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# The Federal Role in Terrorism Insurance

## Evaluating Alternatives in an Uncertain World

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RAND CENTER FOR TERRORISM RISK MANAGEMENT POLICY

The research described in this monograph was conducted within the RAND Center for Terrorism Risk Management Policy (CTRMP).

**Library of Congress Cataloging-in-Publication Data**

The federal role in terrorism insurance : evaluating alternatives in an uncertain world / Lloyd Dixon ... [et al.].
p. cm.
ISBN 978-0-8330-4235-4 (pbk. : alk. paper)
1. Terrorism insurance—Government policy—United States. 2. United States. Terrorism Risk Insurance Act of 2002. I. Dixon, Lloyd S.

HG8535.F43 2008
368.4'8—dc22

2007039017

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Published 2007 by the RAND Corporation
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# Summary

## Introduction

After the 9/11 attacks, most commercial insurers began excluding terrorism losses from their property-insurance policies, which previously had not identified the terrorism threat as a separate peril. Concerned that the unavailability of terrorism insurance would impede postattack economic recovery and hinder growth, Congress responded with the Terrorism Risk Insurance Act of 2002 (TRIA). TRIA requires commercial property-casualty insurers to offer insurance for losses suffered in terrorist attacks, and, in return, the federal government agrees to reimburse insurers for a proportion of claim payments that exceed a certain threshold amount. Congress amended TRIA in 2005, but TRIA will expire at the end of 2007 unless Congress takes further action.

After five years of support, the federal government's role in the market for terrorism insurance remains a subject of wide-ranging debate. Some envision TRIA as a temporary program needed only while insurers develop the tools and build the financial capacity to insure against terrorism risk. Others see a strong federal role in providing terrorism insurance as an ongoing necessity. Indeed, in the face of a growing awareness of the risk of nuclear, biological, chemical, and radiological (NBCR) attacks and routine exclusions of NBCR losses from coverage even when conventional attacks are insured, Congress is now considering not only whether to extend the program but also whether to expand it to improve the availability of NBCR coverage.

This monograph aims to contribute to this ongoing policy debate by addressing two directly relevant questions:

- What would be the implications of allowing TRIA to expire at the end of 2007?
- What would be the effects of modifying TRIA to improve the availability and affordability of insurance for NBCR attacks?

## Analytic Approach

In answering these questions about the federal government's role in providing terrorism insurance, we used a simulation model to compare the outcomes of TRIA and potential alternative government interventions across a very wide range of plausible scenarios. We also used a robust decisionmaking (RDM) approach to handle the numerous, deep uncertainties that can confound any analysis of this topic. In the following sections, we discuss the program alternatives considered, the outcomes evaluated, the simulation model that relates the interventions to the outcomes, and the RDM approach used to exploit this model.

### Program Alternatives Considered and Outcomes Evaluated

We considered three main alternative federal government interventions in the market for terrorism insurance:

1. TRIA as currently configured
2. no government program (the equivalent of allowing TRIA to expire)
3. TRIA modified to include NBCR coverage.

The first intervention replicates the current program as it exists in 2007, while the second intervention allows TRIA to expire. The TRIA-with-NBCR-coverage intervention modifies the current program by requiring insurers to offer policies that cover both conventional and NBCR attacks for a single price. In this alternative, policyholders must accept coverage for both conventional and NBCR coverage or decline terrorism coverage altogether. The monograph examines four variants of this intervention that differ in two key dimensions: the insurer deductible and the program cap.

The *TRIA deductible* refers to the maximum amount of insured losses for which insurers remain entirely responsible. Above the deductible, the federal government reimburses insurers for a proportion of their payments. This reimbursement comes from a mix of taxpayer funds and a federally mandated surcharge on future insurance policies. The higher the deductible, the greater an insurer's potential costs and, therefore, the more an insurer will charge for terrorism insurance. This monograph examines two levels of deductible for the TRIA-with-NBCR-coverage interventions: one identical to that of the current TRIA program, which is equal to 20 percent of an insurer's total written premiums on the insurance lines that the TRIA program covers, and one in which the deductible falls to 7.5 percent of insurer premiums.

The *TRIA program cap* refers to the provision in the TRIA legislation that limits total payments by insurers, future policyholders, and taxpayers for losses to no more than $100 billion. Because the legislation does not specify who is liable for losses beyond this amount, some insurers have expressed uncertainty about whether they would be directly or indirectly liable for any loss above the cap. Because many NBCR attacks could involve losses greater than $100 billion, an insurer's uncertainty about

the "hardness" of the program cap increases its expected losses and, therefore, reduces its willingness to offer NBCR coverage. Thus, this monograph examines two types of caps for the TRIA-with-NBCR-coverage interventions: one that retains the current TRIA cap and one in which the cap becomes unambiguously binding (a "hard" cap). To harden the cap, we assume that the government would guarantee to pay all the insured losses from $100 billion to $650 billion.

