Research Brief

RAND CENTER FOR TERRORISM RISK MANAGEMENT POLICY

Evaluating Alternatives for Renewing TRIA in an Uncertain World

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Abstract

Using RAND's robust decisionmaking approach, researchers assessed three TRIA-related policy interventions. Results show that the 2007 version of TRIA reduces taxpayer costs across a broad range of scenarios relative to taxpayer costs in the absence of a government terrorism-insurance program and produces positive outcomes in a number of other dimensions for conventional attacks. But the 2007 version of TRIA does not effectively address the risks that NBCR attacks present to either businesses or taxpayers; a robust strategy that both hardens the cap and lowers the deductible is critical to achieving positive outcomes when TRIA is expanded to require insurers to offer coverage for both NBCR and conventional attacks.

Following the 9/11 attacks, Congress passed the Terrorism Risk Insurance Act (TRIA) of 2002, which established a temporary federal terrorism-risk insurance program. The act provided a system of shared public and private payments for insured commercial property and casualty losses due to acts of terrorism. Congress amended TRIA in 2005 and extended the program at the end of 2007 for seven years without major changes in program structure.

To inform the 2007 debate about whether and how TRIA should be extended, RAND Corporation researchers assessed options for modifying the program, including allowing the program to expire. Evaluating the advantages and disadvantages of different approaches was challenging, because many difficult-to-analyze uncertainties underlie the analysis. For example, what would be the frequency and type of attack—conventional versus nuclear, biological, chemical, or radiological (NBCR)? What proportion of businesses would take up insurance coverage for property losses from terrorist attacks under different government interventions in the terrorism-insurance market? To what extent would the government provide compensation to businesses that fail to purchase terrorism insurance?

Under such conditions, policymakers want strategies that perform reasonably well relative to alternatives over a wide range of plausible futures. The RAND analysis assessed policy options for renewing TRIA with a quantitative tool that uses computer simulation to assess the performance of these options over a large number of plausible futures.

How Was the Analysis Set Up?

The analysis examined the performance of three interventions: (1) TRIA as it was configured in 2007, (2) no government terrorism-insurance program, and (3) four variants that modify TRIA to include NBCR coverage by requiring insurers to offer coverage for both conventional and NBCR attacks. All four NBCR variants required bundled conventional and NBCR coverage, but the first one did so without changing other program features. Another variant left the deductible equal to 20 percent of an insurer's total written premiums on the insurance lines covered by TRIA but made the program's $100 billion cap unambiguously binding so that insurers would face no liabilities for losses above this amount (a "hard cap"). A third variant did the reverse, retaining the current cap but lowering the deductible to 7.5 percent of insurer premiums. A final variant did both: It hardened the cap *and* lowered the deductible to 7.5 percent.

In assessing the interventions, the analysis used six nominal attack scenarios drawn from an attack-loss model developed by Risk Management Solutions (RMS): two conventional attacks (1- and 10-ton truck bombs) and four NBCR

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Corporate Headquarters
1776 Main Street
P.O. Box 2138
Santa Monica, California
90407-2138
TEL 310.393.0411
FAX 310.393.4818

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attacks (a 5-kiloton nuclear bomb, an outdoor anthrax attack, an attack using a radiological device [a dirty bomb], and an indoor sarin attack). Also, the analysis scaled up and down the magnitude of each attack (in terms of property losses and workplace injuries and deaths) to provide data for a wide range of conceivable attack scenarios.

The authors' approach scanned thousands of combinations of parameter values related to attack type, insurance-industry uncertainties (e.g., the hardness of the TRIA cap as reflected in the proportion of insured losses greater than $100 billion for which insurers are liable), and postattack government-compensation uncertainties (e.g., the percentage of uninsured business losses that the government compensates). The end result was thousands of plausible futures for each intervention.

