. 2004	Hurricane Ivan	$8.5
10	Apr. 2011	Flooding, hail, wind, and tornadoes that struck Tuscaloosa and other locations	$7.4

SOURCE: Property Claim Services (PCS), a division of Verisk Analytics. As of February 23, 2014: http://www.iii.org/facts_statistics/catastrophes-us.html

Congress reacted to the contraction of terrorism insurance markets by passing the Terrorism Risk Insurance Act (TRIA) in 2002. The law created a government reinsurance backstop for commercial property and casualty insurance in the case of a certified terrorism attack.[2]

Provisions of TRIA provide mechanisms for avoiding an immediate drawdown of capital for insured losses or possibly covering the most extreme losses. The act covers commercial property damage, ordinary business interruption, and workers' compensation lines, but it explicitly excludes insurance lines covering crops, mortgage and title guarantees, medical malpractice, flood, reinsurance, and life. TRIA further establishes policies for federal payments to insurers in the event of terrorist events, thresholds for when these policies are triggered, mechanisms for the government to recoup payments, and an overall limit on insured losses from terrorism events of $100 billion. Twice since its original passage (in 2005 and 2007), Congress extended TRIA, each time reconsidering whether the law was justified and what levels of insured losses would trigger various provisions for government reinsurance. The current TRIA program is set to expire in 2014. Thus, Congress is again reconsidering the appropriate government role in terrorism insurance markets, as well as the costs and benefits of TRIA.[3]

Terrorism is a critical national security issue.[4] Thus, the question of whether and how the government should insure terrorism risk should also be considered within the context of national security policy. To support this deliberation, in this report we examine three topics at the nexus of national security and TRIA:

- First, how has terrorism risk changed, and does it still warrant industry attention? In the decade that has passed since the original passage of TRIA, the terrorist threat has changed in many ways. We describe what we have learned about terrorism over this time and how we understand the threats we can expect to face in the future.
- Second, can we model terrorism risk adequately to know how to administer terrorism insurance in a private marketplace? One of the principal motivations for TRIA was the claim that terrorism was too ambiguous to be insured. We examine different approaches that are used to model terrorism risk and assess how they can be used to estimate terrorism risk.
- Third, does access to terrorism risk insurance in and of itself make the nation more safe and secure? In previous deliberations about terrorism insurance, the case has been made that terrorism insurance supports national security. We discuss the logic behind several of these claims and whether evidence exists to support them.

As Congress decides what steps to take before TRIA expires, answers to these three questions can help industry and government understand how national security concerns influence the need for terrorism insurance, understand how access to such insurance would support U.S. national security pursuits, and consider these national security issues alongside other costs and benefits of TRIA.

How Has Terrorism Changed Since 2001?

The first topic to address when considering the renewal of TRIA is whether terrorism remains a pressing threat to U.S. national security. Doing so requires answering several related questions:

- How many terrorist attacks have occurred?

- What types of attacks have been attempted?
- What factors will influence trends in the future of terrorism?

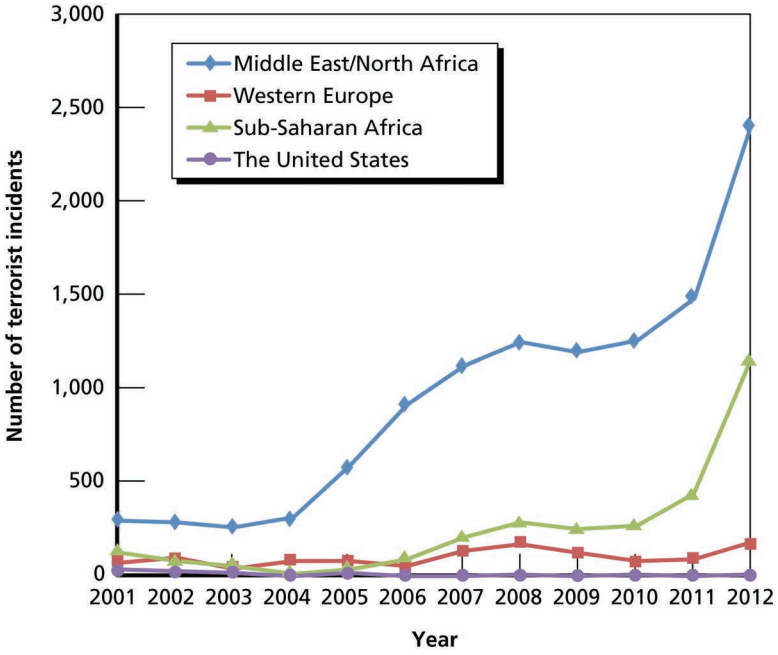
Unlike in 2001, when those managing terrorism risk had to contend with new recognition of the demonstrated intent, reach, and capabilities of terrorists in the United States, these questions can be answered with the benefit of a decade of experience and observation.

The Pace of Terrorism Since 2001

Data about the number and types of terrorist attacks that have occurred since September 11, 2001, provide a picture about how terrorist activity has evolved. While several groups track and report statistics about terrorist activity globally, differences among terrorism data are largely driven by how terrorism is defined, and a categorical definition of what constitutes a terrorist attack remains rather elusive. The Federal Bureau of Investigation (FBI) defines terrorism as acts that endanger human life, violate federal or state law, and appear intended to (1) intimidate or coerce a civilian population; (2) influence the policy of a government by intimidation or coercion; or (3) affect the conduct of a government by mass destruction, assassination, or kidnapping.[5] Many scholars widely accept a definition of terrorism that characterizes it by the nature of the act, and not the identity of the perpetrators or their cause.[6] The most comprehensive and up-to-date database on terrorist acts is the National Consortium for the Study of Terrorism and Responses to Terrorism (START) Global Terrorism Database, curated by the University of Maryland; it includes events that meet multiple definitions of terrorism, to provide a dataset that is inclusive of the many perspectives on terrorism that are being studied.[7]

According to the START Global Terrorism Database, only 31 out of 158 sovereign nations have not experienced a terrorist attack since 2001.[8] Terrorism started to rise at a rapid rate in 2004. (See Figure 1.) The sharp increase in terrorism from 2004 to 2012 mostly took place in the Middle East/North Africa region and in Sub-Saharan Africa. Western Europe also experienced a spike in the levels of terrorist attacks from 2008 to 2010. These data also reveal that the number of terrorist attacks in the continental United States has been relatively low and stable except for the incidentally high levels between 2001 and 2003. Since 2001, fewer than 10 percent of all terrorist attacks have occurred in the United States.[9]

