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The Center On Federal Financial Institutions (COFFI) is a nonprofit, nonpartisan, non-ideological policy institute focused on federal insurance and lending activities.

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Terrorism Risk Insurance: Conceptual Issues

The federal government directly participates in the insurance against terrorist attacks of up to \$100 billion per year. It does this under the Terrorism Risk Insurance Act of 2002 ("TRIA"), which was enacted in November 2002, and is in effect until December 31, 2005. This law provides a federal financial backstop for the insurance industry for claims from certain terrorist attacks, and requires that every U. S. property and casualty insurance company offer terrorism insurance to its commercial policyholders.

TRIA is currently under review by the U.S. Treasury Department, and new legislation is being proposed in both the House and the Senate to extend TRIA (three bills so far). This paper discusses the conceptual issues of having a national terrorism insurance program with federal government involvement. It is the second in a series of three papers being published concurrently by COFFI. The other two are "Terrorism Risk Insurance Act of 2002: A Primer" and "TRIA: Where Do We Go from Here?". The primer explains in non-technical terms how TRIA works, and the other paper discusses how TRIA has performed so far and where it may go from here. Please note that COFFI is not advocating any particular policy options in these papers.

This author owes a considerable debt of gratitude to Jeffrey Brown for his paper, written with J. David Cummings, Christopher Lewis and Ran Wei, entitled "An Empirical Analysis of the Economic Impact of Federal Terrorism Reinsurance", written in 2004 and published in The Journal of Monetary Economics (see "References" for complete information). Although it was written with a different audience in mind, numerous passages bear quotation or paraphrase. With his kind permission, I have generally not noted short quotes or paraphrases, in order to improve readability. I would also like to acknowledge the kind assistance of Doug Elliott, Ellen Seidman and Barbara Stewart. Any mistakes or omissions are, of course, my own.

These papers are dedicated to the memory of Vita M. Marino, who died on September 11, 2001 at Two World Trade Center, New York City.

Please refer to the glossary for an explanation of terms specific to this field.

Executive Summary

A fundamental question is whether the federal government should be involved in providing terrorism insurance. Following 9/11, the Terrorism Risk Insurance Act of 2002 (“TRIA”) was enacted as a partnership between the federal government and the private sector to ensure that terrorism insurance would be available for businesses to purchase. As TRIA is expiring next year, the question of appropriate government involvement is being raised again. If it is concluded that the federal government should be involved, then what should its role be? Should it continue as it is now, for another few years, or should it take another form? Or, has TRIA served its purpose in allowing the private markets to develop sufficiently that a federal role is no longer needed?

One of the basic concepts of insurance is to pool the risk of many people or businesses with similar circumstances, spreading the losses of an unlucky few among the entire pool. All the participants then face a level of cost they can handle, rather than having the unlucky face financial ruin. However, certain conditions must be true for insurance to work as a method of risk-sharing; that is, for a risk to be “insurable”. At least two basic conditions must be met before the insurers are willing to provide coverage against an uncertain event. First is the ability to estimate the chances of the event occurring. Second is the ability to set premiums for each potential customer or class of customers, both to accommodate the expected future losses and to provide a reasonable level of coverage at a rational price.

The occurrence of an unexpected huge financial loss such as the terrorist attacks of 9/11 (approximately \$40 billion in insured losses) can change the risk landscape for insurers so radically and so fast that the associated risk assessment becomes very problematic. This event presented the insurance industry with a new set of challenges for assessing the probabilities of future attacks, including the requirements of constructing brand new models for pricing terrorism risk.

There are economic theories of public policy (Brown et al., 2004, paraphrased here), which address the range of possible roles of the government in addressing market failures such as the insurance market crisis which followed 9/11. Laissez-faire public policy maintains that any market-based equilibrium, however imperfect, is better than one with the government involved. At the opposite end of the spectrum, public interest theory maintains that, in specific instances, the government can improve upon the market equilibrium by substituting for private sector coordination. The market-enhancing view takes a middle position. This view holds that public policy should facilitate the development of the private market, such as by improving information flows, but should not create new federal institutions to substitute for private solutions.

Within this conceptual framework, the current situation regarding international terrorism and the associated risks of future attacks presents some unique characteristics, which have been widely cited as justification for some role for the federal government. These include:

- The relationship between military and foreign policies and terrorism losses;

- The lack of access to government intelligence information by the private markets to aid in the assessment of the probability or other characteristics of an attack;

- The government’s already-existing role as the guarantor of last resort;

The difficulty of pricing the losses; and

The enormous size of potential losses.

Thus, there are a number of reasons to believe that the private market would have difficulty in solving the terrorism risk insurance problem, at least for the largest and least frequent events, arguing for some type of federal role. Nevertheless, there was evidence that some terrorism insurance was becoming available even prior to the passage of TRIA, indicating that a private market solution may have already been emerging for part of the problem. Even after the passage of TRIA, there are private markets offering terrorism insurance for risks not covered by TRIA.

Questions remain as to whether the private markets have developed to the point of offering terrorism insurance to all willing to purchase it; whether the cost of such coverage would be affordable; and, whether the private insurance industry would have sufficient capital available to withstand the potentially most catastrophic terrorist attacks.

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Introduction

The Terrorism Risk Insurance Act of 2002 (“TRIA”) was created in response to a crisis situation. The terrorist attacks of September 11, 2001 shocked the world. The political and economic challenges that followed were unprecedented. The stated purpose of TRIA is as follows:

To establish a temporary Federal program that provides for a transparent system of shared public and private compensation for insured losses resulting from acts of terrorism, in order to—

- 1. protect consumers by addressing market disruptions and ensure the continued widespread availability and affordability of property and casualty insurance for terrorism risk; and*
- 2. allow for a transitional period for the private markets to stabilize, resume pricing of such insurance, and build capacity to absorb any future losses, while preserving State insurance regulation and consumer protections.¹*

Now it is three years since the attacks, TRIA is expiring at the end of next year, and there are decisions to be made on these complex issues. Some of the important conceptual questions that were raised as TRIA was being developed are still applicable today:

What are some of the basic insurance concepts that apply?