Performance was assessed using five outcome measures. Two of the five measures—the fraction of losses that remain uncompensated after an attack and the cost to taxpayers—represent outcomes broadly reflecting effects on society as a whole. The other three—the fraction of losses paid by the insurance industry, the fraction of insurance-industry surplus used to compensate losses after an attack, and the cost to future policyholders—represent outcomes reflecting the operation of the insurance marketplace and the role the insurance industry plays in bearing terrorism risk. The fraction of commercial policyholders that purchase terrorism insurance (the take-up rate) for each intervention was also projected, because it is an important driver of the outcomes examined.

TRIA Has Positive Effects on the Terrorism-Insurance Market for Conventional Attacks but Comes Up Short for NBCR Ones

Table 1 summarizes the results of retaining the 2007 version of TRIA relative to no government terrorism-insurance program in terms of the five outcome measures for conventional and NBCR attacks. The cells present the direction of the outcome (higher, lower, or unchanged) and the proportion of scenarios in which the change occurs (some, many, most, or all). For example, for conventional attacks that result in less than $40 billion in losses, the fraction of loss that remains uncompensated after an attack decreases in all scenarios with TRIA in place relative to no government program.

Looking at the results for conventional attacks in the table (the first two columns), we see that TRIA provides benefits in many dimensions for conventional attacks. Under TRIA, the government assumes much of the risk for very large conventional attacks, which, as shown by the last row in Table 1, allows insurers to assume more of the risk for the smaller conventional attacks. Considering both government payments under the program and postattack government compensation of uninsured losses, taxpayer cost is lower in most futures under TRIA for conventional attacks that result in total losses less than about $40 billion. Conversely, the cost to taxpayers is higher for larger conventional attacks. By increasing the take-up rate for commercial property insurance, TRIA also reduces the fraction of losses that go uncompensated for both small and large conventional attacks.

While TRIA provides many benefits for conventional attacks, the analysis suggests that TRIA has only limited benefits for NBCR attacks (last two columns). The take-up rate for losses from NBCR attacks was very low before TRIA and remains very low with TRIA in place. Outcomes for NBCR attacks causing property and workers' compensation (WC) losses less than $40 billion are no different from losses under no government program. Because the TRIA program

Table 1
Results of Retaining the 2007 Version of TRIA Relative to No Government Terrorism-Insurance Program

	Conventional Attacks		NBCR Attacks	
Outcome Measure	**<$40 Billion**	**>$40 Billion**	**<$40 Billion**	**>$40 Billion**
Fraction of loss that remains uncompensated after attack	All lower	All lower	All unchanged	Many unchanged; some higher, some lower
Cost to taxpayers	Most lower	All higher	All unchanged	Most higher
Cost to future policyholders (with minimum recoupment)	Most unchanged; some higher	Most higher	All unchanged	Most unchanged; some higher
Fraction of industry surplus used to compensate loss after attack	Most higher	All lower	All unchanged	Most unchanged; many lower
Fraction of loss paid by insurance industry	Most higher	All lower	All unchanged	Most unchanged; many lower

Note: Share of scenarios with indicated change in outcome. *Some* refers to 1–30 percent of scenarios; *many* refers to 31–50 percent of scenarios; *most* refers to 51–99 percent of scenarios.

cap limits insurer payouts to some extent in very large attacks, TRIA increases taxpayer cost in most of the large NBCR-attack scenarios. The TRIA cap does somewhat protect the insurance industry from very large WC claims in the aftermath of a large NBCR attack, and this protection from very large losses helps preserve insurers' ability to provide insurance coverage after such an event.

