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Terrorism Insurance*
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Regulating the Market for Terrorism Risk Insurance

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Abstract

Since the terrorist attacks of 9/11, interest in the impact of terrorism on the insurance industry has surged. Even with the catastrophic human losses and physical destruction, the attacks resulted in one of the most costly insurance events in American history.¹ In the aftermath, an important public policy question arose as to whether, and how, the federal government should intervene to provide a temporary “backstop” for property-casualty terrorism risk insurance. The Terrorism Risk Insurance Act of 2002 (TRIA),² initially passed to address this concern, was renewed under the Terrorism Risk Insurance Extension Act (TRIEA) of 2005 and reauthorized

¹ Lucien J. Dhooge, “September 11 and the Insurance Industry,” *American Business Law Journal*, Vol. 40 (Summer 2003). (Insured losses totaled an estimated \$30-\$90 billion (includes property and casualty insurance, business interruption, and worker's compensation) Of the U.S.-based insurers, American International Group (AIG) suffered the biggest pre-tax loss (\$820 mil.) from the attacks while Citigroup, Inc. incurred a \$502 million pre-tax loss.

² The Terrorism Risk Insurance Act (TRIA), P.L. 107-297, Nov. 26, 2002. Under TRIA, the Federal government pays 90% of each insurer’s primary property casualty losses for a given year above the applicable insurer deductible, up to a max of \$100 bil. *See also* The Terrorism Risk Insurance Extension Act (TRIEA)(2005).

by the recent Terrorism Risk Insurance Program Reauthorization Act (TRIPRA) of 2007.³ While the most recent renewal of the legislation reinforces that the threat of terrorism is not a transitory phenomenon it also leaves lingering the future of federal terrorism insurance regulation. This paper suggests that continued regulation beyond TRIPRA's expiry of December 31, 2014 may be necessary due to insurability and/or capacity concerns; however, any extension of the legislation will have to address concerns with TRIA's interference with price-setting and normal incentives created by functioning insurance markets.

This paper contributes to the literature on terrorism risk insurance by focusing regulation's disincentive to mitigate post-event insurance losses by increasing moral hazard and risk-taking by businesses. While terrorism insurance legislation has made the cost of insurance more accessible, artificially low premiums have not come without consequence. When state or federal regulation interferes with pricing and the ability to add or drop coverage, it interferes with the policyholders incentives to take precautions to avoid/limit loss – a problem referred to as moral hazard. In the context of terrorism, moral hazard places all U.S. residents at risk in that policyholders are not taking precaution to mitigate and reduce community and high-risk facility risk. Ignoring moral hazard may therefore increase our nation's vulnerability to terrorism.

This paper presents a path towards correcting the moral hazard problem. Terrorism risk insurance can be used as a lever to motivate high-risk facilities to adopt risk-reducing precautionary measures through improvements in pricing accuracy and by linking terrorism risk insurance benefits to national preparedness goals. A public partnership that exploits the strengths of both sectors is presented which includes conditioning participation in TRIPRA upon adherence to risk mitigation programs such as the National Infrastructure Protection Program (NIPP), and encouraging maximum private sector participation such as providing tiered pricing and lower deductibles to mitigate post-event losses. These steps have the potential to reduce the federal role over time by increasing take-up rates for terrorism coverage among businesses and commercial property-owners and by reducing the costs the federal government would otherwise bear in the event of a catastrophic terrorist attack.

³ Terrorism Risk Insurance Program Reauthorization Act of 2007, signed into law December 26, 2007

1. INTRODUCTION

The federal role in the market for terrorism insurance remains a subject of wide-ranging debate.⁴ After much wrangling in the Senate and the House, on the eve of the December 31, 2007 expiry, Congress enacted legislation and the President signed into law the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPRA).⁵ While debate centered how much to expand the program, a consensus emerged that the private sector did not have the capacity to insure against large-scale terrorism risk in the U.S. and that a public-private partnership is not only necessary but desirable to help stabilize commercial markets.⁶ Not only that, given our current engagement in a violent conflict in Iraq and a string of tragic attacks in London, Madrid, India, Indonesia and elsewhere since 9/11, the threat of terrorism cannot be viewed as a short-term threat – it has the potential to be a long-term reality.

Despite the persistent threat of terrorism and a federal interest in ensuring the stability, availability, and affordability of terrorism insurance, one question remains unanswered: is continued regulation of terrorism risk insurance justifiable and if so, can the private insurance industry and policymakers develop a path that will correct some of the distortions caused by regulation? This section begins by describing the federal role in regulating market for terrorism risk insurance before and after 9/11, leading to a description of current legislation and its historical underpinnings. It concludes by introducing how current legislation can be modified to correct distortions, encourage market incentives and motivate a diminished federal role.

1.1. TRIA: Historical Background

Prior to 9/11, terrorism coverage was provided without separate charge as a part of standard commercial property-casualty policies, since these policies did not contain specific

⁴ Opinions range from calling the program an outright entitlement program while others believe that it is property correcting for market failures.

⁵ Passed in Congress on November 16, 2007 (Pub. L. 110-160)

⁶ Lloyd's "TRIA Extension more likely" 8 Feb. 2007, James Walmsley, available at:

http://www.lloyds.com/Lloyds_Worldwide/International_compliance_news/TRIA_extension Accessed 2/1/08 (Prior to passage of the bill, an insurance information institute survey of US property and casualty insurance executives found that 89% of those polled were confident that the government would move quickly to extend the law for a significant period to provide a permanent backstop.) *See also* Testimony of Franklin W. Nutter, President, Reinsurance Association of America, Before the Terrorism Insurance Implementation Working Group, National Association of Insurance Commissioners, March 29, 2006 (stating that, according to the Reinsurance Association of America, a national trade association of domestic reinsurers and reinsurance brokers representing U.S. Property and casualty reinsurance industry, the reinsurance industry strongly believes in a private/public solution.)

terrorism exclusions.⁷ The 9/11 attacks transformed the landscape of the insurance industry. Recovering from the extraordinary scale of insured losses resulting from 9/11, insurance and reinsurance companies reevaluated the financial risks of covering terrorism. The largely unregulated reinsurance industry that insures the insurance industry and which absorbed two-thirds of the covered losses of 9/11, reduced its exposure to terrorism after 9/11 by selectively excluding terrorism coverage, increasing pricing, reducing limits, and raising collateral requirements.⁸ In addition, during the fall of 2001, some investors began requiring a return on investment of 20% to invest in terrorism coverage.⁹ The serious shortage of capital against terrorism meant that, for insurers to sell their clients the same level of coverage they offered pre-9/11, they had to locate other sources of funding.¹⁰