Should the federal government be involved with terrorism risk insurance?

How did the terrorist attacks of 9/11 change the insurance industry’s view of terrorism risk?

Is terrorism risk insurable by the private markets?

How does terrorism risk differ from natural catastrophe risk?

Is it possible for terrorism risk to be assessed?

How have other countries responded to terrorism risk?

Does TRIA [or some form of government involvement] benefit the insurance industry in the long term?

¹ TRIA legislation, Sec. 101 (b), <http://www.treas.gov/offices/domestic-finance/financial-institution/terrorism-insurance/pdf/hr3210.pdf>

What are some of the basic insurance concepts that apply?

One of the basic concepts of insurance is to pool the risk of many people or businesses with similar circumstances, spreading the losses of an unlucky few among the entire pool. All the participants then face a level of cost they can handle, rather than having the unlucky face financial ruin. However, certain conditions must be true for insurance to work as a method of risk-sharing; that is, for a risk to be “insurable”. At least two basic conditions must be met before the insurers are willing to provide coverage against an uncertain event. First is the ability to estimate the chances of the event occurring. Second is the ability to set premiums for each potential customer or class of customers, both to accommodate the expected future losses and to provide a reasonable level of coverage at a rational price.

The occurrence of a huge financial loss such as 9/11 (approximately \$40 billion in insured losses) can change the risk landscape so radically and so fast that the associated risk assessment becomes very problematic. The terrorist attacks of 9/11 presented the insurance industry with a new set of challenges for assessing the probabilities of future attacks, including the requirements of constructing brand new risk models. In addition to dealing with the uncertainty of the likelihood and location of future attacks, the insurers must develop new methodologies for pricing terrorism risk.

Should the federal government be involved with terrorism risk insurance?

This is a complex question because of the unique circumstances surrounding terrorism risk. There are economic considerations, but the discussion does not end there. There are social and political issues that are more difficult to resolve.

The economic theories of public policy, which address the issue of the appropriate role of government in addressing market failures, can be applied to the current terrorism insurance and reinsurance markets, as discussed in the paper by Brown et al. (Brown, 2004). According to Brown, there are three primary theories of public policy concerning the appropriate role of government in addressing market failures: laissez faire, public interest theory, and market-enhancing policies. The fundamental premises—and policy prescriptions—associated with each of these policy camps is quite different:

Laissez-faire public policy maintains that any market-based equilibrium, however imperfect, still provides a more efficient allocation of resources within the economy than an equilibrium involving government intervention.

The public interest theory of regulation suggests that the existence of market failures can lead to sub-optimal allocation of resources and that government intervention targeted at addressing these market failures can improve welfare. This theory suggests that, in specific instances, the government can improve upon the market equilibrium by substituting for private sector coordination.

The market-enhancing view takes a middle position. This view holds that public policy should facilitate the development of the private market, such as by improving information flows, but should not create new federal institutions to substitute for private solutions.²

However, Brown goes on to say, the current situation with international terrorism and the associated risk of future attacks encompasses some unique characteristics that distinguish it from other types of market “failures”. Some of these characteristics, which have been widely cited as justification for some form of federal government role, are as follows:

The relationship between terrorism losses and government military policies;

The lack of access to government intelligence information by the private markets to aid in the assessment of the probability or other characteristics of an attack;

The government’s already-existing role as the guarantor of last resort;

The difficulty of pricing the losses; and

The enormous size of potential losses.

Thus, there are a number of reasons to believe that the private market will have difficulty in solving the terrorism risk insurance problem, at least for the largest and least frequent events, arguing for some type of federal role. Nevertheless, there was evidence that some terrorism insurance was becoming available even prior to the passage of TRIA, indicating that a private market solution may have already been emerging. Clearly there are private markets now offering stand-alone terrorism insurance, in addition to the coverage mandated under TRIA.

Moreover, even if terrorism is affected by, or the result of, government foreign policy, the most efficient mechanism for financing terrorism losses may still reside within the private sector, especially given the prominent role of preventing terrorism losses through enhanced security at the property-specific level. Thus, the private market still might be able to provide a more efficient solution for terrorist events, especially in the relatively low coverage layers.

The private markets do have a finite amount of capital, however. Capital, or equity, as defined for an insurance company, is the amount of funds in excess of its stated obligations. These obligations include funds set aside as “reserves”. Reserves are established by insurance companies to pay for losses which have already occurred, but not yet been paid. Reserves generally are not established for anticipated losses, such as catastrophic events that might occur, because such reserves are not tax deductible. Insurance companies do not hold funds in reserve for anticipated storms or earthquakes, for example. This practice would also apply to terrorism events. These losses must be covered out of equity funds, or capital. Holding additional equity capital in the industry to shield against highly infrequent events would be costly, due to regulatory, tax and accounting constraints. In addition, insurance companies operate in a regulated industry, and the amount of premium volume they are allowed to write in any given year is dependent upon the amount of capital held. Therefore, a dramatic drop in capital due to a large terrorism event would limit an insurer’s ability to write new business (called “capacity”).