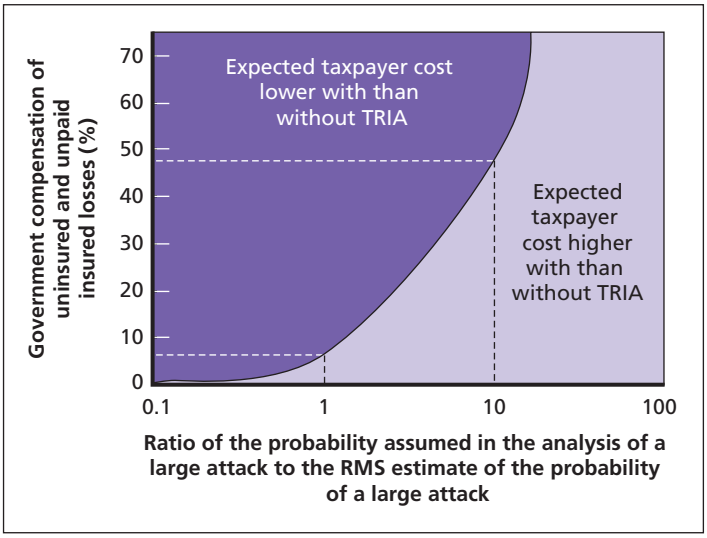
TRIA Is Expected to Save Taxpayers Money

As is apparent from the second row of Table 1, TRIA saves taxpayers money only for conventional attacks that cause less than about $40 billion in losses; nevertheless, expected taxpayer cost considering all types of attacks is lower with TRIA than without TRIA over a wide range of assumptions about the relative probabilities of large and small attacks and government compensation for uninsured and unpaid insured losses.

Indeed, the figure below shows that, for the baseline attack probabilities predicted by RMS (indicated by "1" on the horizontal axis), the expected taxpayer cost under TRIA is less than it would be without TRIA, as long as the government compensates more than about 5 percent of uninsured losses and unpaid insured losses (the lower dotted lines). Even if the likelihood of a large attack were 10 times the baseline estimate, the expected cost to taxpayers under TRIA is less if postattack government compensation exceeds roughly 50 percent of uninsured and unpaid insured losses (the upper dotted lines).

It is impossible to accurately predict the amount of government compensation after a major terrorist attack. But judging from the government's actions after 9/11 and after many natural disasters, the figure suggests that, over a very wide range of plausible assumptions, TRIA is likely to cost taxpayers less than if there were no government program.

Expected Annual Taxpayer Cost With and Without TRIA



Which NBCR Variant Is Chosen Makes a Big Difference

If we were to modify the 2007 version of TRIA to require insurers to offer policies that cover both NBCR and conventional attacks *without* changing other program features, such as the program deductible or the cap, it would have little upside for NBCR attacks and could have major unintended consequences for conventional attacks. In particular, the outcomes for conventional attacks when the cap and the deductible are unchanged are similar to those that would occur if there were no government program. For NBCR attacks, this version of TRIA with NBCR coverage does not improve outcomes much over TRIA alone.

However, requiring NBCR coverage while also hardening the cap and reducing the deductible to 7.5 percent generates outcomes comparable to, or better than, TRIA in several key dimensions for conventional attacks and improves outcomes in several dimensions for NBCR attacks (as shown in Table 2). The take-up rate is higher in most of the conventional-attack scenarios examined, and the fraction of losses that remain uncompensated is lower. The cost to taxpayers falls in most of the smaller conventional-attack scenarios relative to TRIA but rises in most of the larger ones.

For NBCR attacks, the take-up rate rises substantially under this intervention; as a result, the fraction of losses that remain uncompensated falls broadly across the NBCR attack scenarios (last two columns of Table 2). Even though the cap has hardened and the deductible is lower, the insurance industry's role in compensating losses from NBCR attacks grows in many of the NBCR-attack scenarios less than $40 billion and all the NBCR attack scenarios less than $6 billion. Also, the cost to taxpayers declines for most NBCR attacks. Future policyholders do fare worse in this intervention than under TRIA because the lower insurer deductible leads to greater postattack surcharges in insurance premiums after an attack.

