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# The Impact on Federal Spending of Allowing the Terrorism Risk Insurance Act to Expire

*Tom LaTourrette, Noreen Clancy*

## Key findings

- For terrorist attacks with losses less than about \$50 billion, having the Terrorism Risk Insurance Act (TRIA) in place will lead to less federal spending than if TRIA were eliminated.
- Eliminating TRIA could increase federal spending by \$1.5 billion to \$7 billion for terrorist attacks with losses ranging from \$14 billion to \$26 billion.
- The greater federal spending without TRIA would result from less insurance coverage, leading to greater uninsured loss and hence greater demand for federal disaster assistance.
- For attacks with greater losses, the federal government pays a portion of the losses. When considering both disaster assistance and spending through the program, the federal government would pay less without the program if losses exceed about \$50 billion.
- In the absence of a terrorist attack, TRIA costs taxpayers little, and in the event of a terrorist attack comparable to any experienced before, it is expected to save taxpayers money.

**SUMMARY** ■ When the terrorist attacks 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 provides a government reinsurance backstop in the case of a terrorist attack that spreads risk across the entire commercial insurance industry and possibly covers 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 considering the appropriate government role in terrorism insurance markets.

One dimension of the impact of TRIA is the amount that taxpayers pay under TRIA and how that might change if TRIA were to expire. This policy brief explores this question, with particular attention to how the presence or absence of TRIA could influence other forms of federal spending. If allowing TRIA to expire causes terrorism insurance coverage to revert to pre-TRIA levels, a greater fraction of loss in a terrorist attack would go uninsured than would be the case with TRIA in place.

More loss going uninsured would increase demand for

other forms of compensation, which could, in turn, lead to an increase in other (non-TRIA) forms of federal disaster assistance.

In this policy brief, we first summarize federal spending through TRIA, then examine the influence of TRIA on the availability of terrorism insurance coverage. We then discuss alternative forms of compensation for disaster losses, focusing primarily on federal disaster assistance, and examine the extent to which the amount of spending is influenced by how much of the loss is uncompensated

by insurance. We conclude with some model simulations of how much taxpayers would pay with and without TRIA under different scenarios.

We find that, for terrorist attacks with losses up to about \$50 billion, taxpayers would end up paying less under TRIA than if TRIA was eliminated. As attack losses increase, federal payments through TRIA become necessary, eroding the taxpayer savings under TRIA. From the perspective of federal spending, we find that TRIA appears to be a reasonable policy: In the absence of a terrorist attack, it costs taxpayers relatively little, and in the event of a terrorist attack comparable to any experienced before, it is expected to save taxpayers money.

## INTRODUCTION

The terrorist attacks of September 11, 2001, caused sudden and dramatic changes in the domestic market for terrorism insurance. Prior to that day, terrorism was generally not identified as a separate peril in U.S. commercial insurance contracts, and so losses resulting from terrorist attacks were covered under the general terms of commercial property-casualty policies. The 9/11 attacks revealed not only the industry's enormous exposure to terrorism risk, but also the formidable challenge of insuring against it. The sudden emergence of a largely unfamiliar risk, warnings from the government about future attacks, suggestions that losses from a terrorist attack could be in the realm of hundreds of billions of dollars, and the unknown consequences of military responses all contributed to tremendous uncertainty about the frequency and magnitude of future attacks.<sup>1</sup> In the face of the extraordinary losses from the 9/11 attacks and the tremendous uncertainty about future terrorism risks, insurers very quickly withdrew from the market: In most states, terrorism losses were excluded from coverage in most insurance lines.<sup>2</sup> While some stand-alone terrorism insurance was offered in high-risk areas, prices were high, making it difficult to afford.<sup>3</sup>

The simultaneous emergence of and exodus from the commercial terrorism insurance market had noticeable consequences. The dearth of coverage for terrorism losses led to much concern and some emerging evidence that the economy, particularly the real estate and commercial lending sectors, would suffer. Lenders were becoming reluctant to support large commercial developments and other business investments unless they carried terrorism insurance, and existing development projects were being halted for the same reason.<sup>4</sup>

In the face of these mounting concerns, Congress created the Terrorism Risk Insurance Program with the passage of the Terrorism Risk Insurance Act (TRIA) (Pub. L. 107-297) in November 2002.<sup>5</sup> TRIA provides a federal reinsurance backstop for terrorism coverage in the commercial property-casualty terrorism insurance market. Under TRIA, the commercial insurance industry is responsible for paying all eligible insured terrorism losses up to at least a specified industry retention amount, currently equal to \$27.5 billion. Insurers are responsible for paying an insurer deductible (equal to a percentage of their prior year's direct-earned premium in TRIA-eligible insurance lines) plus a share of insured losses in excess of their deductible (the insurer cost share). The industry retention, insurer deductible, and insurer cost share are applied on an

annual basis, regardless of the number of terrorist attacks that occur. Federal payments through TRIA involve the federal government initially paying the remaining share of insured losses above the insurer deductible, followed by mandatory recoupment of at least part of that share through a surcharge on all commercial property-casualty policies nationwide. The minimum required recoupment amount is such that the insurance industry, through the sum of deductibles, insurer cost shares, and recoupment surcharges, pays at least the total insured loss amount up to the \$27.5 billion insurance industry retention amount. If eligible losses in any year exceed \$27.5 billion, the federal government has the option of recouping additional amounts beyond the minimum amount. In exchange for this federal backstop, insurers are required to offer terrorism insurance coverage for commercial property-casualty lines on terms that do not differ materially from other coverage.<sup>6</sup>

TRIA applies to specific lines of commercial insurance, the largest of which include commercial property (structures and contents), business interruption, workers' compensation, and general liability. TRIA does not apply to personal insurance lines, life and health insurance, reinsurance, and several other specific lines of insurance. TRIA also does not affect state insurance regulations, including in particular the requirement that employers provide workers' compensation insurance and that workers' compensation insurance cover terrorism.<sup>7</sup> This means that workers' compensation, a major source of losses to terrorism, is always covered by insurance.