² Brown, Jeffery, J. David Cummins, Christopher Lewis, Ran Wei, “An Empirical Analysis of the Economic Impact of Federal Terrorism Reinsurance,” *The Journal of Monetary Economics*, Vol. 51, July 2004, pp.861-898

Raising capital to pay losses following a large loss event is also difficult because of investor concerns about the ongoing viability of the insurer and whether the capital infusion will be adequate to meet all its future obligations. Unlike the private insurance industry, the federal government may be better positioned to accomplish funding for certain types of losses because it can raise money following a disaster by borrowing at the risk-free rate of interest and then repay the loans out of tax revenues. There is a challenge to this view, however, on the grounds that it places risks on taxpayers regardless of their willingness to bear them.³

How did the terrorist attacks of 9/11 change the insurance industry’s view of terrorism risk?

The insurance and reinsurance industry’s reaction immediately following the events of September 11, 2001 seemed to be fairly unified. There was a consistent view that the industry was grappling with an inability to assess a new type and order of magnitude of terrorism risk. To illustrate this point, the following table shows the largest insured losses from terrorism from 1970 to 2001, and clearly the 9/11 losses are of a much higher order of magnitude, both in the number of fatalities and the amount of insured loss.

TABLE 1: LARGEST INSURED LOSSES FROM TERRORISM 1970-2001

EVENT	COUNTRY	FATALITIES	INSURED LOSS (MILLIONS OF 2001 \$)
Attacks on World Trade Center and Pentagon, 2001	U.S.	3,014	\$40,000+
Bombing in London's Financial District, 1993	U.K.	1	\$907
Bombing in Manchester shopping mall, 1996	U.K.	0	\$744
World Trade Center Bombing, 1993	U.S.	6	\$725
Bombing in London's Financial District, 1992	U.K.	3	\$671
Suicide Bombing at Colombo Int'l Airport, 2001	Sri Lanka	20	\$398
Bombing in London's South Key Docklands, 1996	U.K.	2	\$259
Oklahoma City Bombing, 1995	U.S.	166	\$145
Explosion in PanAm Boeing 747 over Lockerbie, 1998	U.K.	270	\$138
Dynamiting of three hijacked planes in Zerga, 1970	Jordan	0	\$127

Source: "Economic Perspectives on Terrorism Insurance" published in May 2002 by the Joint Economic Committee of the U.S. Congress (available via internet: www.house.gov/jec/terrorism/insur.pdf)

The terrorist attacks of 9/11 killed 3014 people and inflicted damage currently estimated at nearly \$80 billion, about half of which was covered by insurance. Commercial property, business

³ Further discussion of the consideration of the costs of compensating taxpayers for the burden of supplying capital can be found in Braun, A. R. M. Todd, and N. Wallace, 1998, "The role of damage-contingent contract in allocating the risks of natural catastrophes", Federal Reserve Bank of Minneapolis Working Paper No. 586D.

interruption, workers' compensation, life, health, disability, aircraft hull, and general liability insurance lines each suffered catastrophic losses. More specifically, the estimated insured losses break down by line of insurance as follows:

Business interruption—approximately \$11 billion

Workers compensation—approximately \$2 billion

Life insurance—approximately \$2.7 billion

Property, WTC—approximately \$3.5 billion

Property, Other—approximately \$6 billion

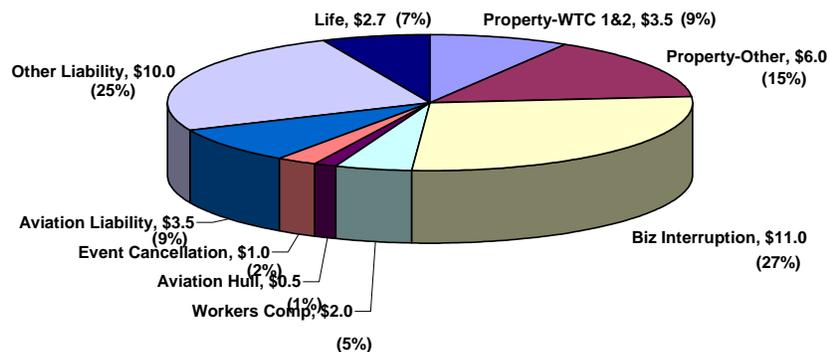
Aviation liability—approximately \$3.5 billion

Aviation hull—approximately \$.5 billion

Event cancellation—approximately \$1 billion

Other liability—approximately \$10 billion.⁴

Chart 2: Composition of Insured Loss Estimates, by Line (\$ Billions)



Source: Insurance Information Institute, July

The major European reinsurers had been hit with the majority (approximately 60%) of the total losses from 9/11. “Reinsurers” assume part of the risk and part of the premium originally taken by

⁴ Insurance Information Institute paper, “September 11, 2001: The First Year. One Hundred Minutes of Terror that Changed the Global Insurance Industry Forever,” by Robert Hartwig, 2002, <http://www.iii.org/media/hottopics/insurance/sept11/sept11paper/>

insurers. Reinsurance effectively increases an insurer's capital and therefore its capacity to sell more coverage. The business is global and some of the largest reinsurers are based abroad. As a result of these large losses from 9/11, the reinsurance industry began implementing terrorism risk exclusions in their reinsurance treaties that renewed on January 1, 2002, the earliest renewal date post-9/11. An "exclusion" in a reinsurance contract is specific wording that says certain risks will not be covered under the agreement. Without available reinsurance coverage, the insurers did not want to proceed to bear the entire risk of terrorism coverage themselves, so they began to take the necessary steps to obtain regulatory permission to withdraw from the terrorism risk market. In short, the private markets for terrorism risk coverage essentially disappeared following 9/11.

One of the major reinsurers hardest hit by losses from 9/11 is Swiss Reinsurance Group. One year after 9/11, Swiss Re published a paper entitled "Terrorism risks in property insurance and their insurability after 11 September 2001." This paper describes, from this reinsurer's point of view, the challenges it faced:

On 11 September 2001, we were confronted with a new type of terrorism for which we could not have been prepared. Even if we had extrapolated our statistical experience from previous years along more than just a linear path into the future, we would not have arrived at an event with such implications. Some of the reasons for this are:

The totally inconceivable lack of human respect on the part of the planners and the terrorists who carried out the attack;

The unimaginable cold-bloodedness of the attack using innocent airline passengers—men, women and children—as human bombs;

The concerted action carried out uncompromisingly and with totally devastating precision by kamikaze pilots;

The intention of achieving maximum media impact.