Figure 1. Global Terrorist Attacks, 2001–2012, by Region

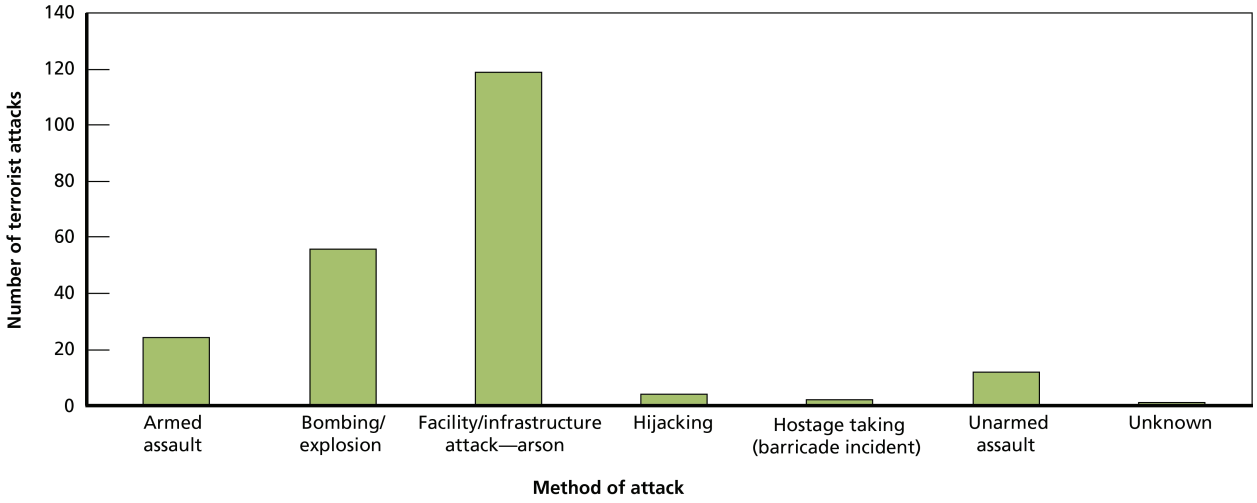


SOURCE: START Global Terrorism Database, 2013.

Between 2001 and 2012, there were nearly 200 terrorist attacks within the United States.[10] The preferred method of attack within the United States has been arson, typically perpetrated by environmental or animal rights groups (see Figure 2). Targets of choice for eco-terrorism can include, but are not limited to, natural resources, meat and fur farms and processing plants, power generation plants, and highly polluting industries.[11] Moreover, the methods that environmental terrorist groups (including animal rights groups) employ are not designed to inflict high human casualties or massive economic damage, but rather to propagate a political message or disable a certain kind of production facility that is perceived as an environmental threat.

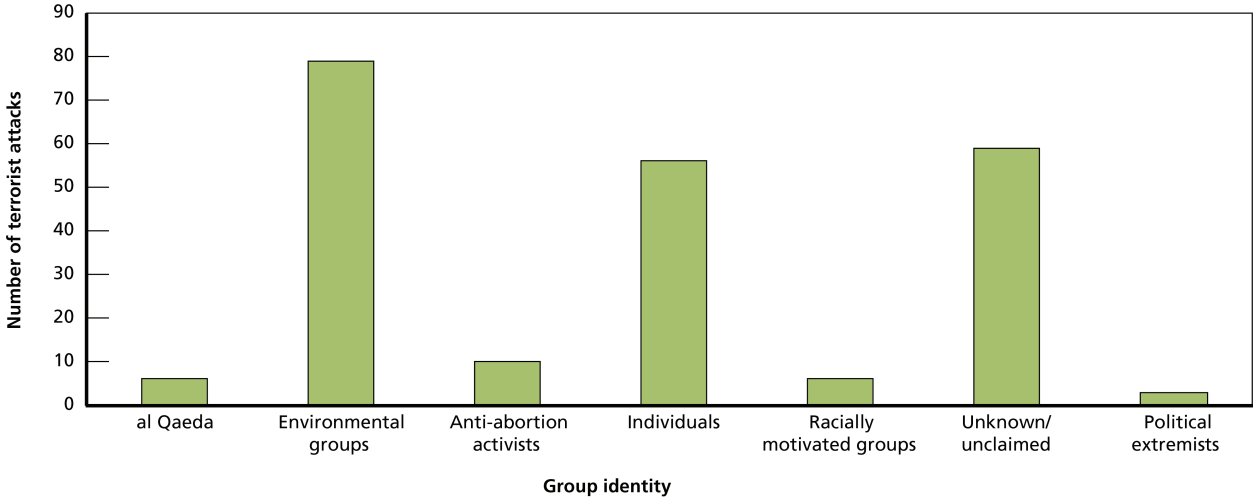
When attacks from the past ten years are broken down according to the perpetrator, we see that al Qaeda has neither conducted nor inspired most terrorism in the United States (see Figure 3). However, al Qaeda and groups affiliated with or inspired by al Qaeda are believed to represent the greatest risk of terrorism, because of their combined motivations and capabilities. For this reason, we take a closer look at the data on al Qaeda and al Qaeda–inspired terrorism.

Figure 2. Number of Terrorist Attacks, by Method Used, in the United States, 2001–2012



SOURCE: START Global Terrorism Database, 2013.

Figure 3. Number of Terrorist Attacks, by Group Orientation, in the United States, 2001–2012



SOURCE: START Global Terrorism Database, 2013.

Most of the experience in the United States with al Qaeda and al Qaeda–inspired attacks has been from evidence produced by foiled terrorist attacks. The Heritage Foundation analyzed records of 47 such foiled terror plots in the United States between 2001 and 2012. Most of the foiled attacks were intended to utilize explosives and/or assault weapons against targets in the United States. A number of the individuals involved in these plots had ties to organizations abroad, such as the Taliban in Pakistan and al Qaeda in the Arab Peninsula in Yemen. Some of these plots point to the potential threat of homegrown radicalization of Muslim converts. At least six of the attacks were planned by individuals who converted to Islam and later became self-

professed Jihadi fighters. The number of the terrorist plots foiled reflects the intensified vigilance against radical Islamist terrorism.[12]

Analysis of terrorism overseas provides insight into what capabilities exist and whether the intent of terrorists active overseas might present a threat of attacks inside the United States. Terrorist attacks against U.S. diplomatic missions and other U.S. institutions on foreign soil make up 28 percent of all international attacks aimed at diplomatic missions and businesses.[13] This high incidence rate indicates the presence of motive, but not necessarily the ability to deliver such attacks within the continental United States. It could also indicate the effectiveness of preventive measures and tightened security at U.S. transportation hubs and other ports of entry.

The Capabilities of Terrorists Since 2001

Terrorism risk is determined not only by the frequency of attacks, but also by the sophistication and size of attacks. More sophisticated attacks are generally more likely to overcome or circumvent security measures. Larger attacks tend to kill more people and cause more damage. The patterns in terrorism since 2001 provide insight into what terrorists have been capable of achieving.

Attacks in the Middle East and North Africa are typically more sophisticated and more lethal than the average attack in Western Europe and the United States, with a few exceptions. Nonetheless, these exceptions, such as the attack on the Madrid trains in 2004, are the ones that cause the most concern. As a result, despite the fact that al Qaeda–inspired or affiliated groups have been responsible for a minority of observed attacks, the attacks they have conducted were among the deadliest and most economically devastating. These al Qaeda attacks were well planned, coordinated and designed to inflict the largest amount of damage in an indiscriminate manner. The attacks were designed to attack not only symbols of authority, such as the police or government installations, but also the population and the infrastructure of the countries in which they occurred.