A key objective of TRIA was to give the private insurance industry a transitional period during which it could begin pricing terrorism insurance and develop ways to cover losses without federal assistance.<sup>8</sup> Accordingly, TRIA was designed to be temporary and expire at the end of 2005. However, insufficient development of the terrorism insurance market during those three years led to an extension until the end of 2007 (Pub. L. 109-144) and then a subsequent extension that is set to expire at the end of 2014 (Pub. L. 110-160).

A central question in each of the debates about the reauthorization of TRIA has been whether the program is still necessary. Some observers contend that the continued existence of TRIA is at odds with its intended purpose of providing a transitional period for the industry to recapitalize and invest in improved terrorism risk modeling. According to this view, TRIA is impeding the development of a self-supporting private insurance market.<sup>9</sup> An alternative view is that terrorism risk continues to fail basic insurability requirements that risks be statistically predictable and independent. According to this

view, terrorism remains fundamentally uninsurable, and TRIA is necessary to support a functioning market.<sup>10</sup>

One important dimension of the impact of TRIA is the amount that taxpayers pay under TRIA and how that might change if TRIA were to expire. In this policy brief, we examine this question, with particular attention to how the presence or absence of TRIA could influence other forms of federal spending. We do not consider other potential impacts of TRIA, such as its effect on private insurers, real estate development, or national security and resiliency. Terrorism insurance coverage under TRIA is much more widely held than it was prior to the enactment of TRIA, and allowing TRIA to expire could cause terrorism insurance coverage to revert to pre-TRIA levels. In that case, a greater fraction of loss in a terrorist attack would go uninsured than would be the case with TRIA in place. More loss going uninsured would increase demand for other forms of compensation, which could, in turn, lead to an increase in other (non-TRIA) forms of federal disaster assistance.

In the remainder of this policy brief, we first summarize federal spending under TRIA, then examine the influence of TRIA on terrorism insurance coverage. We then discuss alternative forms of compensation for disaster losses, focusing primarily on federal disaster assistance, and we examine the extent to which the amount of spending is influenced by how much of the loss is uncompensated by insurance. We conclude with some model simulations of how much taxpayers would pay with and without TRIA under different scenarios.

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## FEDERAL SPENDING THROUGH TRIA

Federal spending through TRIA results from the federal government paying a share of insurance claims for terrorist attacks for losses exceeding an insurer's deductible. The cost to taxpayers therefore depends on the magnitude of losses suffered in attacks and the details of how those losses are distributed among insurers.<sup>11</sup> A key feature of TRIA is that it is designed such that the insurance industry is responsible for all but the very large attacks—the federal government makes no net expenditures

until the commercial insurance industry has paid at least \$27.5 billion in claims in TRIA-eligible insurance lines. To put this number in perspective, the insurance industry loss in TRIA-eligible lines from the 9/11 attack was \$31.5 billion at the time, or \$41.8 billion in 2014 dollars.<sup>12</sup> Since terrorism was not yet excluded at the time of the 9/11 attacks, all losses were covered. Today, with terrorism exclusions in place, an equivalent attack would result in an insured loss of about \$30 billion. Thus, taxpayers would contribute through TRIA only in an attack comparable in magnitude to the 9/11 attacks, which to this day remains the second-most costly insurance event in U.S. history, exceeded only by Hurricane Katrina.<sup>13</sup> Since there have been no attacks of this magnitude since TRIA was implemented, the only costs to taxpayers through TRIA since its inception have been administrative costs, which have been \$2 million per year from 2010 through 2013.<sup>14</sup>

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## THE INFLUENCE OF TRIA ON TERRORISM INSURANCE COVERAGE

By limiting an individual insurance company's exposure to terrorism risk, TRIA greatly minimizes the possibility of an insurer facing potentially ruinous losses from extremely damaging terrorist attacks. This assurance, along with the requirement that insurers offer terrorism coverage, has helped support a commercial terrorism insurance market. One metric of the health of an insurance market is policyholder take-up. The policyholder take-up is the fraction of commercial property-casualty insurance policyholders that also purchase terrorism insurance. As noted above, prior to the 9/11 attacks, terrorism was not defined as a separate coverage, and hence take-up was effectively 100 percent. Immediately following the 9/11 attacks, terrorism was excluded from general property-casualty insurance and separate terrorism coverage had to be purchased. Availability was limited and prices were high, leading to low take-up. After TRIA was implemented in November 2002, terrorism insurance take-up began to rise.

A key feature of TRIA is that it is designed such that the insurance industry is responsible for all but the very large attacks.

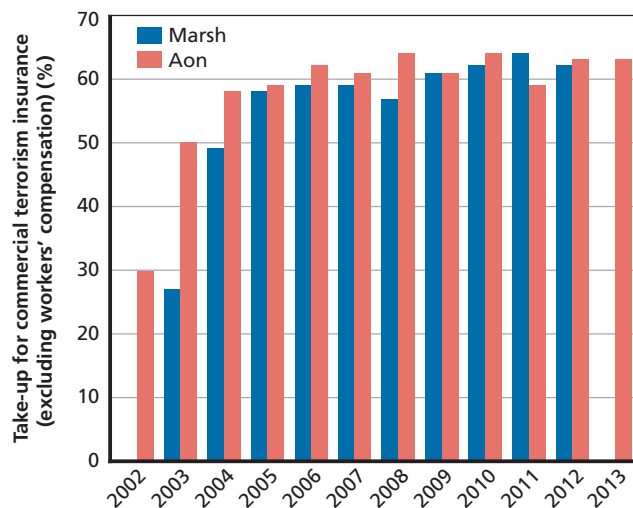
Figure 1 shows the trend in commercial terrorism property insurance take-up among relatively large businesses, as reported by two large insurance brokerage firms. From a low in the year following the 9/11 attacks, take-up increased to just above 60 percent by 2006 and has remained at that level since then. Note that Figure 1 excludes workers' compensation insurance. Because employers are required to purchase workers' compensation insurance and workers' compensation cannot exclude terrorism coverage, terrorism take-up in workers' compensation has remained at 100 percent.