For their part, the insurers did not anticipate:

An airborne attack using several passenger aircraft, nor

An accumulation across various lines of business (general property, aviation, business interruption, liability, accident, life).

In short, the terrorist attack on 11 September 2001 assumed dimensions bordering on the limits of insurability.⁵

This question of insurability of terrorism risk raises several issues, which will be discussed in further detail below.

⁵ "Terrorism risks in property insurance and their insurability after 11 September 2001," Swiss Re, [http://www.swissre.com/INTERNET/pwstilpr.nsf/Download?ReadForm&_ModPath=INTERNET/pwswspr.nsf&Redirect=../pwstilpr.nsf/vwFilebyIDKEYLu/ESTR-5MDHVE/\\$FILE/Terror_Risks_Prop_en.pdf](http://www.swissre.com/INTERNET/pwstilpr.nsf/Download?ReadForm&_ModPath=INTERNET/pwswspr.nsf&Redirect=../pwstilpr.nsf/vwFilebyIDKEYLu/ESTR-5MDHVE/$FILE/Terror_Risks_Prop_en.pdf)

Is terrorism risk insurable by the private markets?

In order for any risk to be insurable by the private markets, certain basic criteria must be met:

The risk must be defined in terms of what is covered in the event of a claim;

The risk must be quantifiable, both in terms of estimated frequency (how often is it likely to occur) and severity (what would be the expected amount of a claim);

The risk must be able to be priced at rates the marketplace will accept.

In general terms, terrorism risk falls into a category of catastrophic risk, meaning that it has many of the characteristics of natural catastrophes, which are:

Low frequency—doesn't occur often, as compared to some other types of risks, such as auto or medical insurance;

High severity—claim amounts are usually high relative to capital amounts;

Difficult to estimate--while quantifiable, the ability to predict natural catastrophes is challenging and relies upon sophisticated computer models that combine actuarial data (insurance premiums, paid claims, timing of losses) with scientific data (weather patterns, earthquake fault lines and activity).

How does terrorism risk differ from natural catastrophe risk?

Following Hurricane Andrew and the Northridge earthquake, the insurance industry called for federal intervention but the private markets eventually recovered without any federal aid. Beginning with Hurricane Andrew in 1992, market expectations with regard to the frequency and severity of catastrophic events increased dramatically.⁶ Although insurance and reinsurance prices rose after Hurricane Andrew and the Northridge earthquake, significant amounts of new capital flowed into the industry and reinsurance prices eventually declined, according to an industry report published in 2003 by Guy Carpenter, a leading reinsurance broker..⁷

The private market's success in offering insurance and reinsurance against natural catastrophes raises the question as to whether the terrorism insurance market would have rebounded in the absence of TRIA and perhaps might have provided a more efficient solution to the insurance market crisis that followed the World Trade Center attacks. Another way of asking this question is to inquire as to whether terrorism risk is different in some fundamental way from the risk of natural catastrophes.

Many of the same elements that make terrorism insurance a difficult problem for private insurance markets are also present in the case of natural catastrophes, namely, the low frequency, high severity nature of the events and their magnitude relative to the resources of the insurance industry. Unlike natural disasters, however, terrorist attacks are based on deliberate human acts, undertaken with the intent of avoiding detection and causing as much damage as

⁶ Andrew was the largest disaster prior to the World Trade Center attacks, with insured losses of about \$20 billion. The Northridge earthquake in 1994 caused \$17 billion in insured losses, further increasing expectations regarding potential catastrophic claims.

⁷ Guy Carpenter, Inc. 2003, "The World Catastrophe Reinsurance Market: 2003" (new York), <http://www.guycarpenter.com/portal/extranet/publications/brief/reports.html?vid=12>

possible. Such actions are inherently more difficult to predict and are outside the realm of traditional actuarial and scientific modeling.

For hurricane and earthquake risk, Congress has primarily focused its efforts on mitigation, enacting requirements for making buildings and infrastructure safer in order to withstand those natural disasters. And while there are also government policies in place post-9/11 to improve security nationwide to mitigate future terrorist attacks, these may not be sufficient in preventing another event. In other words, mitigation efforts for natural disasters are more predictable and more easily achieved than mitigation for terrorist attacks.

One of the most significant differences between terrorism and other types of catastrophes is that the frequency and severity of terrorist attacks are also affected by U. S. governmental policy. U.S. foreign policy directly impacts the motivation and likelihood of terrorist attacks from different militant factions. U.S. domestic policy and the success of governmental homeland security programs also affects the mitigation of terrorist attacks—both in preventing such attacks and limiting the magnitude of any attack that does occur—although this is far from being an exact science. Moreover, much of the information required to predict terrorist events is likely to remain highly classified and unavailable to those outside of agencies such as the FBI and CIA. In fact, one of the arguments proffered in support of a federal role in the provision of terrorism insurance was that terrorism events represent a negative effect of the national security policies of the sovereign government.

Is it possible for terrorism risk to be assessed?