The past five years have seen a complete absence of large-scale coordinated attacks in Europe or in the United States. This could be due to the fact that the original al Qaeda organization's capacity has been gradually diminishing over the past ten years. Most training camps in Pakistan, Yemen, and Afghanistan have been routinely targeted and destroyed. Therefore, al Qaeda's ability to recruit and enroll new recruits in sophisticated training programs that require consistency and time seems to have greatly diminished during the past ten years. If the pressure of overseas counterterrorism efforts remains at the current level, it will be hard for al Qaeda to reconstitute the essential capabilities required to carry out coordinated attacks outside its own region.[14]

Radical groups that associate themselves with al Qaeda might have the intent to strike U.S. targets, but it seems that these groups favor targets within their own areas of operations, and not within the United States. These groups are mostly involved in localized or regional conflicts and

are fighting adversaries they consider to be a greater threat than the United States. However, the threat from such groups, or at least from individuals inspired by such groups, remains omnipresent.

Trends Influencing Future Terrorist Threats

The history of terrorism in the United States since 2001 does not define the full range of possibilities for how terrorism could evolve in the future. However, it does aid in the interpretation of several trends that will ultimately determine whether the future risk is similar to current experience or radically different.

Will the Jihadi Message Continue to Resonate?

Organized radical groups view recruiting not as a means to end, but rather as a stand-alone policy objective. The creation of the proper mindset that allows their policies to be propagated is the foremost achievement that such groups seek to accomplish. This has led some to be concerned that the spread of the jihadi message will also lead to increased terrorism threats in the United States.[15] For example, groups such as the Somali-based al Shabaab recruited a steady flow of fighters from predominantly expatriate communities abroad, including those in the United States. However, despite the apparent radicalization of these youths, it remains uncertain that any of them are interested in carrying out an attack within their host countries.

The terrorism threat in the United States would increase if the jihadi message resonated more significantly with youth in the United States. However, so far, the attractiveness of this message has been quite limited, and the U.S. citizens it has motivated have taken part in regional political struggles overseas as opposed to taking actions in the United States.

Will Regional Conflicts and Geopolitical Changes Increase Terrorism Threats?

The weakening of the al Qaeda core in Afghanistan and Pakistan has created an increasingly decentralized organization.[16] Numerous groups have adopted the name and used it to further their own separate groups. New radical groups are being created in North Africa, the Sahel Region, the Levant, and Sub-Saharan Africa. Sectarian conflicts throughout the Middle East have enabled these groups to obtain financial and military support from regional governments that are invested in ending these conflicts in favor of their allies of the same sect. To complicate matters, the removal of strong counterterrorism partners in Tunisia and Egypt and the chaotic situation in Libya have created more permissive security environments for terrorist groups to spread.[17]

So far, the geopolitical shifts associated with the Arab Spring have not increased the threat of terrorism in the United States or Europe, because most hostilities have remained targeted toward domestic or regional politics in the Middle East and North Africa. However, the United States could eventually feel ripples of this change in the form of increased threats and new, well-trained terrorist groups that might choose to widen their choice of targets beyond their own regional

conflicts. This change in targeting might be closely linked to how these groups perceive the United States and other Western countries.

Will Terrorists Use Weapons of Mass Destruction, Cyber Attacks, or Other Advanced or Unforeseen Tactics or Weapons?

The terrorist attacks that have occurred in the United States since 2001 have fortunately been contained to a few incidents that have affected far fewer people than the attacks on September 11 and have not had significant economic consequences. One of the primary reasons for this is that terrorists have proven either incapable of or not interested in using unconventional weapons. The future risks from terrorism hinge on whether terrorists will ultimately use advanced weapons or other unforeseen tactics.

Some experts have long asserted that it's only a matter of time before terrorists can develop or gain access to unconventional or mass destruction weapons.[18] While terrorists usually use traditionally proven methods of attack, such as explosives, direct attacks, or arson,[19] the potential of an unconventional cannot be totally precluded. When affiliated groups have had access to rudimentary chemical weapons, such as chlorine gas, they have used the materials in improvised devices. For example, terrorist organizations that are closely associated with al Qaeda, such as al Qaeda in Iraq and the Afghani Taliban, have repeatedly attempted to use chemical weapons. Several attacks in Iraq were carried out by exploding large chlorine tanks, and the Taliban used various gaseous poisons in its attacks against schools and other facilities.[20] That such weapons have not been used for terrorism in the United States has been credited both to concerns by terrorists about potential social backlash if such tactics were used and to a mismatch between the sophisticated capabilities required to develop and use such weapons and the more basic training and resources available to would-be terrorists in the United States.[21]

If the assessment that today's terrorists are not capable of completing more complex and lethal attacks in the United States using weapons of mass destruction provides comfort, it may only be temporary. The robustness of this assertion will depend in part on global efforts to control the proliferation of chemical, biological, radiological, and nuclear technologies. Take, for example, the case of chemical weapons in Syria. For a time, the world was concerned that instability in Syria had put the security of that nation's chemical weapons stockpile at risk. The situation changed when Russia and the United States struck an agreement to secure and destroy these weapons, an apparent success for global nonproliferation. The future risk of terrorist use of weapons of mass destruction ultimately depends on the success of agreements like this, as well as on global negotiations with other nations that currently do not fully comply with global nonproliferation accords.

Similarly, U.S. national security policymakers have raised concerns about the potential for cyber terrorism being used to attack critical infrastructure in the United States.[22] Once again, terrorist writings indicate interest from al Qaeda and its affiliates in using cyber tactics, and these "*WarGames*" scenarios can spark provocative images. However, most evidence suggests that

terrorists lack the capability and motivation to conduct devastating cyber attacks against U.S. critical infrastructure.[23] While the threat of cyber terrorism is evolving, so are the domestic cyber security capabilities of the government and critical infrastructure operators.[24] Ultimately, the future threat of cyber terrorism is deeply uncertain, depending both on how capabilities and defenses come into being.

How will U.S. Terrorism Security and Counterterrorism Policies Change?

For the decade following 2001, counterterrorism and domestic terrorism security efforts received large increases in funding. However, the combined forces of congressional budget negotiations, shifting priorities at the Department of Homeland Security away from terrorism and toward infrastructure resilience and disaster preparedness, and public reactions to revelations of surveillance efforts of the National Security Agency in the name of counterterrorism could shift priorities and resources away from terrorism security. At the same time, if history provides a lesson, terrorists may eventually discover weaknesses in existing security approaches that have so far been credited as contributing to the dearth of terrorism attacks in the United States.