Data from Marsh Risk Management Research show that take-up depends modestly on business size (as measured by total insured value, or TIV). Over the 2010–2012 period, take-up for businesses with TIV over \$500 million was between 64 and 70 percent, while take-up for the smallest business size reported (TIV less than \$100 million) was 56–60 percent. Take-up also varies with the type of business, with the highest values (72–82 percent) in media, education, financial institutions, and health care and the lowest reported values (42–55 percent) in manufacturing, energy and mining, and chemicals.<sup>15</sup>

It is not clear why take-up stopped increasing after about 2006 or why it plateaued at the particular level that it did. The design of the original TRIA legislation and subsequent renewals included periodic increases in the insurer deductible, insurer cost share, and the industry retention amounts from 2003 to 2007. While these increases occurred at the same time that take-up increased, increasing the insurance industry's share of losses would presumably increase costs and decrease demand. The fact that take-up continued to increase during this period therefore presumably reflects an increase in availability as insurers reentered the market. Lacking any empirical explanation for the observed trend in take-up, we assume for our simulations below that take-up will remain constant at the current level as long as TRIA remains in place. Taking the average of the estimates from 2012 and 2013 gives a best estimate for current take-up of 63 percent.

TRIA has been credited with making commercial terrorism insurance generally available nationwide at rates that are viewed as reasonable.<sup>16</sup> Indeed, a widely cited insurance industry report stated that the market for terrorism coverage is "functioning solely on the basis of TRIA being in place."<sup>17</sup> It is therefore not surprising that a predicted consequence of eliminating TRIA is a reversion to the limited availability/high price conditions that prevailed between September 11, 2001, and the implementation of TRIA. There are several estimates of

**Figure 1. Trend in Policyholder Take-Up For Terrorism Coverage for Relatively Large Businesses**



SOURCES: Marsh Risk Management Research (2013), Aon (2013). The median TIV for businesses in the Marsh sample is \$165 million. No information is available on the size of businesses in the Aon sample.

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the extent to which take-up might drop were TRIA to be eliminated. Dixon et al. compiled survey results and other analyses by the U.S. Department of the Treasury, academics, and insurance and banking organizations showing that failing to extend TRIA in 2005 was expected to decrease take-up by between 38 and 76 percent.<sup>18</sup> In addition, industry surveys conducted prior to the 2005 and 2007 extensions of TRIA indicated that the elimination of TRIA would result in an 85 percent reduction in available insurance supply for property risks.<sup>19</sup> Taking the average of these three estimates gives a decrease of 66 percent.

Because these estimates are several years old and are based on anticipated responses to a condition that has not actually occurred, we consider them to be quite uncertain. While empirical support for the extent to which take-up would drop without TRIA is weak, support for the counter-argument that private industry has developed the ability to sustain a terrorism insurance market without TRIA is similarly lacking. Claims that such ability exists are largely philosophical rather than empirical.<sup>20</sup> Lacking any better evidence to the contrary, we assume for our simulations that elimination of TRIA will lead to take-up dropping by the 66 percent estimated above. If take-up were to decline by this amount in the wake of TRIA being eliminated, the current take-up of 63 percent would drop to 21 percent.

## ALTERNATIVE FORMS OF COMPENSATION FOR UNINSURED TERRORISM LOSSES

Given the apparent relationship between TRIA and terrorism insurance coverage take-up, the fraction of the total loss in a terrorist attack that was covered by insurance would be much lower without TRIA than with it. The lower insurance coverage without TRIA would almost certainly increase demand for other forms of compensation. There are multiple sources of compensation that, at least in principle, could replace the decreased insurance coverage. Here we summarize several potential compensation mechanisms, in each case highlighting the extent to which they could replace uninsured loss to businesses. We ultimately conclude that historical spending through individual mechanisms and programs is too idiosyncratic for us to use it to develop an aggregate spending estimate for future disasters. However, the discussion serves to demonstrate that several forms of disaster assistance are expected to be available to replace uninsured loss to businesses after a terrorist attack.

### Philanthropy

While donations to injured victims and survivors of those killed in terrorist attacks are relatively common,<sup>21</sup> philanthropy to businesses is uncommon and contributes little to the overall compensation. After the 9/11 attacks, for example, a total of \$2.7 billion was donated to the overall recovery, of which only \$110 million was given to businesses.<sup>22</sup> Given that the majority of the \$32.5 billion insured loss was to businesses, philanthropy represented a very small fraction of the total compensation. We therefore neglect any contribution that philanthropy may make toward replacing decreased insurance coverage for businesses.

### Torts

Cantor-Fitzgerald, a financial services firm with offices in the World Trade Center, lost two-thirds of its nearly 1,000 employees in the 9/11 attacks, the largest number of casualties for any company that day. It sued American Airlines for more than \$1 billion in business and property losses in 2004 and finally agreed to a settlement of \$135 million in December of 2013.<sup>23</sup> While there has been substantial litigation on behalf of victims and response workers, as well as some large but thus-far unsuccessful suits by property owners seeking to

recover damages beyond those compensated by insurance,<sup>24</sup> the Cantor-Fitzgerald settlement is the only successful litigation on behalf of businesses stemming from a terrorist attack that we are aware of. This again represents a negligible fraction of the total compensation to businesses.

An important difference between conditions in 2001 and now is that losses in the 9/11 attacks were largely covered by insurance, whereas insurance take-up is considerably lower now, and would be substantially lower still without TRIA. It seems reasonable to expect that less insurance coverage would prompt more efforts to obtain compensation through lawsuits. Estimating how much compensation might occur through torts when insurance coverage is limited would require a sample of large terrorist attacks with differing levels of insurance coverage. In addition, the success of lawsuits would probably vary by the type and circumstances of the attack. Without such data, we cannot pursue this question and hence neglect compensation through the tort system. We note, however, that the role of torts as a compensation mechanism is severely hampered by their high cost and potentially extensive duration.