Insurers responded by limiting coverage by charging higher premiums, including cancellation clauses, and omitting multi-year terms,¹¹ as well as increasing deductibles and other policy limits. For instance, insurance premiums which were based on location, building security, and amount of coverage, ranged from 0.5 % to 1 % of the insured value and in some New York City locations premiums were as high as 10 % of the insured value.¹² Cancellation clauses that allowed the insurer to cancel a policy with 30 days notice were common, allowing insurers to cancel policies during periods of heightened terror alert and forcing owner operators to plan on a month-to-month time horizon.¹³ The availability of only single-year policies was especially problematic for multi-year construction projects, many of which required three-year insurance policies for financing.¹⁴ In addition, in April 2002, the seven carriers that offered stand-alone terrorism coverage for U.S. properties, offered deductibles for property damage ranging from \$5,000 to \$50 million and capacity limits per location ranging from \$50 to \$500 million.¹⁵

⁷Kent A. Smetters, “Insuring Against Terrorism: The Policy Challenge,” NBER Working Paper W11038 (January 2005). (noting that the impact of 9/11 on the reinsurance industry was even greater than the impact on insurers. For example, Berkshire Hathaway, owner of two reinsurance companies, suffered a \$2.28 billion charge for pre-tax insurance losses due to 9/11. In his letter to shareholders, Berkshire Chairman Warren Buffett said: “we, and the rest of the industry, included coverage for terrorist acts in policies covering other risks, and received no additional premium for doing so.”)

⁸ Robert E. Chapman and Chi J. Leng, (March, 2004) “Cost Effective Responses to Terrorist Risks in Constructed Facilities” National Institute of Standards and Technology, U.S. Department of Commerce. Report NISTIR #7073

⁹ *Id.*

¹⁰ *Id.*

¹¹ Statement of Warren W. Heck, Chairman and CEO, Greater New York Mutual Insurance Company Insurance Company of Greater New York Strathmore Insurance Company, Hearing on Terrorism Insurance before the NAIC The Terrorism Insurance Implementation Working Group, March 29, 2006.

¹² *See supra* note 8.

¹³ *Id.*

¹⁴ *See supra* note 8.

¹⁵ *Id.*

Lack of capital coupled with an inability to predict, and thus quantify the risks associated with terrorism, including the likelihood of future attacks, their location, and the financial losses accruing as a result, led the insurance industry to respond to these challenges by first limiting and later eliminating coverage. Not surprisingly, insurance companies lobbied state governments, their primary regulators, for the freedom to exclude terrorism from their policies leading to terrorism exclusions in 45 states, the District of Columbia, and Puerto Rico.¹⁶ Further, concerned about the consequences of inadequate terrorism insurance on construction lending and investment and potential economic slowdown, President Bush urged the U.S. Congress to enact legislation that would create a federal backstop for terrorism insurance. Without TRIA the real estate market would have had great difficulty building new office or apartment buildings after 9/11, and large construction projects would not have been able to proceed without the multiyear coverage they required.¹⁷

1.2. The Terrorism Risk Insurance Program in Transition: 2001-2014

Since 9/11 three pieces of legislation have defined how terrorism risk insurance is regulated today. Congress passed the Terrorism Risk Insurance Act (TRIA), unanimously, in November 2002.¹⁸ TRIA is a cost-sharing program whereby the federal government is responsible for paying a certain percentage of for commercial property and casualty insurer's primary losses during a given year above the applicable insurer deductible, up to a certain maximum.¹⁹ TRIA requires all property-casualty insurers doing business in the U.S. to offer terrorism coverage for losses due to international terrorist activity within the U.S. on roughly the same terms as their non-terrorism coverage and does not prevent stand-alone coverage that is available outside of TRIA property and commercial coverage.²⁰ More importantly, under TRIA,

¹⁶ *Id.* (noting that California, Florida, Georgia, New York, and Texas had not approved terrorism exclusions as of April 2002); *See also*, NAIC Public Hearing on Terrorism Insurance Matters, Statement from Michael Fenlon, on Behalf of the Risk and Insurance Management Society, March 29, 2006.

¹⁷ Testimony of Steven Spinola, President Real Estate Board of New York, Before the NAIC Terrorism Insurance Implementation Working Group, March 29, 2006.

¹⁸ Passed in Congress on November 26, 2002 (Pub.L. 107-297, 116 Stat. 2322) (TRIA). On the unanimous vote, see Senator Dodd, Opening Statement, Hearing Examining the Terrorism Risk Insurance Program, Senate Banking Committee, Examines TRIA, available at: <http://dodd.senate.gov/index.php?q=node/3752/print> (Accessed 2/1/08).

¹⁹ Terrorism Risk Insurance Act § 101. Lines of insurance that are unaffected are: individual life, group life, and aviation.

²⁰ Clients purchase terrorism insurance on two platforms – within a property program or on a standalone basis. The standalone market offers can provide global and non-certified coverage, with the advantage over property carriers in that it can offer multi-year policies and it can be placed on a non-cancelable basis.

the federal government assumed responsibility for terrorism related losses above a certain deductible, thereby creating a federal backstop.²¹

Since the enactment of TRIA, two additional pieces of legislation have modified the rules regulating the market for terrorism risk insurance. The Terrorism Risk Insurance Extension Act (TRIEA) of 2005 extended TRIA until December 31, 2007.²² While TRIEA revised several structural aspects of the program, Congress pressed to reauthorize TRIEA beyond 2007, citing insufficient insurance industry capacity and limited scope for certified acts of terrorism. According to the American Academy of Actuaries, “without a federal backstop, there will be a long-term, rather than just an immediate negative effect where there will be higher prices, decreased availability and lower take-up rates”.²³ A study by Marsh Inc., also showed that without renewal of TRIA in 2007, the availability of capacity (and pricing) would vary depending on the client’s exposures.²⁴ For middle market sized clients with little to no exposure in central business districts or without what are often referred to as “trophy or target” properties, Marsh found that pricing was reasonable and capacity was generally available beyond TRIEA’s expiration.²⁵ However, for clients with exposures in urban areas with a high concentration of risk, clients in high hazard industries or with properties viewed as “target” risks, or for large clients seeking maximum capacity, capacity was limited and the cost was high. This inequality in the market leaves clients who needed the coverage the most without protection and options.²⁶ Thus, on December 26, 2007, the eve of TRIEA’s expiry, the President signed into law the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPRA), modifying and extending TRIEA through December 31, 2014.²⁷

Each piece of legislation requires all property and casualty insurers in the U.S. to make terrorism coverage available to commercial lines of property and casualty insurance. Worker’s compensation -- a compulsory line of insurance for all businesses in all states-- covers employees

²¹ See *supra* note 19.