Enhancing TRIA to Cover NBCR Attacks Can Save Taxpayers Money

As with TRIA alone, the intervention with NBCR coverage, hard cap, and lower deductible increases the industry role in providing compensation for smaller NBCR attacks in return for shifting some of the risk for the largest attacks to the government. However, because the probability of large attacks is believed to be much lower than that of smaller attacks, expected taxpayer cost is lower here than under TRIA over a wide range of assumptions about the relative risks of large and small attacks and about the proportion of uninsured and unpaid insured losses compensated by the government. For current RMS estimates of large and small conventional and NBCR attack probabilities, expected annual taxpayer costs are lower under TRIA with this version of NBCR coverage if

Table 2
Results for TRIA with NBCR Coverage, Hard Cap, and 7.5 Percent Deductible Relative to the 2007 Version of TRIA

Outcome Measure	Conventional Attacks		NBCR Attacks	
	<$40 Billion	>$40 Billion	<$40 Billion	>$40 Billion
Fraction of loss that remains uncompensated after attack	Most lower	Most lower	All lower	All lower
Cost to taxpayers	Most lower	Most higher	Most lower	Most higher
Cost to future policyholders (with minimum recoupment)	Most higher	All higher	Most higher	All higher
Fraction of industry surplus used to compensate loss after attack	Most lower	All lower	Most lower	Most lower
Fraction of loss paid by insurance industry	Most lower	All lower	Many higher[a]	Most lower

Note: Share of scenarios with indicated change in outcome. *Some* refers to 1–30 percent of scenarios; *many* refers to 31–50 percent of scenarios; *most* refers to 51–99 percent of scenarios. [a] Higher for all NBCR attacks causing losses of less than $6 billion.

the government compensates more than roughly 25 percent of uninsured and unpaid insured losses.

Hardening the Cap and Lowering the Deductible Is a Robust Strategy When TRIA Is Expanded to Cover NBCR Attacks

Because of the uncertainty over the hardness of the existing TRIA cap, the analysis suggests that both hardening the cap *and* lowering the deductible are critical to achieving positive outcomes when TRIA is expanded to require insurers to offer coverage for both NBCR and conventional attacks. If the existing cap is quite soft, lowering the deductible alone does not improve outcomes for NBCR attacks and can result in a deterioration of program performance for conventional attacks. If the cap is already fairly hard, hardening the cap would not make a great deal of difference, and lowering the deductible becomes key to avoiding adverse outcomes relative to TRIA. Thus, hardening the cap and lowering the deductible together are robust to the substantial uncertainty over how insurers perceive the hardness of the current cap.

Implications

Overall, the analysis shows that both retaining the 2007 version of TRIA and enhancing TRIA to cover NBCR attacks in a way that *both* hardens the cap *and* lowers the deductible can achieve positive outcomes by transferring risk for the largest attacks to taxpayers. In return, the insurance industry is able to play a larger role in compensating losses for smaller attacks, and the resulting decline in uninsured losses means less government compensation after an attack. Because the probability of large attacks is thought to be far lower than the probability of smaller attacks, both TRIA and TRIA with NBCR coverage can achieve these benefits while reducing the expected taxpayer cost.

The extension of TRIA signed into law at the end of 2007 preserves the program's benefits for conventional attacks but does little to improve the availability of coverage for NBCR attacks. The take-up rate for NBCR coverage will thus likely remain very low, limiting the nation's ability to manage terrorism risk. The legislation directs the U.S. Government Accountability Office to examine the availability and affordability of NBCR coverage and to recommend legislative or other government actions to improve the availability and affordability of such insurance. The framework used here can be useful in this and other analyses of the program by allowing rapid evaluations of program configurations of interest. ■

This research brief describes work done for the RAND Center for Terrorism Risk Management Policy, which is housed within the RAND Corporation and combines expertise of the RAND Institute for Civil Justice; RAND Infrastructure, Safety, and Environment; and Risk Management Solutions. The work is documented in *The Federal Role in Terrorism Insurance: Evaluating Alternatives in an Uncertain World*, by Lloyd Dixon, Robert J. Lempert, Tom LaTourrette, and Robert T. Reville, MG-679-CTRMP (available at http://www.rand.org/pubs/monographs/MG679/), 2007, 150 pp., $28.00, ISBN: 978-0-8330-4235-4. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. **RAND**® is a registered trademark.

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