For each of the TRIA, no-government-program, and TRIA-with-NBCR-coverage interventions, we evaluated performance using five outcome measures. Two measures—the fraction of losses that remain uncompensated after an attack and the cost to taxpayers—represent outcomes broadly reflecting impacts on society as a whole. Three measures—the fraction of insurance industry surplus used to compensate losses, the fraction of losses paid by the insurance industry, 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. Unlike previous studies, when calculating cost to taxpayers, we considered not only payments through the TRIA program but also payments made after an attack to provide compensation for uninsured losses or unpaid insured losses. We restricted our attention to property and workers' compensation (WC) losses. The TRIA program addresses other insured losses, such as losses on liability insurance policies, but they were beyond of the scope of this study.

We also examined the impact of the various government interventions on the take-up rate for terrorism insurance, which is an important intermediate variable that drives the five outcome measures considered. The *take-up rate* on property insurance policies refers to the proportion of property policies that have coverage for terrorism attacks and can differ for conventional attacks and NBCR attacks. The take-up rate for WC policies is 100 percent, because WC policies cover losses regardless of cause. When take-up rates are high, the insurance industry plays a larger role in compensating losses from terrorist attacks. When take-up rates are low, property owners' losses remain uncompensated unless the federal government pays them.

### The Robust Decisionmaking Approach

Many of the most important underlying factors, or parameters, that determine the performance of the different government interventions, such as the frequency and magnitude of terrorist attacks, insurer beliefs about the hardness of the existing TRIA cap, and government assistance after an attack for businesses that fail to purchase terrorism insurance, are deeply uncertain. That is, there is no empirically based agreement on the value of these parameters or even the proper probability distribution to place over their plausible values. Policymakers and stakeholders implicitly make assumptions about these parameters that guide their decisions, but the assumptions can vary widely, contributing to vastly divergent views about the appropriate policies. Thus, this monograph considers the performance of the alternative government interventions over a

very large number of plausible futures that capture a wide range of attacks, beliefs about the existing TRIA cap, levels of postattack government compensation, and other key factors. The monograph then uses RDM methods to identify patterns of outcomes generally observed across this broad range of futures and thus should help policymakers more confidently choose among the alternative government interventions despite the uncertainties involved.

The simulation model developed to evaluate outcomes over a wide range of futures includes a terrorist-attack model, a take-up rate model, a model of postattack government compensation, and an insurance-compensation and loss-distribution model.

- The terrorist-attack model predicts losses and probabilities of a large number of conventional and NBCR attacks of widely differing sizes.
- The take-up rate model predicts take-up for each of the TRIA-with-NBCR-coverage interventions based on the price of terrorism insurance, which is, in turn, determined by the cost to insurers of providing that insurance. We calibrate the take-up rate model to estimates in the literature for take-up rates with and without the current TRIA program.
- Given the uncertainty about what business assistance programs will be available after an attack, the postattack government compensation model considers levels of postattack government compensation that range from 0 percent to 75 percent of total uninsured and unpaid insured losses.[1]
- The insurance-compensation and loss-distribution model allocates losses caused by an attack across insurers, taxpayers, and businesses affected by the attack (in the form of uncompensated losses) and future insurance policyholders.

The hardness of the existing TRIA cap plays a key role in the both the take-up rate model and the insurance-compensation and loss-distribution model. For example, if the current cap is perceived to be very soft, hardening it will make a great deal of difference. Given the considerable uncertainty over the hardness of the cap, we consider scenarios in which the insurers are responsible for no insured losses and unpaid insured losses over the $100 billion TRIA program cap (a hard cap) up to scenarios in which insurers are responsible for 75 percent of such losses (a very soft cap).

[1] At the bottom of this range, government assistance is completely independent of the amount of uninsured loss and unpaid insured losses, which might be the case if government assistance were based only on the size of the attack and not the amount of uninsured losses. At the top of this range, the government will compensate most losses suffered by businesses without terrorism insurance. The higher the postattack compensation the government chooses to offer, the smaller the fraction of losses that are uncompensated but the higher the cost to taxpayers.

## Key Findings

Using this analytic approach, we answered the two questions posed earlier.