²² Passed in Congress on December 22, 2005 (Pub. L. 109-144, 119 Stat. 2660). On the vote result See *supra* note 18 (noting that in 2005, the Banking Committee under the Chairmanship of Senator Shelby reported by a unanimous vote, legislation extending TRIA for two more years. The bill was later approved unanimously by the Senate.)

²³ Testimony of Debra T. Ballen, American Insurance Association, NAIC Public Hearing on Terrorism Insurance Matters, March 29, 2006.

²⁴ Marsh, Comments by Jill Dalton, Managing Director, MARSH USA Inc., Before the NAIC Terrorism Insurance Implementation Working Group, March 29, 2006. Having worked on property renewals at the end of 2005, Marsh Inc., shared their experience on how the markets would respond if TRIA were not extended beyond 2005.

²⁵ *Id.*

²⁶ *Id.*

²⁷ Passed in Congress in November, 2007 (Pub. L. 110-160).

injured or killed on the job and therefore automatically includes coverage for acts of terrorism.²⁸ For the terrorism coverage to be triggered for commercial policies, a terrorist attack has to be declared a “certified act” by the Secretary of the Treasury.²⁹ The insurer is required to make coverage available and if the insured rejects an offer, the insurer may then reinstate a terrorism exclusion.³⁰ Once an event reaches the \$100 million trigger in aggregate industry loss, insurer exposure is limited to a deductible plus co-payment. The government cap is \$100 billion; after that, recoupment of the federal share occurs through policyholder surcharges.³¹

With all three pieces of legislation, limits to coverage include war exclusions and restrictions apply for nuclear, biological, chemical and radiological (NBCR) events in both personal and commercial insurance policies. These exclusions reflect the realization that damage from these events is fundamentally uninsurable. No formal declaration of war by Congress is required for the war risk exclusion to apply. If some NBCR exclusions are permitted by a state, an insurer does not have to make available the excluded coverage.³² In some states a doctrine known as “fire following” applies such that in the event of a terrorist-caused explosion followed by fire, insurers could be liable to pay out losses attributable to the fire (but not the explosion) even if a commercial property owner had not purchased terrorism coverage.³³

Since 2002, many efforts to expand coverage under TRIEA and TRIPRA have either failed or been postponed. TRIPRA succeeded in expanding coverage by changing the definition of “act of terrorism” to eliminate the requirement that the individual(s) are acting on behalf of any foreign person or foreign interest. This makes property and casualty coverage available for losses resulting from domestic terrorism. Other limitations on coverage were preserved or expanded. Insurer exposure continues to be limited to its deductible plus co-payment, thereby providing finite limits and some degree of legal certainty that insurer liability is limited by the existing \$100 billion program cap. Only now, TRIPRA requires clear and conspicuous notice to

²⁸ Insurance Institute TRIA White Paper available at <http://www.iii.org/media/research/triawhitepaper/> (Accessed 2/1/08)(noting that worker’s compensation is also the only line of insurance that does not exclude coverage for acts of war. In addition, State laws preclude exclusions for workman’s compensation insurance, which means that nuclear, biological, chemical, and radiological (NBCR) risks are covered to the degree that the underlying coverage includes coverage for the perils.).

²⁹ *Id.*

³⁰ *Id.*

³¹ The recoupment reflects “paygo” concerns. For a discussion of this term, see the House glossary of terms accessible at: http://www.rules.house.gov/archives/glossary_fbp.htm (Accessed 2/1/08) (briefly, the “Pay-As-You-Go”, or “PAYGO” requirement of the Budget Enforcement Act of 1990 states that congressional action on revenue legislation and legislation on entitlement or other mandatory programs should not add to the budget deficit).

³² *See supra* note 28.

³³ Insurers are now seeking to limit fire coverage resulting from a terrorist attack because commercial policyholders that choose to reject TRIA or other terrorism coverage are effectively paying no premium for the protection offered by fire-following coverage. So far, 7 states have amended their standard fire policy laws to exclude acts of terrorism.

policyholders of the existence of the cap. In the event that insured losses exceed the cap, the U.S. Treasury is required to promulgate regulations for determining pro-rata shares of insured losses under the program. The insurer deductible increased to a fixed 20% of an insurer's direct earned premium, and the federal share of compensation changed to 85% of insured losses that exceed insurer deductibles. Compare that to the 2006 rules, when 90% of the commercial terror loss for primary insurance was covered subject to individual company retention of 17.5%. While attempts to add group life insurance as a covered line failed, moves to provide coverage for certain nuclear, chemical, biological and radioactive (NCBR) events were postponed.³⁴ TRIPRA required that The President's Working Group on Financial Markets continue an ongoing study of the long-term availability and affordability of terrorism risk, while requiring The Comptroller General to study and report on the availability and affordability of insurance coverage for losses caused by terrorist attacks involving NCBR and on the issue of whether there are specific markets in the nation where there are unique capacity constraints on the amount of terrorism insurance available.³⁵ The results of these studies will guide the course for future regulation.

Nevertheless, it is important to note that government intervention into private insurance markets is not a new phenomenon and that much can be learned from previous legislative efforts. To this day, the insurance industry is subject to wide state regulation. Each state has its own insurance code but the National Association of Insurance Commissioners (NAIC) prepares and recommends model legislation and administrative rules, serving to unify state regulation. One example of State regulation is the California Earthquake Authority (CEA), created in 1996 shortly after the Northridge Earthquake to ensure the availability homeowners coverage and end a serious threat to the vitality of the state's housing market. One example of Federal efforts to regulate insurance include among others, the National Flood Insurance Program (NFIP), created in the late 1960s to minimize the outlay of Federal disaster relief funds following natural disasters.³⁶ These efforts are noteworthy in that they serve as models for future federal legislative efforts.

1.3. Research Scope and Approach

³⁴ Anne Gron and Alan O. Sykes, *Terrorism and Insurance Markets: A Role for the Government as an Insurer?* 36 *Ind. L. Rev.* 447, 462-63 (2003).

³⁵ Both reports are to be made available no later than one year after the enactment of the Act.

³⁶ Other federal efforts include the development of the Federal Deposit Insurance Corporation, the Overseas Private Investment Corporation, the Crop insurance program and the Safety Act.