### Federal Disaster Assistance

The federal government provides assistance in the wake of disasters through a number of different agencies to provide a wide range of services, including medical care, food and shelter, debris removal, repair and replacement of damaged property, repair of damaged infrastructure, tax relief, subsidized loans, flood insurance, crop insurance, unemployment insurance, and much more.<sup>25</sup> Federal disaster assistance amounts to several billion dollars each year and has increased over time, a subject of growing concern.<sup>26</sup>

Figure 2 shows the amount of federal disaster assistance provided to individuals, businesses, and state and local governments each year from 1989 through 2013. Since 1989, the federal government has provided an average of more than \$15 billion per year in disaster assistance, and there have been only two years in which the federal government provided less than \$1 billion in disaster assistance. The data are broken out into two categories. The first is the amount appropriated to the Disaster Relief Fund, a fund managed by the Federal Emergency Management Agency (FEMA) that is nominally intended to cover “regular” disaster relief needs. In most cases, these funds are released after a state has requested assistance and the president makes a major disaster declaration.<sup>27</sup> The second component of disaster assistance shown in Figure 2



is emergency supplemental appropriations. These are ad hoc appropriations passed by Congress in the aftermath of disasters to provide additional emergency assistance. It is clear from Figure 2 that supplemental appropriations are passed almost every year and that in most years total disaster assistance spending far exceeds the amount appropriated annually to the Disaster Relief Fund.

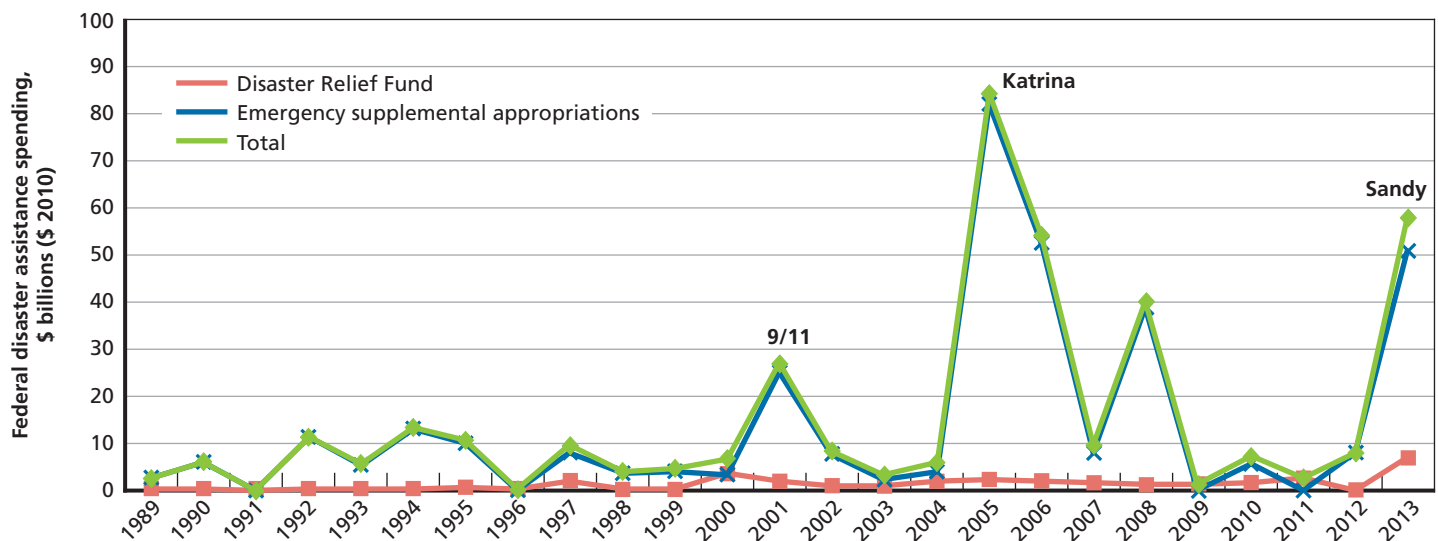
The dual-channel approach to funding disaster assistance provides Congress and the Administration with the flexibility to quickly provide funding boosts for large disasters without precommitting resources that may never be needed. This flexibility is well illustrated by the peaks in 2001, 2005, and 2013, representing extraordinarily large amounts of funding for the 9/11 attacks and for Hurricanes Katrina and Sandy, three of the costliest disasters in U.S. history. These peaks demonstrate that federal disaster assistance funding responds to disaster size—larger disasters receive more funding. This suggests that the amount of federal disaster assistance is large enough and flexible enough that federal disaster assistance at least ostensibly could be used to replace insurance coverage lost through the elimination of TRIA.

## Federal Disaster Assistance for Uninsured Business Loss

The extent to which federal disaster assistance might actually increase to replace decreased insurance compensation to businesses stemming from the elimination of TRIA is difficult to determine. A review of how federal disaster assistance has been allocated in past disasters indicates that a large portion of the funding goes to individual assistance, restoration of infrastructure and government facilities, and new investments in risk mitigation that fail to be appropriated pre-disaster.<sup>28</sup> For example, in the \$50.7 billion aid package for Hurricane Sandy, about 60 percent was for individual and household assistance, construction and flood control, and public transit.<sup>29</sup> The amount of such funding is not expected to be particularly sensitive to the extent of insurance coverage by businesses.

At the same time, there are forms of federal disaster assistance that will at least partially compensate businesses not covered by insurance. For example, the Hurricane Sandy aid package included \$16 billion for the Community Development Block Grant Program, managed by the U.S. Department of Housing and Urban Development. This program is intended to address unmet needs in housing, businesses, and infrastructure/community facilities.<sup>30</sup> Applicants (typically states) must complete a detailed needs assessment and spending plan, and eligibility criteria mandate that only losses that are not subject