### Consequences of Allowing TRIA to Expire

TRIA has positive effects on the insurance market for *conventional* attacks relative to letting the program expire: The proportion of property-insurance policies with terrorism coverage is higher and the proportion of losses that remain uncompensated is lower for conventional attacks with TRIA than without TRIA.

TRIA's performance differs for larger and smaller conventional attacks. For conventional attacks with less than about $40 billion in total losses, TRIA increases the proportion of losses compensated by insurers relative to scenarios in which TRIA has expired and reduces taxpayer costs, once postattack government compensation is considered. For attacks with losses greater than about $40 billion, TRIA can reduce the role the insurance industry plays in compensating losses and can significantly increase the cost to taxpayers relative to scenarios without TRIA. For comparison, note that the attack on the World Trade Center caused roughly $23 billion in insured property and WC losses.

Even though TRIA saves taxpayers money only for conventional attacks causing less than $40 billion in damage, the expected annual taxpayer cost considering all types of attacks (conventional and NBCR) 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 of uninsured and unpaid insured losses. This result holds because terrorism experts believe larger attacks to be far less likely than smaller ones. The higher taxpayer expense from government reimbursement in large and rare terrorist attacks is offset by the lower taxpayer cost in the likelier smaller terrorist attacks leading to net taxpayer savings. The costs are lower in the smaller attacks, because insurers, relieved of the risk from large attacks, offer lower prices, which increases take-up rates, lowering ex post government compensation and increasing the insurance share of compensation. The expected taxpayer costs remain lower under TRIA than without TRIA as long as the government compensates more than about 5 percent of uninsured and unpaid insured losses in the aftermath of an attack.

In contrast to the findings for conventional attacks, TRIA has done little to improve outcomes after NBCR attacks because of the continued low take-up rate for insurance coverage against NBCR attacks. More than 30 percent of the loss remains uncompensated in roughly 55 percent of the scenarios examined with or without TRIA in place. The primary benefit of TRIA for NBCR attacks is that the cap somewhat reduces the threat to the ongoing health of the insurance industry associated with large WC payouts. While this limited support of WC has value, many see the continued low take-up rate for property insurance against NBCR attacks as a significant gap in the nation's ability to manage terrorism risk.

### Consequences of Expanding the Terrorism Risk Insurance Act of 2002 to Cover NBCR Attacks

To address the study's second question, we evaluated, as noted previously, four variants to TRIA that require insurers to offer bundled policies that cover terrorism losses due to both conventional and NBCR attacks—variants that differ in their deductibles and the hardness of their program caps. This analysis concluded that requiring terrorism policies to cover both conventional and NBCR attacks without changes in other program features such as the program cap or the insurer deductible may not improve outcomes much for NBCR attacks and may have significant adverse consequences for coverage of conventional attacks.

However, modifying the cap and deductible can improve outcomes for a program that requires insurers to offer both conventional and NBCR coverage. Specifically, hardening the cap and reducing the deductible from 20 to 7.5 percent generates outcomes comparable to those under TRIA in several key dimensions for scenarios associated with conventional attacks and significantly improves outcomes for scenarios associated with NBCR attacks. With such changes, the fraction of NBCR attack scenarios with uncompensated losses greater than 30 percent drops to only 11 percent compared to 56 percent under TRIA. This decline owes both to the higher take-up rates for NBCR coverage and government payment of all the insured loss between $100 billion and $650 billion.

Analogous to the finding for conventional attacks under the current version of TRIA, taxpayer cost is higher under TRIA with bundled NBCR coverage, a hard cap, and a 7.5 percent deductible than it is under TRIA for NBCR attacks that produce more than $40 billion in losses, but it is lower for many of the smaller NBCR attack scenarios examined. Because the probability of large attacks is perceived to be much lower than that of smaller ones, overall expected taxpayer cost is lower for a program that hardens the cap, lowers the deductible, and requires bundled NBCR coverage than it is for TRIA over a wide range of assumptions about the relative risk of large and smaller attacks and about the proportion of uninsured and unpaid insured losses compensated by the government. In this case, expected taxpayer cost will be lower given existing estimates of the relative probabilities of large and smaller terrorist attacks as long as the government compensates more than about 25 percent of uninsured and unpaid insured losses. Once again, government reimbursement of large losses in rare attacks lowers prices, which encourages NBCR take-up that reduces ex post government compensation in likelier smaller attacks.

Because of the uncertainty over the existing TRIA cap's hardness, our 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 (that is, insurers may be liable for some fraction of losses above the $100 billion cap), 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 much difference, and lowering the deductible becomes key to avoiding adverse outcomes under TRIA. Hardening the cap while lowering the deductible is a robust strategy that effectively addresses the substantial uncertainty over how insurers perceive the hardness of the current cap.