In order for the private insurance and reinsurance markets to offer terrorism insurance, there must be techniques in place for the assessment of the probable frequency and severity of the risk. For more than a decade, the insurance industry has relied upon sophisticated computer modeling techniques to predict and manage the risks associated with natural catastrophes such as hurricanes and earthquakes. Estimating the frequency and severity of the potential losses for natural disasters initially proved to be a difficult problem for private insurers, but enhanced modeling capabilities from such specialized firms as Applied Insurance Research (www.air-worldwide.com) and Risk Management Solutions (www.rms.com) have responded well to the task. Such modeling is also starting to be applied to terrorism risk by those firms and others within the industry, with the first generation of these terrorism models having been released in 2002.⁸ Dr. Gordon Woo, the chief architect of the RMS terrorism model, has published several noteworthy academic papers on this topic.⁹

With the enactment of TRIA, all commercial property and casualty insurers were required to make difficult pricing decisions regarding terrorism risk, which, as previously stated, had generally not been priced as stand-alone, separate coverage prior to 9/11. Insurance Services Office, Inc. (ISO) is a leading provider of data, analytics and other services to the insurance industry, and is the parent organization of Applied Insurance Research (AIR). ISO used the AIR Terrorism Loss Estimation Model to develop advisory loss costs, which were filed with the insurance

⁸ Kuntreuther, Howard and Michel-Kerjan, Erwann, April 2004, "Dealing with Extreme Events: New Challenges for Terrorism Risk Coverage in the U.S.", <http://grace.wharton.upenn.edu/risk/>

⁹ "Game Theory and Terrorism Risk," "The Al Qaeda War Game," "Quantitative Terrorism Risk Assessment". For a more complete list of Dr. Woo's research papers, see www.rms.com.

commissioner of every state in 2002 to assist insurers in their premium rates for terrorism coverage under TRIA. These were filed as advisory, not mandatory, rates.

ISO defined three tiers for the country, listing Washington (DC), New York, Chicago and San Francisco in the highest tier with recommended loss costs in those cities of \$0.10 per \$100 of property value. A second tier consisted of Boston, Houston, Los Angeles, Philadelphia and Seattle; the rest of the country fell into the third tier. ISO's recommendations were not, however, well received by cities in the first tier who felt they were being treated unfairly. Negotiations ensued and compromises were made. This process highlights the reality of the struggle at times between policymaking and statistical modeling. Even if ISO's models were perfect, the public perception of the risk was obviously different, and resulted in a different conclusion.

ISO filed revised loss costs for first-tier cities based on zip code level model results, which differentiated between the higher risk of downtown city centers and the lower risk of properties on the outskirts. But nowhere did the new loss costs exceed \$0.03 per \$100 of property value for the first tier, with \$0.018 per \$100 of value for the second tier, and \$0.001 per \$100 of value for the third tier. The Departments of Insurance in all 50 states eventually approved these ISO advisory loss costs that covered the years 2003, 2004 and 2005.¹⁰

It should be noted, however, that there are some significant differences, between modeling natural catastrophe risk and terrorism risk. First, there is a wealth of historical data available on natural catastrophes, and even though earthquakes and hurricanes cannot be predicted with pinpoint precision, the ability to rely upon historical data is a major advantage in modeling these events. Even though there is historical information on past terrorism events, this data is much less helpful in predicting future events. Terrorist attacks are based on deliberate human acts undertaken with the intent of avoiding detection and causing as much damage as possible. Such actions are inherently more difficult to predict and are outside the realm of traditional actuarial and scientific modeling. Moreover, the past statistical loss experience with major attacks is insufficient to permit the use of conventional empirical techniques. While there have been some historical terrorism events, they have been much smaller in claim amounts compared to the 9/11 attacks (see table above), and the combination of a relatively small number of historical data points with the fact that all were substantially smaller in claim amounts makes the use of this data unproductive. Although multi-disciplinary modeling approaches can be developed that will aid in estimating terrorism losses, such modeling clearly poses unique challenges.

Secondly, terrorists are noted for adaptive learning, and risk modelers accordingly also need this facility, because the terrorist threat is constantly evolving.¹¹ For example, terrorists are expected to seek out other targets if security is increased around certain ones believed to be "high-profile," such as government and military facilities. In addition, the security landscape has changed dramatically in the U.S. over the past year, placing a greater logistical burden on terrorists by impairing reconnaissance, fundraising, travel, and weapons acquisition.¹² Therefore, terrorism risk modeling techniques must incorporate this sort of "adaptive behavior" information as well, which has clearly not been a component of any prior natural catastrophe modeling methodology.

¹⁰ Kuntreuther and Michel-Kerjan

¹¹ RMS brochure, "Managing Terrorism Risk in 2004", http://www.rms.com/publications/terrorism_risk_modeling.pdf

¹² RMS brochure, "Managing Terrorism Risk in 2004"

How have other countries responded to terrorism risk?

It is instructive to consider the private-public partnerships that other countries have established to deal with terrorism risk. Several features of these programs could be considered in developing a sustainable terrorist insurance program in the U.S. after 2005 that involves shared responsibilities between the public and the private sectors.¹³

The following table shows countries with government-backed terrorism insurance plans¹⁴:

September 11, 2001: One Hundred Minutes of Terror that Changed the Global Insurance Industry Forever