Those who support a continuing federal role in the regulation of terrorism risk insurance cite that the market for terrorism insurance is not currently viable and that regulation is economically necessary. In contrast, others feel that the legislation not only interferes with the regular market and price-setting created by functioning markets but also distorts normal incentives created by insurance. As Lakdawalla and Zanjani state, “the distinguishing feature of terrorism risk lies not in the insurance market itself, but in the closely associated market for self-protection.”³⁷ As they suggest, and I detail below, terrorism risk insurance regulation distorts the traditional role insurance has played in fostering risk mitigation or precautionary measures. In a normal insurance market, the insurer faces mitigation-based pricing and is presented with the opportunity to adopt risk-reducing behavior in exchange insurance premium discounts. This is because, for many private sector enterprises, the level of investment in security reflects risk versus consequence tradeoffs that are based on two factors (1) what is known about the risk environment, and (2) what is economically justifiable and sustainable in a competitive marketplace or in an environment of limited resources. In the case of terrorism risk insurance, however, the full price of the risk is not reflected in the premium and the insured is faced with an artificially low price for insurance which in turn creates a disincentive for precaution, a problem known as moral hazard. Continued regulation may thereby lead to limited improvement in our nation’s vulnerability to terrorism.

While this paper sides with policymakers and economists that support a private-public partnership that exploits the strengths of both sectors,³⁸ it expands previous research on terrorism risk insurance by focusing correcting the moral hazard problem as a way to increase viability in the market for terrorism risk insurance. The paper begins by discussing whether terrorism risk is more insurable since TRIA’s passage suggesting that continued regulation may be necessary. Parts 3 and 4 present how moral hazard concerns can be overcome by increasing pricing accuracy and by conditioning TRIPRA participation with adherence to risk mitigation measures. Part 5 provides examples of how TRIPRA can fit in a framework of national preparedness strategy. Part 6 concludes with a summary and suggestions for future research.

2. TERRORISM: IS IT MORE INSURABLE SINCE TRIA?

³⁷ Lakdawalla, Darius and Zanjani, George (2005). “Insurance, self-protection, and the economics of terrorism”. *Journal of Public Economics*, vol. 89 (9-10):1891-1905 (September).

³⁸ R. Glenn Hubbard and Bruce Deal, “The Economic Effects of Federal Participation in Terrorism Risk,” Working Paper, September 14, 2004; Lloyd Dixon, John Arlington, Stephen Carroll, Darius Lakdawalla, Robert Reville, and David Adamson, “Issues and Options for Government Intervention in the Market for Terrorism Insurance,” Working Paper, RAND Center for Terrorism Risk Management Policy (2004).

Justification for a continued federal role in the market for terrorism insurance draws from concerns that the market is not viable. The insurance and reinsurance industry both cite that the terrorism risk insurance market is not viable because terrorism is an uninsurable risk and because the market lacks the capacity to absorb high loss events; meanwhile, economists and others question whether terrorism exclusions are even market failures necessitating government intervention. Despite the ongoing debate, there are reasons to believe that terrorism remains uninsurable, and that continued regulation beyond 2014 may be necessary for this reason.

The following paragraphs provide the criteria for insurability and apply it to terrorism risk. The conclusion is that terrorism risk continues to be uninsurable because it does not meet some insurability criteria. This supports economists' view that government involvement is necessary due to the lack of information on terrorist threats and, in particular, the scale of potential losses.

2.1 Pre-TRIA Environment: Conditions for Insurability

A risk is determined insurable when one is able to: (1) identify the risk and assess and quantify, or partially estimate, the probability and magnitude of losses³⁹, and (2) feasibly set premiums for each potential customer or class of customers which reflect the risk.⁴⁰ If both conditions are satisfied, the risk is considered to be insurable. An insurable risk may not be profitable, however. It may not be possible to specify a rate at which there is sufficient demand and incoming revenue to cover the development, marketing, operating and claims processing costs of the insurance and yield a net positive profit over a pre-specified time horizon. In such cases the insurer will opt not to offer coverage against the risk.⁴¹

2.1.A. *Calculating Risk and Setting Premiums*

Insurers must be able assess risk and set a premium for their risk. Insurers and reinsurers use computer modeling as a tool to assess risk -- to predict potential future losses and better

³⁹ *Catastrophe Modeling: A New Approach to Managing Risk*. Patricia Grossi and Howard Kunreuther, eds. Springer Publishers, NY:2005.

⁴⁰ *Id.* (noting that to these, other insurers would add two additional criteria: randomness and unpredictability of an event, mutuality of risks to encourage pooling and diversification of risks, geographic and otherwise).

⁴¹ *Id.*

manage and prepare for natural and man-made catastrophes.⁴² Models for hurricanes and other natural catastrophes developed to determine the potential cost of catastrophes for a specified geographic area including specific industry types. Computer modeling evolved in the late 1980s as companies became increasingly aware of their exposure to catastrophic risks, and escalated after Hurricane Andrew in 1992 and the Northridge earthquake in 1994.⁴³ Specifically, the models simulate the physical characteristics of thousands of potential catastrophes and project their effects on both residential and commercial property using large databases that combine historical disaster information with current demographic, building (age, type and usage), scientific and financial data. Models also incorporate policy and financial data from insurers and reinsurers, such as coverage value, deductibles or attachment points (the point at which reinsurance begins to apply) and limits, to create a profile (an exceedance probability curve) that depicts the probability that a certain level of loss from different event scenarios will be exceeded on an annual basis. In this process, firms can evaluate the correlation of expected losses from a single event or combination of events affecting multiple territories.⁴⁴

Once risk is estimated, the insurer will set a premium rate that yields a profit and avoids an unacceptable level of loss.⁴⁵ Insurers will strive for profit maximization subject to a survival constraint – a mix of portfolio of risks with an overall expected probability of insolvency less than some threshold that ensures stability of the insurer’s operation.⁴⁶ Computer models that aid in the assessment of risk in a portfolio of exposures which in turn guides an insurer’s underwriting strategy, can also help the insurer decide how much reinsurance to purchase and what price to charge policyholders. The premium for catastrophe insurance is based on a ‘loss cost’ plus ‘catastrophic loss cost’, expenses, and a profit margin.⁴⁷ Loss costs are broken down to line and can be considered a ‘wholesale price’ to which expenses and a profit margin are added to form the ‘retail cost’ of insurance that the policyholder faces.⁴⁸ To satisfy the first insurability condition, an insurer must be able to set a “loss cost” and a “catastrophic loss cost”. Catastrophic modeling firms provide information on the wholesale price for catastrophic losses,

⁴² American Insurance Association, Testimony for the National Association of Insurance Commissioners (NAIC) 9/28/2007 Public Hearing on Catastrophe Modeling.

⁴³ See *supra* note 42. See also New York Times Magazine, In Nature’s Casino, by Michael Lewis, August 26, 2007; <http://www.nytimes.com/2007/08/26/magazine/26neworleans-t.html> (Accessed 2/1/08)

⁴⁴ Catastrophe Modeling: A Vital Tool in the Risk Management Box, Feb. 2008. By Claire Wilkinson, VP-Global Issues, Insurance Service Office.