### Overarching Conclusions

Looking across the analysis of both questions addressed by this study, we found that, overall, both retaining TRIA and enhancing TRIA to cover NBCR attacks in a way that 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 can 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.

In choosing an extension to TRIA to better address NBCR attacks policymakers must be careful to choose an intervention that achieves the desired goals and avoids unintended consequences. For example, our analysis shows that simply extending TRIA to require a bundled offer of NBCR and conventional coverage without changing other program features, such as the cap or the deductible, can actually make the situation worse.

## Implications for Recent Legislation

The U.S. House of Representatives has passed legislation that would extend and modify the TRIA program (H.R. 2761). The bill requires insurers to offer coverage for conventional and NBCR attacks, includes detailed language that attempts to harden the program cap, and lowers the deductible for NBCR attacks. While the interventions considered in this monograph differ in some important ways from this legislation, our analysis nonetheless provides some relevant insights.

The House bill includes several features identified in this monograph that will likely improve the performance of the TRIA program. First, the bill attempts to address the shortcomings of the TRIA program, identified here, for NBCR attacks. Second, the bill attempts to harden the TRIA cap, which our analysis suggests is important to successfully including NBCR coverage in the program. Finally, the bill lowers the deductible for NBCR attacks, consistent with the findings in our analysis.

Our analysis differs from the House bill in two important ways. First, the legislation attempts to harden the cap with detailed language and methods for prorating losses that exceed the cap, while the interventions considered here harden the cap by

assuming the government guarantees to pay the insured loss more than $100 billion up to $650 billion. Critical to the House bill's impact on NBCR coverage will be insurers' perceptions about whether the bill's language is sufficiently strong to limit their actual liability for any insured loss that exceeds $100 billion and how these perceptions evolve over time.

Second, the House bill links offers for NBCR and conventional terrorism coverage differently from how the options considered in this study do so. As in our analysis, the House bill requires insurers to offer coverage for conventional and NBCR attacks that does not differ in terms, amounts, or other conditions for coverage for events other than terrorism. We require policyholders to either accept or reject this bundled coverage. Under the House bill, in contrast, if the policyholder rejects the initial offer of coverage, the insurer may offer coverage options that differ in terms, amounts, or other conditions from the underlying policy. In particular, an insurer may offer coverage for only conventional attacks and not NBCR attacks.[2] The question remains whether allowing policyholders to separately purchase conventional and NBCR coverage will result in a sufficiently high take-up rate for NBCR coverage to generate outcomes similar to those found in this analysis. Existing research suggests that the demand for NBCR coverage is low; thus, allowing this coverage to be offered separately may not result in substantial take-up. Further research on the effect of offering unbundled versus bundled conventional and NBCR coverage is clearly warranted. However, given the potential importance of this issue and the shortage of solid evidence on which to base any judgments, Congress should plan to review the effects of new legislation on NBCR take-up and revise its approach in the next few years as appropriate, even if it chooses to reauthorize the overall TRIA program for a longer period.

## Moving Forward

This monograph does not address some issues relevant to a full assessment of government intervention in the market for terrorism insurance. For instance, we do not assess (1) the impact of changes in insurance price and take-up rate caused by TRIA and enhancements to it on economic activity preattack or the speed of economic recovery and resiliency of the economy after an attack, (2) how price changes might affect incentives for businesses to adopt measures to mitigate terrorism risk, (3) how any change in the insurance industry's existing willingness to bear terrorism risk might affect take-up rates over time, or (4) how government programs affect the flow of new capital into insurance markets or the development of instruments or strategies to spread insurance

[2] That we modeled a different approach than the House bill should signal no policy preference. We settled on the options analyzed here before the House bill was introduced and chose to bundle NBCR and conventional coverage because (1) it seemed like the simplest way to extend TRIA to better address NBCR attacks, and (2) it is analytically more straightforward to analyze bundled coverage than to analyze unbundled coverage.

risk. Including such issues would increase the comprehensiveness of our analysis but would not affect the basic trade-offs identified here.

The models and methods used in this study apply to a wider range of questions than those considered here. For instance, our simulations could be adapted to examine a broader range of modifications to the TRIA program, such as different insurer copayments or different program caps. These tools could also examine a broader range of government interventions in terrorism-insurance markets, including requiring policyholders to purchase terrorism coverage or pooling arrangements in which a surcharge on insurance policies funds a pool that is then used to pay claims following a terrorist attack.

The threat of terrorism does not appear to be a transitory phenomenon confronting the United States, and the role that insurance can play in mitigating this threat warrants ongoing analysis.