Summary

Terrorism has occurred steadily and at a low level in the United States since 2001, yet complex terrorist attacks on the scale of 9/11 have not occurred. Nevertheless, the threat of future attacks persists, and the overall picture that history paints about the types of attacks that terrorist use remains ambiguous. The current threat of terrorism in the United States is best characterized by conventional attacks using bombs, firearms, and arson. At the same time, existing terrorist groups aspire to conduct more complex and devastating attacks on targets in the United States. The possibility that in the future terrorists will attack the United States with greater frequency or more extreme methods cannot be ignored.

Are Terrorism Risk Models Useful for Setting Risk-Based Insurance Premiums?

Understanding terrorism risk is a fundamental requirement to being able to manage that risk appropriately. Law enforcement and emergency management organizations need to know how much risk they face in order to determine whether or not they are adequately prepared.[25] Critical infrastructure operators need to know which threats are most likely and how those threats can be most effectively countered.[26] Insurers need to know how much capital is required to cover the exposure they are underwriting and whether premiums are appropriately set.[27] Decisions like these have motivated governments and private firms to study terrorism in hopes of better describing current and future risks. Unfortunately, several factors make terrorism a difficult phenomenon to model.

Terrorism is the result of complex, unpredictable, and transient decisions. Complexity makes terrorism risk difficult to model because attacks can occur in many ways, can happen in many places, and can have consequences that unfold in an unanticipated manner, as victims and society react to the immediate damage and uncertainty that a terrorist attack creates. Unpredictability makes terrorism risk difficult to model because it is impossible to know the intent and capabilities (i.e., the threat) of all people who might turn to terrorism to achieve their goals. Finally, even if we understand the current terrorism threat from an individual or group, it is difficult to know whether over time that group becomes deterred, dissuaded, deflected, or possibly even motivated to attack by counterterrorism and terrorism security measures.[28]

In an effort to address these challenges, two strategies have been used to predict future terrorism risk: (1) describe what terrorists have done and (2) describe how terrorists make decisions to achieve their goals when confronted by security measures. While each approach can give insight into decisionmaking, each also has significant limitations.

Predicting Future Risk Based on History

Today's terrorism risk models have the benefit of experience and the data that have been assembled since 2002. At the time of the 9/11 attacks, terrorism was a novel threat in the United States. The events of 2001 were unprecedented. In the days after 9/11, we did not know whether the attacks were singular events or whether the country should brace for other sophisticated attacks coordinated by al Qaeda, or even a wave of smaller attacks inspired by bin Laden's proclamations.

In 2014, efforts to estimate terrorism risks have the benefit of more than a decade of experience to draw upon. The approximately 200 successful terrorist attacks and 50 interrupted and foiled plots that occurred in the United States between 2002 and 2013 present a surprisingly consistent picture of what the risk of terrorism has been. With a few notable exceptions, the attackers have been principally domestic groups with narrow political or issue-based agendas, such as environmentalism or racially motivated hate, or individuals acting independently. The majority of attacks have been designed to damage property and have employed relatively basic weapons, such as small bombs, firearms, and fire (arson).[29] The exceptions, while important to understand because they were intended to kill large numbers of people, also used conventional weapons. As a result, the damages from terrorism in the United States over the past decade have been limited. For example, insured losses for any successful event have been below the $100 million in insured loss that would trigger TRIA.

Studies of global terrorism indicate that the tactics we see in the future will likely resemble the attacks we have seen in the past. Terrorism tactics have historically evolved incrementally. Terrorists learn from each other; sometimes through formal meetings and training, but also often by studying what is reported about events that have occurred. Analyses of terrorist training and doctrinal documents also reveal that individuals and groups tend to prefer tried-and-true methods to increase the likelihood of a successful attack.[30]

In the case of known terrorist groups, we often have knowledge about which groups have both the capability and intention of attacking targets in the United States. Fortunately, as discussed previously, most organized terrorist groups are motivated by regional political struggles and are not inclined toward or capable of attacking targets in the United States.[31]

Together, these facts suggest that the future of terrorism will either look like what we have seen in the past, or we will receive some indication that the intentions of a terrorist group have changed, and, consequently, history may not be a valid indicator of future risk. If the latter case occurs, we will be able to adjust risk management after we observe a meaningful change in terrorist threats. However, this picture of terrorism does not anticipate what new terrorist threats might emerge.

Over the past decade, we have been fortunate to have not experienced unconventional terrorist attacks in the United States. However, these events are possible. Trends in emerging technologies and nonproliferation and the writings of terrorist groups warrant concern about cyber, chemical, biological, radiological, and possibly nuclear attacks. Sophisticated attacks such as those that were launched in London, Madrid, and Mumbai are certainly within the capabilities of known terrorist organizations should they assemble a group intent on attacking the United States. While history does tell us how bad unconventional and sophisticated conventional attacks can be, it doesn't tell us how likely such events will be, because both intentions and capabilities of terrorist groups are evolving in response to a dynamic terrorism security environment.

Predicting Future Risk by Modeling Terrorist Decisionmaking

The limitations of using the historical record to estimate terrorism risk has motivated the insurance industry, academics, and the government to study other ways of modeling terrorism risk. Though many techniques are used, they each attempt to do the same thing: model decisions terrorists would make about whether, when, where, and how to attack.

Terrorism risk models used by the insurance industry combine physical modeling of attacks, information about the geographic distributions of people and property, and expert judgments of the likelihood of different types of attacks.[32] The Department of Homeland Security used intelligence analyst judgments about terrorist intentions and capabilities and dynamic modeling of disease events and their consequences to estimate risks from bioterrorism.[33] In response to the deficiencies of static probabilistic risk analysis approaches, researchers have proposed models informed by game theory that described attacker reactions to defender security decisions[34] and models that tried to infer terrorist intent from statements about organizational objectives.[35]

Despite the variety of approaches that have been used, each of the existing attempts to model the likelihood of terrorist attacks suffers a serious limitation: None of them have been subjected to a rigorous assessment of their validity. This point was most clearly made by the U.S. National Academy of Sciences, which, after reviewing a wide range of terrorism risk models at the Department of Homeland Security, concluded that it "did not find any Department of Homeland

Security [terrorism] risk analysis capabilities and methods that are yet adequate for supporting decisionmaking because their validity and reliability are untested."[36]

Though the Academy's conclusion is limited to risk modeling at the Department of Homeland Security, a RAND assessment of the Transportation Security Agency's risk management analysis tool identified two factors that call into question the ability to model terrorism as adequately as natural disasters and in a manner valid to support prediction of terrorism risk.[37] First, while the domain of possible terrorist attacks is limitless, any implemented model considers a finite set of attack types, target types, and target locations. Thus, by definition, any model of terrorism risk is limited by the scope of what is included, and it is impossible to include all attacks that could occur. Second, while in theory it is conceivable that the intentions and capabilities of any known terrorist group could be described using some of the approaches reviewed in this section, in practice it is impossible to build a model that provides a valid representation of all individuals and groups that might decide to use terrorism as a tactic in the United States.