⁴⁵ See *supra* note 39.

⁴⁶ *Id.*

⁴⁷ Conversation with Eric Nordman, NAIC, March, 2008.

⁴⁸ *Id.*

providing the insurance industry with ‘advisory loss costs’ or loss cost estimates for catastrophic events.⁴⁹

Rate setting also considers concerns for adverse selection, moral hazard, correlated risks as well as uncertainty associated with the risk.⁵⁰ Adverse selection occurs when the insurer cannot distinguish (or does not discriminate through price) between the expected losses for different categories of risk, while the insured, processing information unknown to the insurer, selects a price/coverage option more favorable to the insured.⁵¹ In this situation, the highest risks will purchase insurance while lesser risks will not, and the insurer will lose money on each policy sold. Moral hazard occurs when the policyholder adopts more careless behavior after purchasing insurance, causing an increase in the expected loss caused by the behavior of the policyholder.⁵² Correlated Risk refers to the simultaneous occurrence of many losses from a single event. Natural disasters, for instance, produce highly correlated losses due to the nature of the event.

Other concerns will influence insurance rate-setting. For instance, if the capacity of the insurance industry is reduced due to large losses, such as was the case after Hurricane Andrew and the Northridge earthquake, then premiums will rise due to a shortage in supply.⁵³ Higher competition may influence an insurer’s rate-setting decision. Add to these factors the role of state regulation in the retail cost of insurance. Although neither states nor the federal government can require an insurer to provide a certain type of coverage, or mandate that an insurer remain within a jurisdiction thereby allowing exit from the market, state governments can require that certain coverage be provided as a condition to the provision of other insurance within the state.⁵⁴ States regulate the premiums insurers can charge, with some states directly affecting rate increases.⁵⁵ States also regulate whether insurers will be able to use catastrophic modeling outputs in their pricing decisions. The use of catastrophe modeling in developing the catastrophic loss cost part of rate filing is also regulated by states.⁵⁶ Moreover, in the wake of the record hurricane seasons of 2004 and 2005 and amid predictions of increased storm activity over the next 15 to 20 years, use of catastrophe models is being widely scrutinized by insurance regulators.⁵⁷ According to them and consumer advocates, greater transparency is needed to understand how the models

⁴⁹ *Id.*

⁵⁰ *See supra* note 39.

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ Michelle E. Boardman, Known Unknowns: The Illusion of Terrorism Insurance, 93 *Geo. L.J.* 783, 788 (2005)

⁵⁵ For a discussion of state regulation, see Robert H. Jerry, II, *Understanding Insurance Law* 35 (3rd Ed. 2002).

⁵⁶ *See supra* note 37.

⁵⁷ *See supra* note 42.

function⁵⁸ and why some models use different time horizons to project future catastrophic events.⁵⁹ As a result, in the states of Florida and Louisiana, insurance regulators limit the use of catastrophe models to develop catastrophic loss costs.⁶⁰ Add to this actuarial standards and statutory rules that limit the application of these models.⁶¹

2.2. Post-TRIA Environment: Applying Conditions of Insurability to Terrorism Risk

Is terrorism risk outside the well proven principles of “insurability”? What are some limitations and does the current regulatory environment solve these? While there is evidence that mandated participation in TRIA stabilized the insurance market by diversifying the risk base, many continue to feel that terrorism risk is uninsurable because the conditions do not hold.⁶²

2.2.A. *Calculating Risk and Setting Premiums*

TRIA pushed insurers into a new territory by forcing them to make difficult pricing decisions regarding terrorism risk. The fact that insurers have not succeeded in calculating risk to the degree they desire and setting premiums that they can defend is due in large part to the computational challenges involved in calculating terrorism risk. Terrorism risk is a combination of possessing the intent and capability to exploit vulnerability in an asset (threat), identifying a weakness in an asset that can be exploited (vulnerability), and causing physical, mental, and societal losses resulting from an attack (consequence).⁶³ Risk can be national, regional, community, and facility-based. Even with these terms defined, calculating risk is computationally challenging inasmuch as the nature of terrorism as a “low-probability, high-consequence” event, making it difficult to estimate the chance that an event will occur and the

⁵⁸ The Orlando Sentinel, State panel to review insurers’ hurricane-risk models, by Anika Myers Palm, January 28, 2008.

⁵⁹ See *supra* note 37 (noting that some hurricane models use time horizons ranging from 5 to 30 years.)

⁶⁰ *Id.*

⁶¹ Catastrophe Exposures and Insurance Industry Catastrophe Management Practices, American Academy of Actuaries Catastrophe Management Working Group, June 10, 2001.

⁶² See *supra* note 10. See also Testimony of Debra T. Ballen, American Insurance Association, NAIC Public Hearing on Terrorism Insurance Matters, March 29, 2006.

⁶³ Lloyd Dixon and Robert Reville, “National Security and Private- Sector Risk Management for Terrorism,” in Philip Auerswald and others, eds., *Seeds of Disaster, Roots of Response: How Private Action Can Reduce Public Vulnerability* (New York: Cambridge University Press, 2006), pp. 292–304; and Peter Chalk and others, *Trends in Terrorism: Threats to the United States and the Future of the Terrorism Risk Insurance Act* (Santa Monica, Calif.: Rand Corporation, Center for Terrorism Risk Management Policy, 2005), available at www.rand.org/pubs/monographs/MG393/ (Accessed 2/1/08)

consequences related to it.⁶⁴ According to Risk Management Solutions (RMS), a terrorism risk modeling firm, the strategic challenge with regards to risk assessment is not in the risk scenarios themselves, but in estimating the likelihood or probability of these attacks.⁶⁵

While prediction models for terrorist risk are still in their infancy, three proprietary catastrophe modeling firms with wide expertise in natural catastrophe modeling have developed terrorism risk models for insurers: The Insurance Service Office's (ISO) subsidiary AIR Worldwide Corporation (AIR), RMS, and EQECAT (EQE).⁶⁶ Insurers, reinsurers, rating agencies, risk managers and major insurance brokers license models from these firms while others develop their own models. To be sure, catastrophe models aid in assessing terrorism risk and developing 'loss costs' to aid the rate-making process. Yet, as much as catastrophe models specializing in terrorism may aid in rate-setting, concerns for the insurability of terrorism risk remain that are unique to pricing terrorism as a risk.