Table 2
Countries with Government-Backed Terrorism Insurance Plans

Country	Provider	Details
U.K.	Pool Re	The international reinsurance market withdrew capacity as a consequence of IRA terrorism in the 1990s, which, in turn, led to a state-supported solution: Limited private cover with additional excess cover for both property damage and business interruption made available for insurance companies to cede to Pool Re (which sets raises and terms). The British government acts as Pool Re's "reinsurer of last resort", in case of insolvency.
Spain	Conсорcio	Conсорcio CCS (Conсорcio de Compensacion de Seguros) is a state insurance facility guaranteeing cover for "extraordinary risks" such as earthquake, volcanic eruption, flood, storm, terrorism and civil commotion. The cover is for property damage only and is integrated into policies issued by private insurance companies which collect premium on behalf of CCS. After deregulation in 1990, it became possible to insure these risks privately, whereupon CCS provided subsidiary cover only and in accordance with the legal minimum. However, policyholders must pay CCS premium in any case and thus maintain the solidarity principle for catastrophic risks.
South Africa	SASRIA	In 1979, South Africa's particular political situation led to the creation of the national institution SASRIA (South African Special Risks Insurance Association) for the (voluntary) insurance of political risks in respect of property damages and, in later, standing charges. While the political situation has improved considerably in recent years, SASRIA still exists.
Israel	PTCF	Terrorism is excluded from standard property policies but the private insurance market grants cover by separate endorsement. Reinsurance coverage is provided by catastrophe excess of loss treaties. In addition, the state of Israel covers property damage losses triggered by politically motivated violence (including terrorism) through the Property Tax and Compensation Fund (PTCF), which was established to cover property losses resulting from war and war-like activities.
Northern Ireland	Government	Terrorism cover for local risk is excluded. Criminal Damage Compensation Order has been in force since 1978 providing compensation on an indemnity basis for property damage and business interruption.
Sri Lanka	Riots and strikes and terrorism fund	Government sponsored riot fund, set up in 1988 includes the risk of terrorism. Limit is Lkr30 million (approximately US\$300,000) per risk, per location and is subject to 10 percent deductible.
France	GAREAT	Reinsurance pool established to cover the terrorism exposure of all eligible risks. Membership of the pool is obligatory for all members of FFSA, the French insurers' association. The minimum limit for cover through this scheme is 20% of values or Euro 20 million (US\$17.7 million).

¹³ Kuntreuther and Michel-Kerjan

¹⁴ Hartwig

Germany

Extremos AG

Specialty terrorism reinsurer set up by the government to offer cover up to €10 billion in excess of €3 billion.

Sources: Swiss Re, Willis

Perhaps the foreign program most often cited as a potentially viable structure that could replace TRIA is the U.K.'s program, Pool Re. This is one of the structures which was discussed during the development of TRIA, and therefore has potential to be reconsidered now as a more permanent alternative to TRIA. The U.K. program established a mutual terrorism reinsurer, Pool Re, funded by the insurers themselves, and with optional participation, but with the government agreeing to cover any losses that exceed the reserve. Arrangements between Pool Re and the U.K. government are designed such that the net cost to the taxpayers is zero over a period of years. As initially proposed in 2002, the U.S. plan would have established a terrorism insurer, the Homeland Security Mutual Reinsurance Company, with federal reinsurance backstop for terrorism losses. Unlike the U.K. plan, the U.S. proposal made the government the "insurer of last resort," i.e., insurers would not have been required to reimburse the federal treasury for reinsurance payments received under the program (Reinsurance Association of America, 2002).

For a number of reasons, the proposal did not gain much traction with the Administration or Congress at the time. Concerns were raised that the mechanism for funding the pool through insurance company contributions was inadequate, and that the government would effectively have to step in at a very low level of any future loss. In addition, many officials were concerned that the insurance pool would turn into a permanent fixture in the insurance industry, leading to a permanent intrusion of the federal government into a traditionally state-regulated industry. Also, concerns were raised about the potential for market power that could develop with only a single, industry-controlled pool. As a result of these and other concerns, it became clear that the insurance industry's reinsurance pool proposal was not going to proceed successfully to enactment back in 2002.

However, three years after 9/11, some things have changed that might make the Pool Re-type of proposal more attractive. The economic environment is stronger than it was in 2001, and without any further terrorism attacks, the crisis mentality has somewhat abated. We have the benefit of having TRIA in effect for two years, which has provided terrorism coverage for commercial policyholders willing to buy it. And, we have the time to consider whether or not it makes sense to have some form of government involvement in a terrorism insurance program, as other industrial countries now have, that is designed to be a longer-term solution than TRIA initially was.

Does TRIA benefit the insurance industry in the long term?

One point that is often raised in the TRIA debate is whether the existence of TRIA, with its pre-determined co-participation between the public and private sectors, actually restricts the availability of federal funding in the event of a catastrophic terrorist attack. By setting up the TRIA formulas and requirements in advance of any specific terrorism event, the structure of TRIA might serve to limit federal funding that might otherwise have been available. It is impossible to anticipate every single eventuality, which is one lesson we learned from 9/11 in the first place.

By removing the ability of insurers to choose how they offer terrorism coverage, it is inevitable that some would be unable to withstand another major terrorism event, even with the assistance available under TRIA.

In the paper written by Brown, Cummins, Lewis and Wei in 2004, the authors investigate the stock price response of industries affected by the enactment of TRIA. The industries studied were banking, construction, insurance, real estate investment trusts, transportation and public utilities. The stock price effect was primarily negative. TRIA was at best value-neutral for the property-casualty insurance industry, the industry most directly impacted by it. By requiring insurers to offer terrorism coverage, TRIA increased the potential exposure of the industry to terrorism losses. Moreover, TRIA had little impact on the international reinsurance market, which is dominated by foreign reinsurers. By providing “free” government reinsurance, TRIA may have actually delayed or prevented the reemergence of private sector reinsurance for terrorism losses. To the extent that TRIA has impeded the emergence of more efficient private market mechanisms for financing terrorism losses, the net impact of TRIA may well have been negative. Moreover, TRIA does not provide coverage for nuclear, chemical or biological hazards, which may be the most serious threats from future terrorism. Finally, TRIA may have lowered the market’s expectations regarding federal assistance to industries affected by future terrorist attacks by substituting a carefully circumscribed reinsurance program for more open-ended federal disaster assistance, a type of Samaritan’s dilemma effect.¹⁵

¹⁵ Brown, et al.

GLOSSARY

Actuary: A specialist in the mathematics of insurance who calculates rates, reserves, dividends and other statistics.