In considering what might be possible in the realm of modeling terrorist decisionmaking, it is useful to compare terrorism with other catastrophes that we model. For example, hurricane risk models are useful because several conditions are met:

1. Models can be informed by a long history of events generated by physical systems that we expect will continue to exist in the future.
2. There exists extensive publicly available information about mitigation measures that have been implemented, such as the implementation of building codes and levees.
3. We understand how those mitigation measures affect risk.
4. Exposure to hurricanes is not changed as a result of the mitigation measures; only the consequences of exposure are.
5. The regular occurrence of hurricanes provides opportunity to validate risk models.

It is reasonable to suggest that the historical record of terrorism over the past decade satisfies the first and last of these conditions for small-scale terrorism. For unconventional terrorism, on the other hand, such as attacks using chemical, nuclear, or biological weapons, none of these conditions are met, and thus valid modeling is difficult.

In summary, terrorism risk models have been developed to describe how terrorism risk changes when different assumptions about terrorist intent and capabilities are made. These models have proven useful in helping policymakers understand what vulnerabilities communities and infrastructure are exposed to and which security and disaster management capabilities might be desired. However, fundamental assumptions limit the validity of these models for predicting the future expected losses from the full range of terrorist events accurately enough to support an actuarial assessment of terrorism risk.

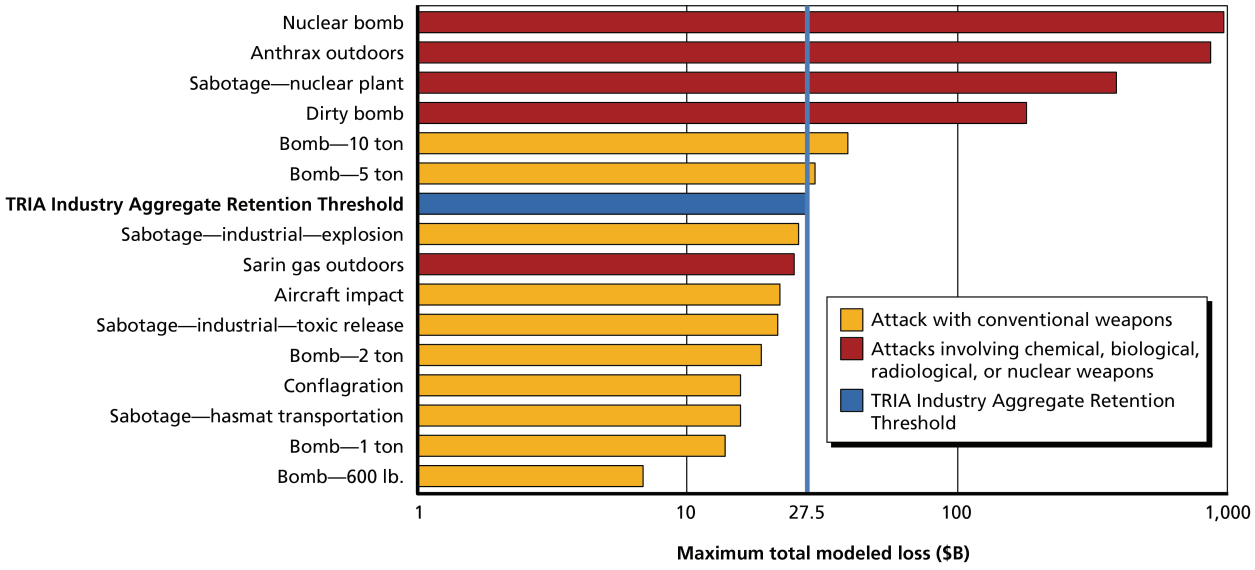
Modeling Terrorism Risk in the Insurance Industry

The above assessment is a rather discouraging portrayal of what is possible in the realm of modeling terrorism risk. However, the net assessment of both historical risk modeling and terrorist decisionmaking models together provide a way forward for assessing the role that TRIA plays in highlighting the value of terrorism modeling for the insurance industry.

Given the existing high levels of individual company deductibles, under TRIA, U.S. taxpayers are largely covering only those nonconventional terrorism losses for which no basis for modeling exists today. This acts to segment the risks we understand well enough to model from those we do not. To illustrate this, Figure 4 presents estimates of the maximum total modeled losses of 16 attack scenarios obtained from the Terrorism Risk Model developed by Risk Management Solutions (RMS).[38] The maximum total modeled losses represent the combined property, casualty, and business interruption loss for the case where the attack is assumed to occur at the target with the greatest combined property and casualty exposure.

The yellow bars in the figure represent the modeled consequences of attacks involving conventional weapons. The red bars represent the modeled consequences of attacks involving chemical, biological, radiological, and nuclear weapons. The blue bar (and line) in the figure indicate how the maximum total modeled losses from these scenarios compare with the Industry Aggregate Retention Threshold as currently specified in TRIA of $27.5 billion.

Figure 4. Estimates for the Maximum Total Modeled Losses from Attack Scenarios Represented in the Risk Management Solutions Terrorism Risk Model



SOURCE: RMS Terrorism Risk Model, 2013.

The Industry Aggregate Retention Threshold is a significant reference point for considerations of TRIA reauthorization. If the total insured losses for an event do not exceed this threshold, the Secretary of the Treasury must recoup 133 percent of any payments made through

TRIA using surcharges on property/casualty insurance policies nationwide. Thus, the federal government does not incur any permanent liability through TRIA for attacks below this threshold.[39, 40]

The RMS modeling results presented in Figure 4 suggest that the maximum losses for conventional terrorist attack scenarios—the types of attacks for which historical records can be used to estimate current risks—will likely not exceed the Industry Aggregate Retention Threshold. In contrast, the expected maximum losses from unconventional attacks—the types of attacks for which modeling capabilities are not valid and reliable—are likely to exceed this threshold. By segregating conventional and unconventional terrorism attacks, TRIA provides a mechanism to help the insurance industry segment risks that can be modeled from those that cannot.

The past decade of experience with terrorism provides a picture of terrorism involving relatively uncomplicated attacks with conventional weapons. If the intent and capabilities of terrorists remain the same, the frequency of these types of attacks is likely to remain constant and at a low enough level that the aggregate losses would not be expected to exceed amounts that would be difficult for the industry to compensate with available capital. Thus, analysis of new terrorist attacks can focus on whether they signal a material change in the intent and capability behind terrorism threats. For example, there are known terrorist groups that have capabilities but not intent, such as al Shabaab and Hezbollah, which are focused on their own region's political conflicts. A new attack indicating a shift in the intentions of a group like these would suggest the potential for a significantly greater frequency of terrorism from conventional attacks. Accordingly, a shift like this would suggest that the insurance industry should take new steps to adjust exposure to terrorism risk or rates of policies in the future.

On the other hand, by considering the history of terrorism, we also recognize what risks we don't understand: risks from attacks involving advanced capabilities from cyber, chemical, biological, radiological, and nuclear weapons. For these attacks, TRIA provides the insurance industry a mechanism that limits exposure to risks that cannot be modeled.