For one, pooling of risks is unavailable for terrorism coverage thereby constraining insurer ability to mitigate market risk. Normally, once an insurer has estimated the probability of an event occurring, it can achieve a predictable level of losses by pooling homogenous, but uncorrelated, risks. In other words, the insurer no longer faces the individual clients' risk levels, but a relatively stable average of all risks. This is difficult to do with terrorist events because of the high correlation of insured losses within a region. Similar to earthquakes, acts of terrorism have the capacity to be geographically focused events – when one occurs many claims are concentrated in a single area. For this reason, insurers are hesitant to offer many policies in an area facing the same hazard such as New York City and Washington D.C.

Insurers covering terrorism also face low transfer of risk or "risk spreading" because the large losses of a few are distributed through an insurer to a large number of premium payers, each of whom pays a relatively small amount. Typically, the larger the number of premium payers, the more accurately insurers are able to estimate probable losses to calculate the amount of premium to be collected from each. Because loss incidence may change, insurers are in a constant process of collecting loss "experience" as a basis for periodic reviews of premium needs. With terrorism, however, industries that are more exposed to risk will be most likely to purchase coverage leading to adverse selection concerns.

⁶⁴ See *supra* note 8.

⁶⁵ Statement prepared by Risk Management Solutions, Inc. (RMS) for the NAIC Terrorism Insurance Implementation Working Group, Public Hearing on Terrorism Risk Insurance Matters, March 29, 2006.

⁶⁶ See *supra* note 63.

Adverse selection occurs when higher-risk consumers purchase policies at premiums more appropriate for lower-risk consumers. Insurers set a rate schedule to capture the varying risk among policyholders.⁶⁷ However, they often fail to differentiate the premium schedule widely enough, due to regulatory controls or other reasons. Therefore, insurers will still incur losses because the premium differential fails to separate out high-risk consumers.

Difficulties, both institutional and actuarial, remain if insurers are to be the appropriate mechanism for pricing and managing risks from terrorist attacks. State regulation presents obstacles to accurate pricing. For some, the traditional statewide rating approach is completely unsuitable for pricing terrorism in so much as an office worker in Times Square equals the same premium as office worker in Rochester. Moreover, the pricing of terrorism risk insurance depends on being able to model threat, vulnerability and consequence of a specific event with some level of accuracy. The limited number of terrorist events from which to specify a probability leads to ambiguity in pricing which in turn presents an actuarial challenge in terrorism risk modeling. Actuarial challenges are technical and informational and not as easily ameliorated by public policy.⁶⁸ In a study of underwriter pricing behavior, Kunreuther found that for the case where both the probability and losses were ambiguous, the premiums were between 1.43 and 1.77 times higher than if underwriters priced a non-ambiguous risk.⁶⁹

2.3. Market Capacity

While some justify a continuing federal role in the market for terrorism risk insurance by arguing that terrorism risk is uninsurable, others simply argue that the market lacks sufficient capacity to withstand a terrorist attack. To be sure, the market for terrorism risk insurance has evolved since 9/11 to make coverage available and affordable against future terrorist attacks. However, there is uncertainty on whether large loss events could be covered.

Since 9/11 industry capacity has increased as each round of insurance legislation made terrorism insurance more available at affordable prices. The percentage of companies buying terrorism coverage, or “the take-up rate,” initially increased sharply after the enactment of TRIA, and an upward trend continues.⁷⁰ According to Marsh Inc., take-up rates increased to 58% at the

⁶⁷ For example, with earthquake insurance, high risk is associated with unbolted foundations, unfastened water heaters, and unbraced chimneys.

⁶⁸ See *supra* note 8.

⁶⁹ *Id.*

⁷⁰ Congressional Budget Office, “Federal Reinsurance for Terrorism Risks: Issues in Reauthorization.” August 2007. Pub. #2940

end of 2005, while the price of terrorism insurance declined.⁷¹ The proportion of U.S. businesses that purchased terrorism rose from 27% in the beginning of 2003, 33% in the end of 2003, to 44% in the beginning of 2004, to 60% by the end of 2005.⁷² This includes terrorism as part of property contracts as well as stand-alone policies. While the purchase of coverage increased by only 1% in 2006, the take-up rate jumped to 64% in the first half of 2007.⁷³ Even if terrorism insurance coverage participation could be made mandatory (1) because everyone is exposed to the threat of terrorism, and no one knows where the next terrorist event will take place, although there is a belief that it is only a matter of time⁷⁴, the rise in take-up rates does not warrant this.

One may argue that take-up rates vary by industry and geography. Real estate, financial institutions and health care have had the highest take-up rates with each exceeding 75%.⁷⁵ Next were media companies at 74%, hospitality firms at 69% and transportation companies and educational institutions at 65%. With respect to geography, in 2005 take up rates in the West rose significantly from 34% to 53% and in the Northeast from 53% to 67%. Take-up rates remain highest in the Northeast, where about two-thirds of firms purchase coverage.⁷⁶ In terms of pricing, since 2003, the price of coverage for terrorism insurance has declined both relative to property and casualty premiums and in absolute dollar amounts. The average rates for terrorism dropped 25% from 2004 to 2005.⁷⁷

The statistics cited above give the impression that the availability and affordability of insurance has raised the industry's capacity to withstand a conventional attack, yet capacity remains a concern among reinsurers and insurers alike. While industry capacity has risen, more information has been developed on the range of possible losses. Whether or not one believes that there is sufficient capacity largely depends on the surplus measure one is using and the type of terrorist event one is using to estimate the loss. Take as a benchmark insured losses resulting from 9/11 estimated at \$40 million. Simulations of conventional attacks can range in losses from \$2 billion (1-ton truck bomb) to \$66 billion (10-ton truck bomb), while NCBR attacks are

⁷¹ Marsh Inc., "Marketwatch: Terrorism Insurance:2006 Market Conditions and Analysis"(2007), pp. 1–2, available at http://global.marsh.com/news/articles/terrorism/documents/MarketwatchTerrorism_2006.pdf (Accessed 2/1/08). The survey by Marsh Inc., an insurance broker, covered 1,437 companies. It included Marsh's clients which is mostly drawn from the nation's largest 5,000 firms and for this reason does not include small companies.

⁷² *Id.* See also the Wharton Risk Management and Decision Processes Center at the University of Pennsylvania, Study on Terrorism Risk Insurance (noting that nearly 50% of commercial enterprises through 2005 have purchased terrorism insurance).

⁷³ See *supra* note 24.

⁷⁴ Robert Rhee, (2008). "Terrorism Insurance is Corporate Welfare".

⁷⁵ See *supra* note 28. See also *supra* note 19.

⁷⁶ James Macdonald, "Terrorism, TRIA and a Timeline to Market Turmoil?" ACE USA, presentation before the real estate Roundtable, April 22, 2004.