**Figure 2. Federal Disaster Assistance Spending**



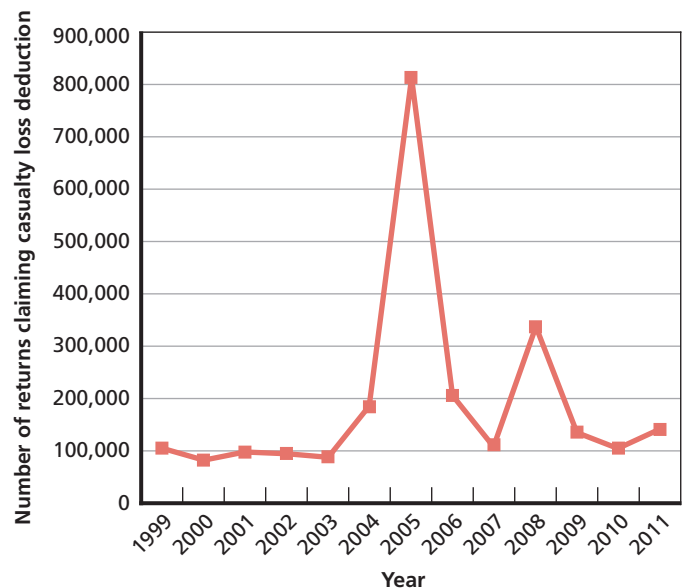
SOURCES: Lindsay and Murray (2011); William L. Painter, *Offsets, Supplemental Appropriations, and the Disaster Relief Fund: FY1990–FY2013*, Washington, D.C.: Congressional Research Service, R42458, 2012. As of April 2, 2014: <http://www.fas.org/spp/crs/misc/R42458.pdf>; William L. Painter and Jared T. Brown, *FY2013 Supplemental Funding for Disaster Relief*, Washington, D.C.: Congressional Research Service, R42869, 2013. As of April 2, 2014: <https://www.fas.org/spp/crs/misc/R42869.pdf>; Federal Emergency Management Agency, *Disaster Relief Fund: Monthly Report Through September 30, 2013*, October 21, 2013. As of April 2, 2014: [http://www.fema.gov/media-library-data/1382473085534-116f432263fc32ab01b91b1bbfea8852/FY13+September+Monthly+DRF\\_508.pdf](http://www.fema.gov/media-library-data/1382473085534-116f432263fc32ab01b91b1bbfea8852/FY13+September+Monthly+DRF_508.pdf).

to compensation through another source, including insurance, qualify for funding. There is substantial flexibility in how the funding is allocated and used by different agencies and programs, making it difficult to generalize how businesses benefit from these grants or to predict how much funding businesses might receive in future disasters. However, given the explicit inclusion of compensation to businesses and the requirement that such funding be provided only for uncompensated losses, this represents a significant source of compensation for uninsured businesses.

Other forms of federal disaster assistance that can help compensate uninsured businesses include subsidized loans from the Small Business Administration (SBA), the casualty loss income tax deduction, and various special programs implemented in the aftermath of disasters. For the 9/11 attacks, SBA raised the normal cap on low-interest Business Physical Disaster Loans from \$1.5 million to allow businesses to apply for up to \$10 million for property damage and an additional \$10 million to refinance mortgages and liens on equipment.<sup>31</sup> SBA also provided “economic injury disaster loans” to businesses suffering economic impacts from the attacks, regardless of physical damage or location (e.g., firms dependent on businesses directly affected by the attack). These loans were available to businesses of all sizes. Although the federal cost of providing SBA loans after the 9/11 attacks was only about \$100 million, this federal assistance channel is dedicated to compensating uninsured businesses and could conceivably be substantially expanded in a future incident if deemed appropriate.

The casualty loss income tax deduction is a little discussed but potentially important form of federal disaster assistance for individuals and small businesses. It allows businesses filing individual tax returns (which include sole proprietorships, partnerships, limited liability companies, and S corporations) to claim 100 percent of uninsured disaster losses as a deduction on their federal income tax.<sup>32</sup> Analysis of IRS tax return records shows a marked spike in the number of tax returns claiming the casualty loss deduction in 2005, the year of Hurricanes Katrina, Rita, and Wilma (Figure 3). Note that the spikes in 2005 and 2008 are probably exaggerated relative to other years because of special legislation passed by Congress that temporarily suspended limitations on the amount that individuals could claim under the casualty loss deduction for those years.<sup>33</sup> The sum of casualty loss deductions in 2005 was nearly \$15 billion, although it is unknown what fraction of this was claimed by businesses.<sup>34</sup> As of 2007, over 90 percent of businesses file individual tax returns, accounting for about 40 percent of busi-

**Figure 3. Number of Income Tax Returns Claiming the Casualty Loss Deduction, 1999–2011**



SOURCE: U.S. Internal Revenue Service (multiple years).

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ness receipts.<sup>35</sup> The casualty loss income tax deduction therefore represents a potentially large source of federal assistance for small businesses affected by a disaster.

Past disasters have also spawned special federal programs to help businesses recover. The 9/11 attacks, in particular, saw the creation of a number of unprecedented grant and tax relief programs aimed at assisting businesses of all sizes in recovering from losses not covered by insurance.<sup>36</sup> The U.S. Department of Housing and Urban Development launched the World Trade Center Business Recovery Grant Program, the World Trade Center Small Firm Attraction and Retention Grant Program, and the World Trade Center Job Retention and Creation Program. FEMA provided grants to private investor-owned utilities to help rebuild vital utility infrastructure in Manhattan. The Department of the Treasury created the Liberty Zone tax benefit program, a package of tax benefits for large and small businesses in New York. Finally, the Department of Transportation provided a substantial amount of assistance to airlines affected by the shutdown of the commercial aviation system in the days after the attack. All told, federal assistance to businesses affected by the 9/11 attacks amounted to more than \$10 billion.<sup>37</sup>

Between existing assistance programs and the array of special programs created after the 9/11 attacks, there appears to be good evidence that the federal government will step in and help compensate businesses for uncompensated losses suffered

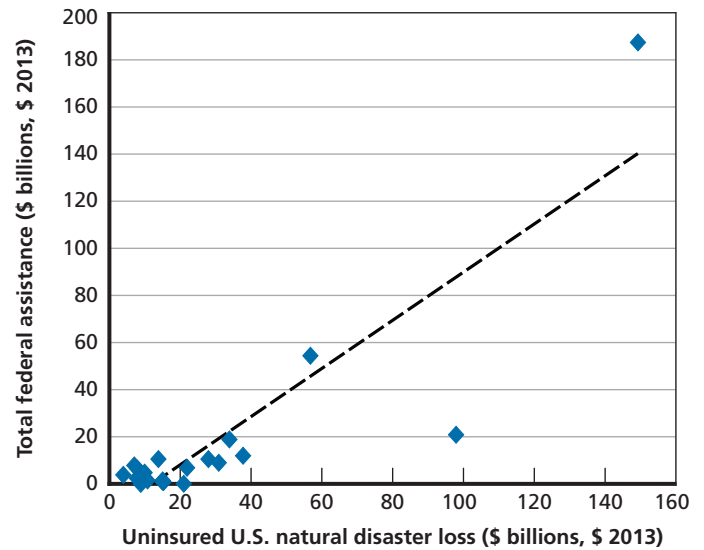
in a terrorist attack. The ad hoc nature of such assistance and the challenge of disaggregating the various forms of assistance included in large supplemental appropriations bills, however, make it very difficult to predict the amount of federal assistance in a future terrorist attack by aggregating spending estimates from individual programs.