Does a Robust Terrorism Insurance Market Improve National Security?

Policy discussions about TRIA are clearly motivated by the national security issues discussed above about whether terrorism remains a threat and whether intelligence and security professionals are able to estimate terrorism risks. However, arguments have also been made that access to efficiently priced insurance for terrorism risk helps the United States achieve national security goals, making the nation more safe and secure.

The goals of terrorism security efforts are often discussed in terms of one of four ways to improve community safety. First, security and law enforcement can *prevent* future terrorist attacks. Second, with awareness of threats, communities and businesses can take steps to *prepare* should an attack occur. Third, when attacks occur, emergency managers can *respond* to help the

victims. Finally, after the attack, efficient *recovery* reduces the broader economic damage caused by terrorism. Accordingly, advocates of TRIA have made claims that the act supports national security in the following three ways:

- *Prevention:* By providing access to affordable insurance, TRIA could contribute to deterring terrorists from attacking the United States.
- *Preparedness:* By reflecting the risk of terrorism in premiums, TRIA could encourage better decisionmaking about what security to implement or risks to accept.
- *Response and recovery:* By establishing policies and mechanisms to cover losses, TRIA could improve resilience and recovery from terrorism events.

While each of these claims can be supported by a logical narrative, the strength of the claims depends upon whether there are credible counter-narratives and whether evidence supports or disproves the claim. For this reason, a review of both the claims and evidence is necessary when considering national security dimensions of the reauthorization of TRIA.

Does TRIA Deter Terrorists from Attacking the United States?

For TRIA to deter terrorists, they would have to believe that the law keeps them from achieving their objectives or raises the costs and risks of doing so. In making claims that TRIA plays a role in deterring terrorism, two terrorist objectives are cited: (1) incite fear through violence to influence policies and actions of the targeted nation and (2) damage the U.S. economy enough to influence U.S. foreign policy. However, neither the logic nor evidence behind each of these claims holds up to scrutiny.

TRIA's Effect on the Objective of Inciting Fear Through Violence

Some argue that terrorism is successful because of the powerful effect that unpredictable, visible, and/or symbolic attacks that kill people and destroy property have in inducing fear in the public. This view is corroborated by risk perceptions studies that suggest that people are more concerned with the risk of dying from terrorism than the economic damage terrorism inflicts.[41]

Accordingly, the record of terrorist attacks in the United States suggests that terrorists have a strong preference for these types of attacks over attacks that would primarily lead to economic damage or promote more security spending. The data presented earlier in this brief demonstrate that terrorists have a preference for using violence against people. Even in cases of environmental terrorism, which are primarily directed toward property instead of people, the motive appears to be to draw attention to the cause, halt a specific activity altogether, and sway public opinion rather than to reduce the profit margins of firms that are targeted. Since TRIA addresses only the financial consequences of terrorism and does not directly reduce the risks of death and injury from terrorism, it does not logically follow that TRIA would reduce the potential for terrorism to cause fear.

TRIA's Influence on the Objective of Damaging the U.S. Economy

The origin of claims that TRIA might deter terrorists from attacking the United States is writing and statements by leaders of al Qaeda and al Qaeda–affiliated terrorist groups. Consider the following statements made over the past decade:

- On November 1, 2004, Osama bin Laden, the founder of al Qaeda, stated ". . . having experience in using guerrilla warfare and the war of attrition to fight tyrannical superpowers as we alongside the Mujahedin bled Russia for 10 years until it went bankrupt and was forced to withdraw in defeat. . . . So we are continuing this policy in bleeding America to the point of bankruptcy."[42]
- On September 12, 2013, Ayman al-Zawahiri, the current leader of al Qaeda and former operational commander of al Qaeda in the Arabian Peninsula, argued in a speech that a campaign of terrorism in the United States would "bleed America economically" due to spending on terrorism security.[43]

From these statements, it is clear that leadership of al Qaeda views weakening the U.S. economic strength as one component in a strategy to achieving the organization's overall political goals. However, the extent to which TRIA would deter terrorism in the United States is moderated by the disparate nature of terrorist activity in the United States and the limited influence that TRIA has on U.S. counterterrorism expenditures.

First, the record of terrorist attacks in the United States suggests that the vast majority are conducted by individuals who are not formally affiliated with organized terrorist groups. It is possible that some of these lone actors are inspired by the messages from al Qaeda. It is equally probable that they are motivated by grievances and resentment primarily generated by their own experiences. For example, the personal histories of Dzhokhar and Tamerlan Tsarnaev (the Boston bombers) and Nidal Hasan (the Fort Hood shooter) provide multiple alternative motives for terrorism beyond a goal of weakening the U.S. economy.

Second, even for those individuals who are swayed by statements of al Qaeda's leaders and want to force the United States into greater expenditures on security, TRIA would deter them from terrorism only if it led them to believe that the existence of TRIA and greater access to terrorism insurance would reduce the amount of money the government must spend on terrorism security. This is difficult to believe, given that terrorism security budgets are estimated to have grown consistently since 2002, when they were $36.5 billion.[44]

In summary, despite inspiring messages to attack the U.S. economy, it is unlikely that TRIA and access to terrorism insurance significantly reduce terrorism risk through deterrence.

Does TRIA Lead to Better Risk Management Decisionmaking?

In theory, one benefit of insurance is that it can make investment of capital more efficient by providing a signal through premiums about the existence of risk and the benefits of steps that could be taken to mitigate those risks. With this signal, firms can direct resources toward security

measures that are most cost-effective and avoid unintentionally concentrating capital in activities or areas that are at a high risk of terrorism.

Our discussions with firms in many sectors over the past several years reinforce that this line of reasoning is considered. According to insurance companies, they encourage policyholders to increase security on insured properties. According to firms seeking insurance, they attempt to negotiate premium reductions in return for making capital improvements (e.g., installing gates or surveillance equipment) or implementing tighter security procedures (e.g., hiring guards or implementing access control processes).

However, these same discussions suggest that signals from terrorism insurance don't in practice make risk management decisionmaking more efficient. Insurer recommendations to increase security are guided more by benchmarking customers against industry practice than assessments of how security changes risks. Customer requests to lower premiums based on security have not been supported by corresponding actuarial evidence of reduced risk. This is not surprising, given analysis of terrorist tactics indicating that terrorism security can either increase or decrease terrorist motivation and selected capabilities depending on the context.[45] Instead, these rates are negotiated based primarily on market conditions.

Conversely, some have argued that the weak price signal about terrorism risk in terrorism risk premiums leads TRIA to incentivize firms to make unwise decisions and take on terrorism risks to which they would otherwise not expose themselves.[46] Such reasoning is also contradicted by the uncertainty surrounding terrorism risk and the effectiveness of terrorism security measures.