⁷⁷ This is measured as both a percentage of property premium and as the rate (premium divided by total value).

simulated to cost approximately \$2 billion (chemical attack) to \$1.9 trillion (nuclear attack).⁷⁸ To determine whether the insurance industry has sufficient surplus, or claims paying capacity, we need to consider the different types of surplus measurements. The entire insurance industry surplus is estimated at \$687 Billion.⁷⁹ The surplus insurers allocate to the insurance lines covered by TRIA is the entire surplus minus the surplus for lines not covered by TRIA. In 2007, RAND estimated the surplus insurers allocate to the lines covered by TRIA to be between \$120 billion-\$240 billion, or one-third the entire surplus.⁸⁰ A third measurement of surplus is the fraction of surplus. This ratio is used by credit rating agencies (e.g., A. M. Best or S&P) as a measure of industry health. Rating agencies downgrade firms if losses exceed too large a fraction of industry surplus (today it is 10%) because the economy might be affected as insurance became more expensive, not only for terrorism but for auto, property, and other insurance lines

The measure I use when discussing industry surplus for terrorism risk insurance is the surplus for lines covered under the legislation. Insurers, either directly or through guarantee funds, pay the entire insured loss until the industry surplus attributable to TRIA lines is spent. Combining the Rand surplus figure of \$120-\$240 billion with worldwide reinsurance capacity valued at \$4-6 billion, the surplus is at most valued at \$246 billion. In sum, comparing the surplus estimate of \$246 billion with the estimated losses from conventional and non-conventional attacks, it is questionable whether the industry can shoulder the losses from a multiple conventional attacks, much less one NCBR attack. While NCBR attacks are currently excluded from coverage, they are being considered for inclusion in the future. The scale of potential losses alone may justify continued government involvement.

Short of preventing a high-loss terrorist attack, various measures can be taken to increase capacity. For one, tax and regulatory policies such as capital constraints and financial requirements which limit insurers from raising sums of private investment constrain capacity.⁸¹ Insurers are limited by legal obstacles to industry-wide pooling and regulatory restrictions such as mandatory terrorism coverage for workman's compensation. Add to this the fact that many real estate investors with large portfolios would likely be in default of their mortgages being unable to obtain the coverage required by their lender.⁸² This is due to the fact that mortgages today are securitized, and those mortgage-backed securities are held by pension funds, annuities, and

⁷⁸ Lloyd Dixon, Robert J. Lempert, Tom LaTourrette, Robert T. Reville "The Federal Role in Terrorism Insurance: Evaluating Alternatives in an Uncertain World", Working Paper, RAND Center for Terrorism Risk Management Policy (2007).(figures use RMS Model Scenarios and Output)

⁷⁹ Estimated \$687 Billion for 2007 by A.M Best

⁸⁰ See *supra* note 78. See also Report of the President's Working Group on Financial Markets p. 45

⁸¹ See *supra* note 19.

⁸² See *supra* note 24.

mutual funds across the country.⁸³ Without TRIA, those securities would be worth far less to their investors today. While some would say that the need for this coverage may be more critical in urban areas, the economic impacts are felt nationally.⁸⁴

Tied to this is a concern for surplus impairment risk. Statutory accounting requires insurers to set aside reserves for the ultimate liabilities arising from the insurance policies they underwrite.⁸⁵ Insurers are not allowed to post reserves for losses that have not occurred.⁸⁶ Therefore, insurers are not allowed to post reserves specifically related to catastrophic losses from natural perils or terrorism until they actually occur.⁸⁷ As a result, catastrophe losses deplete insurer's capital and surplus base intended for the security of all policyholders.⁸⁸ Also related to capacity are pre-loss concerns. Nearly all insurance assumes that premiums are paid first, normally at the inception of the policy (in terrorism programs of pools, private and public sector solutions, such as TRIA, often use a combination of pre-loss and post-loss funding).⁸⁹

Finally, there is evidence that reinsurers will not enter the market, and that “cat bonds” and stand-alone insurance market (as opposed to multi-line carriers) will not provide a meaningful amount of capacity for the foreseeable future.⁹⁰ After 9/11, reinsurers pulled out of insuring terrorism coverage and never re-entered this market. Even though TRIA created a defined layer for reinsurers to participate in sharing the retained risk of loss that primary companies face under the federal terrorism program,⁹¹ the consensus is that reinsurers will not be able to provide enough capacity to replace TRIA coverage in the foreseeable future.⁹² After all, reinsurers made a market driven decision not to enter the market in 2006 when TRIA was nearing its expiration date.⁹³ Similarly, while cat bonds may play an increasingly important role as a supplement to the traditional reinsurance market, they are unable to increase the availability

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ *See supra* note 28. *See also supra* note 19.

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *See supra* note 11 (Noting that, according to a report sponsored by Guy Carpenter, 2005 was a strong year for the cat bond market in terms of the capital issued and the number of bonds placed. Almost \$2 billion in bonds were issued which was a 74% increase over 2004. But Hurricane Katrina dampened the market with a total loss of principal of \$190 million to a bond issued by Kamp Re 2005 Ltd. resulting in capacity tightening by the end of 2005. As a result of the large number of cat losses in 2005, transactions settled at yields considerably higher than the 2004 issues.)

⁹¹ Testimony of Franklin W. Nutter, President, Reinsurance Association of America, Before the Terrorism Insurance Implementation Working Group, National Association of Insurance Commissioners, March 29, 2006.

⁹² *Id.*

⁹³ Testimony of Robert Detlefsen, Director, Public Policy, National Association of Mutual Insurance Companies before the NAIC Terrorism Insurance Implementation Working Group, March 29, 2006.

of coverage of terrorism exposure.⁹⁴ Others point to the potential of the stand-alone market which can provide global and non-certified coverage, can offer multi-year policies and can be placed on a non-cancelable basis. Yet, while capacity in the stand-alone market has remained a fairly consistent \$1-\$2 billion over the past several years, some question whether it will offer a long-term solution to creating significant capacity.⁹⁵

Suggestions to improving capacity include: (i) modifying statutory requirements and mandating participation for all companies in a national program,⁹⁶ (ii) ensuring the ability to file and use rates for terrorism insurance without state approval or a waiting period⁹⁷, (iii) allowing pre-event and post-event assessment authority for a reinsurance facility, (iv) allowing pre-event and post event bonding authority for a reinsurance facility, ensuring “reinsurance treatment” under state laws for premiums to be paid to the reinsurance facility, and (v) allowing voluntary pooling between primary insurers.⁹⁸ Insurers also frequently cite the role for tax policy-based incentives to enhance insurer’s ability to accumulate capital.⁹⁹ This may include encouraging voluntary accumulation of pre-tax funds in reserve for handling losses,¹⁰⁰ to providing favorable treatment for the formation of a voluntary terrorism insurance pool between primary insurers,¹⁰¹ or an industry specific risk retention group (e.g., real estate).¹⁰² In terms of risk-spread, a mutual pool does not create a net additional capital, though it may increase the efficiency with which existing capital is deployed.