So, rather than use a bottom-up approach to add up all the assistance for uninsured businesses from different sources for different disasters, we used a top-down approach to estimate the overall relationship between uninsured disaster losses and federal disaster assistance. Ideally, we would like to examine variations in federal disaster assistance spending for disasters of similar size and type but that differ from each other in terms of commercial insurance take-up. Realistically, however, such data are not available, and insurance take-up probably does not vary enough to conduct such an analysis. Instead, we used aggregate estimates of uninsured disaster losses by year and compared them with total federal disaster assistance spending.

Uninsured loss is the difference between total and insured natural disaster losses in the United States taken from an annual compilation provided by Munich Re, a major global reinsurance firm. Federal disaster assistance spending includes the Disaster Relief Fund allocations and supplemental appropriations shown in Figure 2. The Congressional Research Service periodically analyzes supplemental disaster assistance funding bills and indicates the amounts of federal funding provided for individual disasters. We combined these data, matching each supplemental appropriation amount with the year of the disaster for which the supplemental appropriation was provided. This matching step is important, because some disasters received multiple supplemental appropriations that spanned multiple years. Because the loss data are for natural disasters only, we excluded federal assistance for industrial accidents (the Exxon Valdez and Deepwater Horizon oil spills) and terrorist attacks (the Oklahoma City bombing and 9/11 attacks).

The results are shown in Figure 4. All but two points are for a single year; in two cases, we had to combine multiple years because it was impossible to deconvolve multiple disasters and multiple supplemental appropriations spanning more than one year. The results show a positive correlation between uninsured

**Figure 4. Relationship Between Uninsured Disaster Loss and Federal Disaster Assistance**



SOURCES: Natural disaster loss: Munich Re, "2013 Natural Catastrophe Year in Review," webinar presentation, January 7, 2014. As of April 2, 2014: [http://webinar.munichre.com/2014\\_01\\_natcatreview/natcat\\_webinar\\_record/data/downloads/munichre\\_iii\\_natcatwebinar\\_012014.pdf](http://webinar.munichre.com/2014_01_natcatreview/natcat_webinar_record/data/downloads/munichre_iii_natcatwebinar_012014.pdf). Federal assistance: Lindsay and Murray (2011), Painter (2012), Painter and Brown (2013), FEMA (2013).  
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loss and federal disaster assistance. The positive slope indicates that, on the whole, the federal government provides more disaster assistance when there is a greater amount of uninsured disaster loss. A best linear fit to the data gives a slope of 1.0 ( $R^2 = 0.76$ ), implying that federal disaster assistance increases by one dollar for every dollar increase in uninsured loss. The observed correlation is consistent with the findings of Cummins, Suher, and Zanjani, who found that federal disaster assistance averaged 101 percent of uninsured losses in 65 disasters in the United States over nearly the same time period as our analysis (1998–2008).<sup>38</sup>

There are some important caveats to the correlation shown in Figure 4. First, there is some indication that the generosity of the federal government in terms of providing disaster assistance has increased over time,<sup>39</sup> which could confound the relationship. We see a slight increase over time in the ratio of disaster assistance to total loss in our data, but this trend is dwarfed by

Federal assistance to businesses affected by the 9/11 attacks amounted to more than \$10 billion.

the year-to-year variations, suggesting that any long-term trend is of secondary importance. Second, the slope is particularly dependent on three high-loss points that display considerable scatter. This could be an indication that the relationship between uninsured loss and disaster assistance for higher loss events differs in some fundamental way from that of lower loss events. However, excluding these points does not improve the quality of the fit. Consequently, while we account for the uncertainty in the slope in our simulations below, we do not consider separate loss regimes. Last, because this correlation aggregates all uninsured losses, it tells us only that an increase in the total uninsured loss is associated with an approximately equal increase in disaster assistance. The observed correlation reflects a mix of several types of uninsured loss and we do not know whether some are associated with more disaster assistance than others. For example, increases in uninsured loss to nonbusinesses (e.g., individuals or local governments) could generate more disaster assistance than increases in uninsured loss to businesses, as long as the overall increase was consistent with the observed trend. Given the number of federal disaster assistance programs available to businesses described above, and the extra efforts undertaken to support businesses after the 9/11 terrorist attacks in particular, it appears clear that at least some of the federal disaster assistance in Figure 4 is for uninsured business loss.

Excluding any one or all of the three high-loss points in Figure 4 gives slopes ranging from 0.32 to 1.3. Based on this range, our simulations below examine federal government disaster assistance ranging from one-third to 1.3 times the uninsured loss. A slope greater than 1 implies that federal disaster assistance actually exceeds uninsured loss. As discussed above, a substantial amount of disaster assistance is provided for things other than uninsured losses, so it is certainly feasible to consider situations in which disaster assistance exceeds uninsured loss.

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## FEDERAL SPENDING AFTER A TERRORIST ATTACK WITH AND WITHOUT TRIA

Using the above estimates for how much commercial terrorism insurance take-up is expected to decrease if TRIA is eliminated and the extent to which federal disaster assistance is expected to increase with increasing uninsured loss, we now estimate the amount of federal disaster assistance spending with and without TRIA for different terrorist attack scenarios.