Inaccurate pricing of risk could lead firms either to under- or overinvest in terrorism security, either taking on unwise risk or not making good investments. However, given current uncertainty about terrorism risk, it is impossible to know which is the case. Greater availability and analysis of data on how changes in security affect other factors, such as safety improvements and theft reduction, could ultimately provide evidence that would allow terrorism insurance premiums to be used as a signal of the technical rate of terrorism risk. However, the theoretical benefits of terrorism insurance improving the effectiveness of risk management decisionmaking are likely not realized in practice, given the uncertainty about both the likelihood of terrorist attacks and the effectiveness of terrorism security measures.

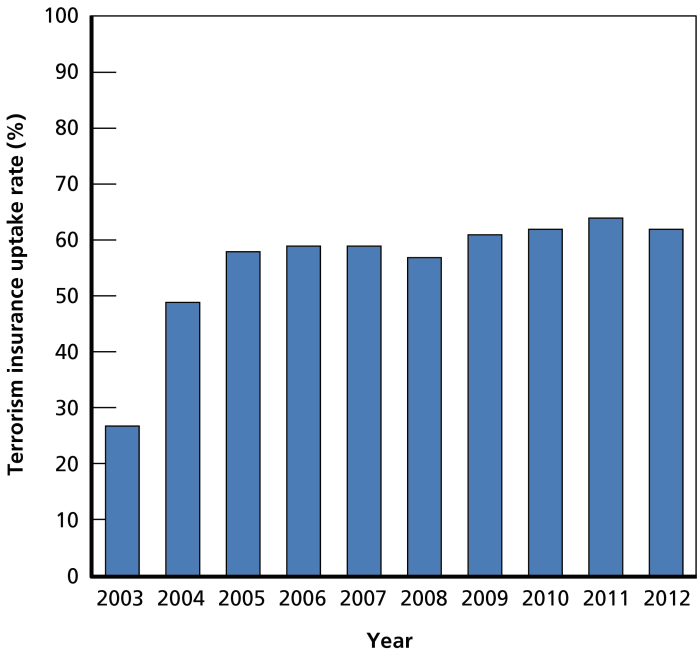
Does TRIA Improve Recovery and Resilience from Terrorism Events?

The first step in answering this question is describing how insurance markets might evolve with and without TRIA. While it is impossible to know for certain how markets would evolve without TRIA, the current state of terrorism markets and the industry experience in the months after 9/11 provide two reference points for consideration.

Insurance Markets with TRIA Enacted

The most common policy problem with insurance is getting people to buy it.[47] By most accounts, insurance markets have been stable and uptake of insurance has been strong since the passage of TRIA. A Marsh 2012 survey of 2,558 firms from 17 industry sectors reports that overall uptake of terrorism insurance has remained at or around 60 percent of companies since 2005 (see Figure 5). A similar review of terrorism insurance pricing showed that in 2012 median rates have been stable for the past three years, representing about 4 percent of the property insurance premium. While these rates and costs varied by both insured value and sector, current market statistics suggest that adequate insurance is currently available.[48]

Figure 5. Terrorism Insurance Uptake Rate



SOURCE: Marsh, *2013 Terrorism Risk Insurance Report,* New York: Marsh Risk Management Research, 2013.

Insurance Markets Before TRIA

The insurance industry response to 9/11 provides one perspective on what might happen to insurance markets should TRIA not be continued. Prior to the 2001 terrorist attacks, terrorism was included in property and casualty lines as an unnamed peril. Thus, uptake was essentially 100 percent. In the aftermath of the attacks, private reinsurers who had underwritten the largest portion of insured losses at the World Trade Center ceased to reinsure terrorism risk in the United States, and by February 2002 commercial exclusions for terrorism were approved for use in 45 states.[49]

Citing this experience, industry experts project significant contraction of the amount of terrorism insurance offered if TRIA were to not be renewed. Though these assessments are based

on inference and logic, many believe that the results would be increased prices and reduced uptake of insurance in a world without TRIA.[50]

Implications of TRIA Renewal on Community Resilience

The scenarios presented below present a distinction between a world where firms have access to insurance for terrorism risk and one in which they must assume the terrorism risk associated with any investments. While it is impossible to know which world would come to be if TRIA were not renewed, comparing these two scenarios helps to understand what the greatest benefits from community resilience might be. Thus, the best way to understand the ways in which TRIA affects community resilience is to understand the ways in which availability of terrorism insurance could affect how communities recover from terrorism events (see Table 2).

Table 2. Possible Outcomes of Decision to Renew TRIA and Effects They Could Have on Community Resilience to Terrorism

Scenario	Assumed State of Insurance Markets	Possible Influences on Community Resilience
TRIA renewed/ status quo	• The market for terrorism risk insurance remains stable and strong.	• Plans are made based on expectations of compensation. • Recovery from terrorist attacks is driven by economic decisionmaking. • Firms are compensated quickly and efficiently. • Established rules reduce litigation.
A world without TRIA	• Insurance is less available. • Prices rise and coverage is limited.	• Compensation is delayed by political deliberation and litigation. • Rebuilding is delayed by uncertainty about compensation. • Compensation may be less or allocated differently than economically optimal. • Insurance markets are unstable after terrorism events.

In a world where TRIA is renewed and insurance markets operate as they have since 2004, several factors could affect resilience and recovery:

- **Firms could plan knowing what losses would be compensated.** With TRIA in place, companies could decide what activities to insure and what risks to assume. Thus, investments could be made without concerns about unforeseen terrorism risk. To the extent these investments fuel economic growth, more resources will be available to support resilience and recovery.
- **Rebuilding could be driven by economic decisionmaking.** After an event, insured companies would have resources with which to rebuild and reinvest, and those decisions could be made based on where companies see the most productive uses for their capital.
- **Firms could be compensated quickly and efficiently.** Property damage payments could be made quickly, without need to decide politically how payments should be awarded or how they should be distributed.

- **Litigation costs could be reduced.** With policies in place and terrorism coverage clarified, people and companies could focus on recovery instead of disputing fiscal responsibilities in courts.

In a world where TRIA is not renewed and insurance becomes more costly and less available, some of the opposite effects could be expected:

- **Insurance, where available, would be more expensive.** The results would likely be less investment and less productive use of capital. In turn, this would lead to less economic growth and fewer resources to be directed toward meeting national security goals or solving other social problems.
- **Compensation could be ambiguous and delayed.** In the absence of broad uptake of insurance, any compensation to firms would be subject to political deliberations and litigation.
- **Rebuilding decisions may be distorted from market considerations.** Uncertainty about how much compensation will be awarded could delay decisions to rebuild. Ultimate decisions about compensation, and thus rebuilding, may further be influenced by political considerations introduced through the compensation process. As a result, compensation may be less or allocated differently than economically optimal.
- **Insurance markets may be disrupted after attacks.** To the extent that insurance is available without TRIA before an attack, prices and availability of markets may become unstable after an attack as firms seek to understand whether the event signals significant changes in future terrorism risk. This could thwart economic activity and recovery from the attack—as anecdotally occurred following 9/11.