Adverse Selection: The tendency of those exposed to a higher risk to seek more insurance coverage than those at a lower risk. Insurers generally react either by charging higher premiums or not insuring at all. In the case of natural disasters, such as earthquakes, adverse selection concentrates risk instead of spreading it. Insurance works best when risk is shared among large numbers of policyholders.

Aggregate Limit: Indicates the amount of coverage that the insured has under the contract for a specific period of time, usually the contract period, no matter how many separate accidents might occur.

Assets: Assets for an insurer refer to “all the available properties of every kind or possession of an insurance company that might be used to pay its debts.”

Balance Sheet: Provides a snapshot of a company’s financial condition at one point in time. It shows assets, including investments and reinsurance, and liabilities, such as loss reserves to pay claims in the future, as of a certain date. It also states a company’s equity, known as policyholder surplus. Changes in that surplus are one indicator of an insurer’s financial standing.

Business Income Insurance (also known as **Business Interruption Insurance**): Commercial coverage that reimburses a business owner for lost profits and continuing fixed expenses during the time that a business must stay closed while the premises are being restored because of physical damage from a covered peril, such as fire. Business interruption insurance also may cover financial losses that may occur if civil authorities limit access to an area after a disaster and their actions prevent customers from reaching the business premises.

Capacity: The supply of insurance available to meet demand. Capacity depends on the industry’s financial ability to accept risk. For an individual insurer, it is the maximum amount of risk it can underwrite based on its financial condition. The adequacy of an insurer’s capital relative to its exposure to loss is an important measure of solvency.

A property/casualty insurer must maintain a certain level of capital to underwrite risks. The amount of capital determines how much business it can underwrite, known as its capacity. When the industry is hit by high losses, such as after the 9/11 attacks, capacity is diminished. It can be restored by increases in net income, favorable investment returns, reinsuring more risk and or raising additional capital. When there is excess capacity, usually because of a high return on investments, premium rates tend to decline as insurers compete for market share. As rates decline, underwriting losses are likely to grow, reducing capacity and causing insurers to raise rates and tighten conditions and limits in an effort to increase profitability.

Capital: Shareholder's equity for stock insurers and retained earnings for mutual insurers. The company's capital is measured by the difference between its assets and liabilities. This value protects the interests of the company's policyholders in the event it develops financial problems. From a regulatory point of view, shareholders' interests are secondary to policyholders' interests.

Casualty Insurance: That type of insurance that is primarily concerned with losses caused by injuries to persons and legal liability imposed upon the insured for such injury, or for damage to property of others.

Catastrophe: Term used for statistical recording purposes to refer to a single incident or a series of closely related incidents causing severe insured property losses totaling more than a given amount, currently \$25 million.

Catastrophe Model: Using computers, a method to mesh long-term disaster information with current demographic, building and other data to determine the potential cost of natural disasters and other catastrophic losses for a given geographic area.

"Certified" Acts of Terrorism: as defined in TRIA, "certified" acts of terrorism are committed by foreign persons against interests in the U.S. or against certain U.S. interests overseas.

Claim: A demand made by the insured, or the insured's beneficiary, for payment of the benefits of an insurance policy. The dollar amount of a claim is often referred to as a "loss" by insurers.

Commercial Lines: Refers to insurance for businesses, professionals and commercial establishments. Among the major coverages are boiler and machinery, business interruption, commercial auto, comprehensive general liability, directors and officers liability, fire and allied lines, inland marine, medical malpractice liability, product liability, professional liability, surety and fidelity, and workers compensation. Most of these commercial coverages can be purchased separately except business interruption which must be added to a fire insurance (property) policy.

Commissioner of Insurance: The title of the head of most state insurance departments. In some states, the title Director or Superintendent of Insurance is used instead.

Coverage: The scope of protection provided under an insurance policy.

Covered Loss: Illness, injury, death, property loss, legal liability, or any other situation or loss for which an insurer will pay benefits under a policy when such event occurs.

Deductible: The portion of an insured loss to be borne by the insured before he is entitled to recovery from the insurer. Usually it is either a specified dollar amount or a percentage of the claim amount.

Earned Premium: The portion of the premium that applies to the expired part of the policy period (usually one year). Insurance premiums are payable in advance but the insurer does not fully earn them until the policy period expires.

Economic Loss: Total financial loss resulting from (1) the death or disability of a wage earner, or (2) from the destruction of property. Includes the loss of earnings, medical expenses, funeral expenses, the cost of restoring or replacing property, and legal expenses. It does not include noneconomic losses, such as pain caused by an injury.

Effective Date: The date on which the protection of an insurance policy goes into effect.

Exclusion: A provision in an insurance policy that eliminates coverage for certain risks, people, property classes, or locations.

Experience: Record of losses for an insurer, or for the insurance industry as a whole, on either an individual policy, or line of business, or overall.

Exposure: Measure of vulnerability to loss, usually expressed in dollars or units.

File-and-Use Rating Laws: State-based laws which permit insurers to adopt new rates without the prior approval of the insurance department. Usually insurers submit their new rates with supporting documentation.

General Liability Insurance: Insurance designed to protect business owners and operators from a wide variety of liability exposures. Exposures could include liability arising from accidents resulting from the insured's premises or operations, products sold by the insured, operations completed by the insured, and contractual liability.

Incurred Losses: The losses occurring within a fixed period, whether or not adjusted or paid during the same period.

Insurable Risk: Risks for which it is relatively easy to get insurance and that meet certain criteria. These include being definable, accidental in nature, and part of a group of similar risks large enough to make losses predictable. The insurer also must be able to come up with a reasonable price for the insurance.

Insurance: A system to make large financial losses more affordable by pooling the risks of many individuals and businesses and transferring them to an insurance company in return for a premium.

Insurance Department: In the U.S., a governmental bureau in each state charged with the administration of insurance laws, including the licensing of agents and insurers and their regulation and examination. In some jurisdictions the department is a division of another state department or bureau.