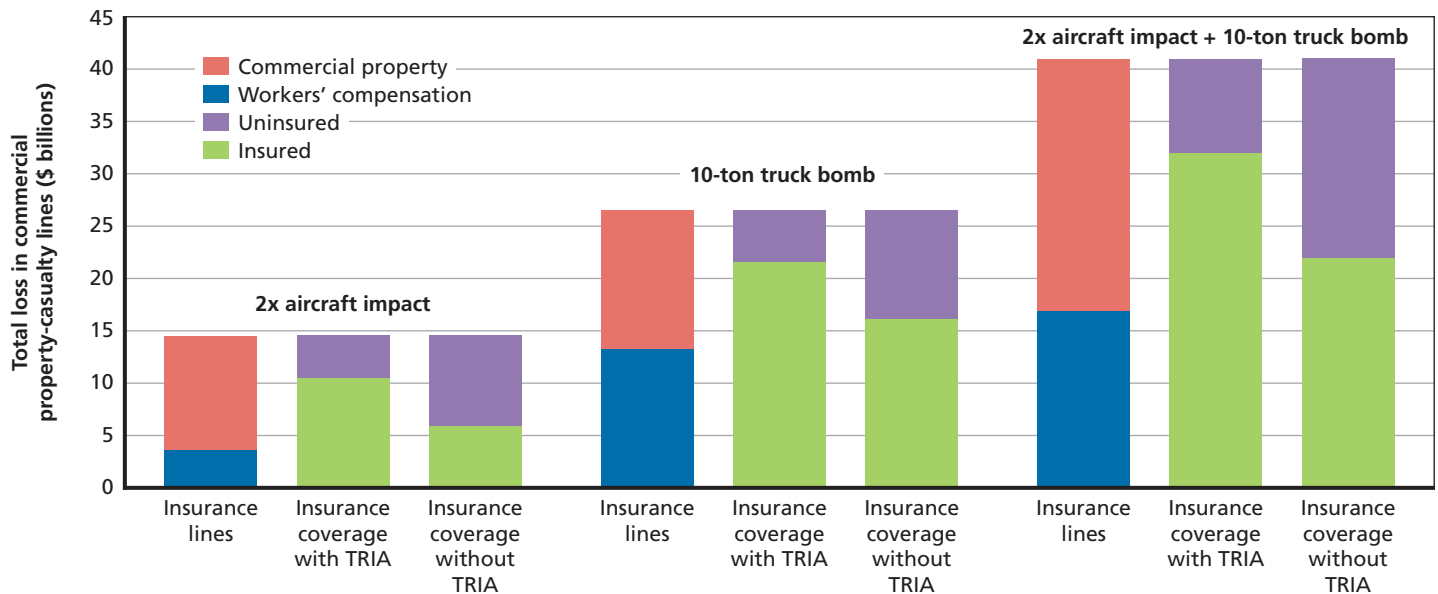
We consider three scenarios: (1) two aircraft impacts into large office buildings, (2) a 10-ton truck bomb, and (3) a combination of two aircraft impacts and a truck bomb. Loss estimates for the scenarios are taken from two previous RAND studies,<sup>40</sup> which, in turn, were derived in collaboration with Risk Management Solutions, Inc. (RMS), using its Probabilistic Terrorism Model. Loss values have been updated to 2014 dollar amounts. The RMS model is designed to help commercial property-casualty insurers manage their exposure to terrorism risk, and it therefore focuses on losses in the commercial property-casualty insurance lines that are relevant under TRIA.<sup>41</sup>

Estimated losses for the three attack scenarios are shown in Figure 5 and Table 1. The total loss values represent the entire “insurable” loss, meaning that this is the best estimate of the insured loss under the conditions where take-up is 100 percent. The part of the total loss attributable to workers’ compensation insurance is distinguished in each scenario. This distinction is relevant, because take-up for workers’ compensation insurance is always 100 percent and does not depend on the existence of TRIA.

We next apply terrorism insurance take-up rates to the loss estimates to compute the relative amounts of total loss that would be covered by insurance and go uninsured. Using property coverage take-up values of 63 and 21 percent with and without TRIA, respectively, Figure 5 and Table 1 also show the insured and uninsured loss with and without TRIA for each scenario. These computations show that the amount of loss estimated to go uninsured without TRIA is expected to be more than double the amount that would go uninsured in the same attack scenarios with TRIA in place.

We next consider the federal costs in each scenario. Before considering general federal disaster assistance spending, we must account for any federal costs through the TRIA program itself. As described above, for attacks with an insured loss less than the \$27.5 billion industry retention amount, the federal government recoups its entire initial share and makes no net payment through TRIA.<sup>42</sup> For attacks with an insured loss

**Figure 5. Distribution of Losses in Three Terrorist Attack Scenarios**



SOURCES: Carroll et al., 2005; Dixon et al., 2007; this analysis.

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greater than the retention, the federal government is responsible for paying for the portion over the retention. Only our third scenario has an insured loss greater than the retention, in which case the federal government will pay \$4.5 billion (Table 1). Recall that TRIA allows the federal government to recoup more than the minimum amount at its discretion, in which case the federal cost would be less than \$4.5 billion. We assume in our computations that this does not occur.

We then compute the change in federal disaster assistance between conditions with TRIA and without TRIA, based on the relationship in Figure 4, to calculate the consequences of allowing TRIA to expire. We calculate the high value for each scenario using the high end of the range for the slope in Figure 4. In this case, the change in disaster assistance equals 1.3 times the change in uninsured loss. The low value uses the low end of the range for the slope and assumes that the change in disaster assistance equals one-third of the change in uninsured loss (Table 1).

The final two rows in Table 1 show the change in total federal spending, which is the sum of the change in disaster assistance and the change in federal spending through TRIA. Our results show that in the first two scenarios, where the total insured loss is below the insurance industry retention amount, the federal government ends up paying from \$1.5 billion to \$7.2 billion less with TRIA in place, because eliminating TRIA increases disaster assistance spending. The general result that the federal government pays less with TRIA in place holds

regardless of the details related to the decrease in take-up without TRIA or the relationship between disaster assistance and uninsured loss: Any decrease in take-up will lead to an increase in uninsured loss and an associated increase in demand for disaster assistance. In the third scenario, in which the insured loss exceeds the industry retention amount, and hence the federal government pays a portion of the loss, the net effect on federal spending reverses between the high and low estimates. In the high estimate, the increase in disaster assistance spending without TRIA is greater than the amount of federal spending through TRIA that is saved by eliminating TRIA, resulting in a net increase in federal spending of \$8.6 billion without TRIA. In the low estimate, the increase in disaster assistance spending without TRIA is less than the amount of savings from eliminating TRIA, resulting in a net decrease in federal spending of \$1.2 billion without TRIA.