Implications of TRIA Renewal for National Security

The primary influences of TRIA on national security are likely through improvements in resilience and recovery. To the extent that TRIA leads to greater access to insurance, this could improve both the pace and effectiveness of recovery efforts and in turn make communities more resilient to future terrorism events. However, other claims about how TRIA and resulting terrorism insurance markets support national security goals are not well supported by evidence (see Table 3). It is unlikely in practice that TRIA deters terrorism or leads to better security and risk management decisionmaking.

Table 3. Summary of Claims for How TRIA Supports National Security Objectives

Claim	Assessment	Summary of Evidence
TRIA deters terrorism.	Unlikely	• Terrorist writings and statements suggest a goal of damaging U.S. economy. • The history of terrorism in the United States suggests that most attacks have the goal of instilling fear through violence. • All terrorists are not purely motivated by al Qaeda. • Security spending has increased since 9/11 despite TRIA.
TRIA leads to better security and risk management decisionmaking.	Unlikely	• In theory, firms can react to the signal of terrorism risk premiums when deciding how to invest and what security to implement. • In practice, the likelihood of terrorism events and the effectiveness of security measures are too ambiguous for premiums to carry a clear signal.
TRIA leads to quicker, more effective recovery and thus improves community resilience.	Likely but unproven	• Depends on how insurance markets would respond to the absence of TRIA. • Insurance could improve recovery in many ways. • Arguments for this claim are based on logic and theory and should be assessed where data are available.

Even in the case of resilience and recovery benefits, specific claims should be further investigated by, for example, comparing the effectiveness of government programs and insurance for compensating victims, assessing the likelihood of litigation after disasters with and without pre-established rules for compensation and liability, and assessing the extent to which recovery satisfied economic and other community objectives after disasters with and without significant uptake of insurance.

Summary

TRIA was enacted in response to belief that terrorism was a real and present national security threat. Our review of the history of terrorism in the United States since the passage of TRIA and counterterrorism studies provides three main insights into the need for terrorism insurance and how insurance markets influence U.S. national security:

- **Terrorism remains a real, albeit ambiguous, national security threat.** The past decade demonstrates that the threat of terrorist attacks persists. The most likely attack scenarios are those involving arson or explosives being used to damage property or conventional explosives or firearms being used to kill and injure civilians. Al Qaeda and other groups may aspire to conduct more destructive attacks using cyber, chemical, biological, radiological, or nuclear attacks, but no group has so far demonstrated the combined intent and capability to do so. Intelligence analysis identifies geopolitical and technology trends that could affect future terrorism risks. However, this analysis does not resolve the uncertainty surrounding the future risk of terrorism.

- **Terrorism risk models are limited in the types of risk they can estimate.** Risk models based on historical events or theories of terrorist decisionmaking can estimate terrorism risk if the future events are similar to the past. These models can also describe how severe the consequences of terrorism could be for specified scenarios that deviate from our current experience. However, these models cannot estimate the likelihood of future terrorist attacks that are more advanced and severe than events that have occurred. The $27.5 billion threshold for aggregate insured losses in TRIA ensures that the insurance industry, rather than the taxpayer, is ultimately responsible for paying for those incidents that are within the realm of the industry's modeling capability. At the same time, this threshold potentially eases the capital requirements for insurers, who under TRIA are required to cover losses from incidents which involve deep uncertainty that cannot be adequately quantified using present modeling approaches.
- **Terrorism insurance can contribute to making communities more resilient to terrorism events.** Terrorism insurance can support community resilience in several ways. Before attacks, access to appropriately priced terrorism insurance can improve the productivity of capital thus promoting economic growth and making resources available to address national security threats or other social problems. After attacks, recovery and rebuilding will be more rapid and efficient when it is clear how much compensation will be available after a terrorist attack and how it will be distributed. To the extent that terrorism insurance is more available with TRIA than without it, renewing the legislation would contribute to improved national security.

As Congress evaluates the need for and effectiveness of TRIA this year and in the future, it should weigh these observations against the costs and other benefits of the legislation.

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About This Document

This document is part of a series of three policy briefs examining the potential ramifications of allowing TRIA to expire. The other two documents in the series examine

- the impact of TRIA on federal spending, considering the costs to taxpayers of payment made through the program as well as taxpayer-funded compensation and assistance for uninsured losses following an attack
- the impact of TRIA on the workers' compensation market, including the potential consequences of a migration of workers' compensation policies from the private insurance market to state-sponsored markets of last resort.

These policies briefs build on previous RAND research for the 2005 and 2007 authorization. For more information on the background and effects of TRIA than allowed in the focused analysis of national security issues here, please see

- *The Federal Role in Terrorism Insurance: Evaluating Alternatives in an Uncertain World*, 2007 (www.rand.org/t/MG679)
- *Distribution of Losses from Large Terrorist Attacks Under the Terrorism Risk Insurance Act*, 2005 (www.rand.org/t/MG427)
- *Trends in Terrorism: Threats to the United States and the Future of the Terrorism Risk Insurance Act*, 2005 (www.rand.org/t/MG393)
- *Issues and Options for Government Intervention in the Market for Terrorism Insurance*, 2004 (www.rand.org/t/OP135).

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About the RAND Center for Catastrophic Risk Management and Compensation

This work is conducted within the RAND Center for Catastrophic Risk Management and Compensation. The center conducts research and seeks to identify policies, strategies, and other measures that have the potential to reduce the adverse social and economic effects of natural and manmade catastrophes by

- improving incentives to reduce future losses
- providing just compensation to those suffering losses while appropriately allocating liability to responsible parties
- helping affected individuals, businesses, and communities to recover quickly
- avoiding unnecessary legal, administrative, and other transaction costs.

The center is part of RAND Justice, Infrastructure, and Environment, a division of the RAND Corporation dedicated to improving policy and decisionmaking in a wide range of policy domains, including civil and criminal justice, infrastructure protection and homeland security, transportation and energy policy, and environmental and natural resources policy.

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[48] Michel-Kerjan, Raschky, & Kunreuther, 2013; Robert P. Hartwig, *Terrorism Risk: A Constant Threat*, New York: Insurance Information Institute, 2013; Marsh, *2013 Terrorism Risk Insurance Report*, New York: Marsh Risk Management Research, 2013; U.S. Department of Treasury, *Report of the Presidents Working Group on Financial Markets: Market Conditions for Terrorism Risk*, Washington, D.C., 2010,

[49] U.S. Department of Treasury, *Report of the President's Working Group on Financial Markets: Market Conditions for Terrorism Risk Insurance.* Washington, D.C., 2006; Erwann O. Michel-Kerjan, *TRIA at Ten Years: The Future of the Terrorism Risk Insurance Program*, written testimony presented to the U.S. House Committee on Financial Services, Subcommittee on Insurance, Housing and Community Opportunity, Washington, D.C., September 11, 2012.

[50] Michel-Kerjan, 2012; Hartwig, 2013; Guy Carpenter, "Future of TRIA and Implications on the (Re)Insurance Market," gccapitalideas.com, December 24, 2012.