Insurance to Value: Insurance written in an amount approximating the value of the property insured.

Insured: The party to an insurance agreement whom the insurer agrees to indemnify for losses, provide benefits and render services to.

Insurer: The party to an insurance agreement who undertakes to indemnify for losses, provide pecuniary benefits and render services.

Limits: Maximum amount of insurance that can be paid for a covered loss.

Line: Type or kind of insurance, such as personal lines or commercial lines.

Loss: Generally refers to (1) the amount of reduction in the value of an insured's property caused by an insurable event, (2) the amount sought through an insured's claim, or (3) the amount paid on behalf of an insured under an insurance contract.

Loss Frequency: Number of times a loss occurs. One of the criteria used in calculating premium rates.

Loss Reserve: The estimated liability, as it appears in an insurer's financial statement, for unpaid insurance claims or losses that have occurred as of a given evaluation date. For individual claims, the loss reserve is the estimate of what will ultimately be paid out on that claim.

Loss Severity: The dollar amount of a loss. One of the criteria used in calculating premium rates.

“Make Available” Provisions: In TRIA, these require that each insurer must make available, in all of its commercial property and casualty insurance policies, coverage for losses due to covered acts of terrorism that does not differ materially from the terms, amounts and other coverage limitations applicable to losses arising from events other than acts of terrorism.

National Association of Insurance Commissioners (NAIC): An association of state insurance commissioners formed for the purpose of exchanging information and of developing uniformity in the regulatory practices of the states through drafting model legislation and regulations. The NAIC has no official power to enforce compliance with its recommendations.

Occurrence: An event that results in an insured loss.

Personal Lines: Property/casualty insurance products that are designed for and bought by individuals, such as homeowners and automobile policies.

Policy: A written contract for insurance between an insurance company and policyholder stating details of coverage.

Premium: The price of an insurance policy for a given period of time, usually one year.

Property/Casualty Insurance: Covers damage to or loss of policyholder's property, and legal liability for damages caused to other people or their property. Property/casualty insurance is one

segment of the insurance industry (the other is life/health). It includes auto, homeowners and commercial insurance. Outside the United States, property/casualty insurance is referred to as nonlife or general insurance.

Rate: The cost of a unit of insurance, usually per \$1000 of coverage. Rates are based on historical loss experience for similar risks and may be regulated by state insurance departments.

Reinsurance: Insurance bought by insurers. A reinsurer assumes part of the risk and part of the premium originally taken by the insurer, known as the primary company. Reinsurance effectively increases an insurer's capital and therefore its capacity to sell more coverage. The business is global and some of the largest reinsurers are based abroad. Reinsurers have their own reinsurers, called retrocessionaires. Reinsurers don't pay policyholder claims directly; they reimburse the insurers for claims paid.

Reserves: (See "Loss Reserves").

Risk: The chance of loss for the person or entity that is insured, or the specific event for which the policyholder is insured.

Solvency: Insurance companies' ability to pay the claims of policyholders. Regulations to promote solvency include minimum capital and surplus requirements, statutory accounting conventions, limits to insurer's investment and corporate activities, financial ratio tests, and financial data disclosure.

Standard Policy: (1) Coverage which has identical provisions regardless of the issuing insurer. Many common policies are standardized. (2) Insurance issued to a standard, or "average", underwriting risk.

Stand Alone Terrorism Insurance: Terrorism insurance coverage offered by insurers which is not subject to the terms and conditions under TRIA. Such coverage may offer broader terms, such as coverage for both foreign and domestic acts of terrorism, as well as coverage for locations outside of the U.S. This law provides a federal financial backstop for the insurance industry for claims from certain terrorist attacks, and requires that every U. S. property and casualty insurance company offer terrorism insurance to its commercial policyholders.

Sublimit: Any limit of insurance which exists within another limit. For example, special classes of property may be subject to a specified dollar limit per occurrence, even though the policy has a higher overall limit.

Surety Bond: A contract guaranteeing the performance of a specific obligation. It is a three-party agreement under which one party, the surety company, answers to a second party, the owner, creditor, or "obligee", for a third party's debts, default or nonperformance. Contractors are often required to purchase surety bonds if they are working on public projects. The surety company becomes responsible for carrying out the work or paying for the loss up to the bond "penalty" if the contractor fails to perform.

Surplus Lines: Property/casualty insurance coverage that isn't available from insurers licensed in the state, called admitted companies, and must be purchased from a non-admitted carrier. Examples include risks of an unusual nature that require greater flexibility in policy terms and conditions than exist in standard forms or where the highest rates allowed by state regulators are considered inadequate by admitted companies. Laws governing surplus lines vary by state.

Terrorism Coverage: Included as part of the package in standard commercial insurance policies before September 11, 2001, virtually free of charge. Since September 11, terrorism coverage is priced and sold separately, either under the terms of TRIA, or as Stand Alone coverage.

Terrorism Risk Insurance Act of 2002 (TRIA): This law provides a federal financial backstop for the insurance industry for claims from certain terrorist attacks, and requires that every U. S. property and casualty insurance company offer terrorism insurance to its commercial policyholders.

Underwriting: The process of selecting risks for insurance and classifying them according to their degrees of insurability so that the appropriate rates may be assigned. The process also includes rejection of those risks that do not qualify.

Underwriting Income: The insurer's profit (or loss) on the insurance sales after all expenses and losses have been paid. When premiums are not sufficient to cover claims and expenses, the result is an underwriting loss. Investment income is not included in this amount.

Workers Compensation: Insurance that pays for medical care and physical rehabilitation of workers injured on the job, and helps to replace lost wages while they are unable to work. State laws, which vary significantly, govern the amount of benefits paid and other compensation provisions.

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