When considering both disaster assistance and spending through the program, the break-even point (the point at which total federal spending with the program in place would exceed spending without it) is somewhere between \$40 billion and \$60 billion in total loss, where the range reflects the uncertainty in the relationship between uninsured loss and disaster assistance. For losses below this amount, the federal government pays less with TRIA than without it; for larger losses, the federal government pays more with TRIA than without it.

**Table 1. Loss Distribution Computations**

	<b>2x Aircraft Impact</b>	<b>10-Ton Truck Bomb</b>	<b>2x Aircraft Impact + 10-Ton Truck Bomb</b>
<b>Loss<sup>a</sup></b>			
Workers' compensation	\$3.7	\$13	\$17
Property	\$11	\$13	\$24
<b>Total</b>	<b>\$14</b>	<b>\$26</b>	<b>\$41</b>
<b>With TRIA<sup>b</sup></b>			
Insured	\$10	\$22	\$32
Uninsured	\$4.0	\$4.9	\$8.9
Federal spending through TRIA	\$0	\$0	\$4.5
<b>Without TRIA<sup>c</sup></b>			
Insured	\$5.9	\$16	\$22
Uninsured	\$8.5	\$10	\$19
Federal spending through TRIA	\$0	\$0	\$0
<b>Effect of eliminating TRIA</b>			
Change in federal spending through TRIA	\$0	\$0	-\$4.5
Change in federal disaster assistance (high) <sup>d</sup>	\$5.9	\$7.2	\$13
Change in federal disaster assistance (low) <sup>e</sup>	\$1.5	\$1.9	\$3.4
Change in total federal cost (high)	\$5.9	\$7.2	\$8.6
Change in total federal cost (low)	\$1.5	\$1.9	-\$1.2

NOTES: All values in \$ billions.

<sup>a</sup> Loss estimates from RMS, Inc. as presented in Carroll et al. (2005) and Dixon et al. (2007) and corrected to 2014 \$.

<sup>b</sup> Property take-up = 63%, workers' compensation take-up = 100%.

<sup>c</sup> Property take-up = 21%, workers' compensation take-up = 100%.

<sup>d</sup> Change in disaster assistance = 1.3\*change in uninsured loss.

<sup>e</sup> Change in disaster assistance = 0.33\*change in uninsured loss.

For losses below about \$50 billion, the federal government pays less with TRIA than without it; for larger losses, the federal government pays more with TRIA than without it.

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## SUMMARY AND IMPLICATIONS FOR POLICY

Our analysis outlines a logical argument that if the elimination of TRIA were to result in a substantial decrease in take-up of terrorism insurance, then the lower take-up would increase the uninsured loss in a terrorist attack, and the greater uninsured loss would translate into more disaster assistance from the federal government, such that total federal spending without TRIA would be greater than it would be with TRIA. The general argument that TRIA may actually reduce federal spending by curtailing demand for disaster assistance has been posed before.<sup>43</sup> Using various data sources, we have quantitatively estimated the magnitude of this effect. We find that eliminating TRIA could increase federal spending by \$1 billion to \$7 billion for terrorist attacks with losses ranging from \$14 billion to \$26 billion. As the size of attack increases and the insured loss increases beyond the \$27.5 billion industry retention amount, the federal liability through TRIA kicks in. For current take-up, an insured loss in TRIA-eligible lines of \$27.5 billion would require a total loss of about \$35 billion (the exact amount depends on the relative proportions of losses in property, workers' compensation, and other insurance lines). This is approaching the insured loss from the 9/11 attacks (\$42 billion in 2014 dollars). For attacks in this realm, the increase in disaster assistance after an attack without TRIA begins to be countered by the elimination of federal payments through the

TRIA program, eventually leading to a net decrease in federal spending should TRIA expire.

This result indicates that, for terrorist attacks on the scale of anything experienced before, having TRIA in place will lead to less federal spending than if TRIA were eliminated. From the perspective of federal spending, TRIA therefore appears to be a reasonable federal policy: In the absence of a terrorist attack, it costs taxpayers relatively little, and in the event of a terrorist attack comparable to any experienced before, it is expected to save taxpayers money.

The inclusion of an industry retention amount in the design of TRIA indicates that one objective of the law is to limit net federal involvement to those attacks that exceed some size threshold. Our finding that the federal government is expected to pay less with TRIA in place than without it when insured losses are less than the retention amount indicates that TRIA goes a bit further and actually reduces federal spending for attacks below this threshold. While the emphasis of our analysis has been on comparing federal spending with and without TRIA in its current form, our findings raise the question of what the appropriate threshold level is. Such a decision requires examining the implications for all stakeholders involved. For the federal government, raising the threshold to levels that are increasingly less likely to occur would expand the realm in which TRIA reduces federal spending and decrease the probability that the federal government would make any net payments.

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- <sup>41</sup> See Appendix A of Dixon et al. (2007) for a detailed description of the RMS model.
- <sup>42</sup> Recoupment occurs by means of a policyholder surcharge, and because the recoupment rate is 133 percent of the initial federal share, the federal government will actually end up recouping more than it initially spent. However, the revenue from recoupment would be partially offset by a decrease in receipts from income and payroll taxes. The CBO, using standard costing methods, reduces the estimated gross revenue impact of the recoupment by 25 percent (Congressional Budget Office, *Terrorism Risk Insurance Program Reauthorization Act of 2007*, cost estimate, October 29, 2007b).

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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 national security implications of terrorism risk insurance, including the evolution of terrorism risk and risk modeling since 2001 and whether access to terrorism risk insurance makes the nation more safe and secure
- 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 three policy briefs build on previous RAND research for the 2005 and 2007 authorizations of TRIA. 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](http://www.rand.org/t/MG679))
- *Distribution of Losses from Large Terrorist Attacks Under the Terrorism Risk Insurance Act*, 2005 ([www.rand.org/t/MG427](http://www.rand.org/t/MG427))
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- *Issues and Options for Government Intervention in the Market for Terrorism Insurance*, 2004 ([www.rand.org/t/OP135](http://www.rand.org/t/OP135)).

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## About the RAND Center for Catastrophic Risk Management and Compensation

This work was 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

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- 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.

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