3. MORAL HAZARD AND CONCERNS FOR RISK MITIGATION

As previously noted, a continuing federal role in regulating terrorism risk insurance beyond 2014 may be justified based on insurability and/or capacity concerns. Given this, the question remains whether the private insurance industry and policymakers can also correct some of the distortions caused by regulation. The remainder of this paper focuses on moral hazard, a problem any future terrorism insurance legislation will need to address. Terrorism insurance

⁹⁴ See *supra* note 90.

⁹⁵ See *supra* note 28. See also *supra* note 19.

⁹⁶ Statement submitted by William P. Bowden, Jr., General Counsel, Willis Group Holdings Limited to National Association of Insurance Commissioners at a Public Hearing on Terrorism Insurance Matters, March 29, 2006.

⁹⁷ Comment by Reynold Becker, Vice President, Commercial Lines and Claims, Property Casualty Insurers Association of America. PCI is composed of more than 1,000 member companies, writing over \$184 billion in annual premium, which is over 40% of the nation’s property/casualty insurance.

⁹⁸ *Id.*

⁹⁹ See *supra* note 68.

¹⁰⁰ See *supra* note 96.

¹⁰¹ *Id.*

¹⁰² See *supra* note 97.

legislation may have made the cost of insurance more accessible; however, terrorism insurance legislation also interferes with normal insurance price-setting behavior. As a result, the real cost of the risk is not translated into the price of insurance and policyholders lack incentives to reduce risk or take precaution, often leading to the adoption of risk-preferring behavior, or moral hazard. Without accurate pricing, policyholders are unable to consider the tradeoffs to making mitigation investments and purchasing insurance, and the benefits of adopting mitigation incentives, such as reducing post-event losses, decreasing risk levels and increasing our nation's ability to protect critical infrastructure from a terrorist attack, disappear. Even worse, when firms fail to take measures to reduce risk-taking behavior they increase our nation's overall vulnerability to terrorist attack creating a negative externality.

A Congressional Budget Office report cited that “commercial policyholders as a group are not taking significant steps to avoid or mitigate terrorism risks associated with their existing properties”.¹⁰³ Thus, the role of creating incentives for corporations to increase security and proactively plan for consequences of an attack – practicing risk mitigation – has been added to the list of future modifications to original TRIA.¹⁰⁴ This section begins by identifying potential mitigation strategies and discussing how terrorism risk insurance legislation has failed to provide these incentives. It concludes by suggesting how legislation can be modified to encourage adoption of mitigation strategies by offering several price-based incentives.

3.1 Defining Mitigation Strategies

Mitigation is defined as the process of reducing the potential impact of an attack, natural disaster, or accident by introducing system redundancy and resiliency, reducing asset dependency, or isolating downstream assets.¹⁰⁵ It is generally difficult to motivate individuals to mitigate risk through voluntarily adopting loss prevention measures, however. Using the case of an earthquake, hazard insurance reduces the cost of rebuilding and makes the homeowner feel more secure and less interested in adopting mitigation measures. For this reason, several mechanisms exist to encourage mitigation. Many involve a combination of engineering alternatives, management, and financial mechanisms and include: (i) geographic relocation, construction of new offices, plants, or other commercial buildings that are inherently more secure and enhancing the structural security of already existing buildings; (ii) introducing other

¹⁰³ See *supra* note 70.

¹⁰⁴ See *supra* note 102. See also *supra* note 8.

¹⁰⁵ U.S. Department of Homeland Security, National Infrastructure Preparedness Plan (NIPP), p.45

forms of security, such as screening or monitoring devices; (iii) local government enforcement of building codes, and banks and other financial institutions requiring inspections of buildings as a condition for mortgages.¹⁰⁶

Most of the above mitigation strategies can be applied to terrorism. To the extent a business has flexibility in where it chooses to locate its base of operation and no significant economic effects result from a decision not to locate in an urban area¹⁰⁷, locating a business outside of high-profile, landmark buildings and in high-density areas such as New York City and Washington, D.C., will decrease risk exposure to terrorism.¹⁰⁸ Evidence suggests that businesses adopted such a mitigation strategy after 9/11, inasmuch as vacancy rates increased significantly for landmark buildings such as the Sears Tower in Chicago, the tallest building in the U.S., and for buildings in close proximity while vacancy rates increased much less in other areas of the city.¹⁰⁹ Another way to mitigate risk is to harden a target by constructing more resilient structures or reinforcing existing structures. There is evidence that business are investing in self protection by introducing terrorism-related safety improvements to both the interiors and exteriors of buildings such as: creating better air-filtration systems, designing stairwells that facilitate evacuation, installing barricades around building perimeters and installing metal detectors for screening visitors or security cameras to monitor activity both inside and outside a building.¹¹⁰

3.2. Financial Mechanisms

¹⁰⁶ Kunreuther, H. (1996) Mitigating disaster losses through insurance. *Journal of Risk and Uncertainty*, 12 (2,3), 171-187. See also Daniel Aunon-Nerin and Paul Ehling, "Why Firms Purchase Property Insurance," Swiss Finance Institute Research Paper No. 07-16 (May 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=972120 (Accessed 2/3/08)

¹⁰⁷ Edward L. Glaeser, "Urban Colossus: Why Is New York America's Largest City?" *Economic Policy Review*, Federal Reserve Bank of New York, vol. 11, no. 2 (December 2005), pp. 8-23, available at www.newyorkfed.org/research/epr/05v11n2/0512glae.pdf (Accessed 2/3/08)

¹⁰⁸ Edward L. Glaeser and Jesse M. Shapiro, "Cities and Warfare: The Impact of Terrorism on Urban Form," *Journal of Urban Economics*, vol. 51, no. 2 (March 2002), pp. 205-224.

¹⁰⁹ Vacancy rates for three Chicago landmark properties and the immediate surrounding area rose from 9% in 2001 to 17% in 2006. By contrast, the vacancy rates in other areas of Chicago increased much less—from 7% to 12.3%. See Alberto Abadie and Sofia Dermisi, "Is Terrorism Eroding Agglomeration Economies in Central Business Districts? Lessons from the Office Real Estate Market in Downtown Chicago" Working Paper No. 12678 (Cambridge, Mass.: National Bureau of Economic Research, November 2006), available at www.nber.org/papers/w12678.pdf (Accessed 2/3/08)

¹¹⁰ James W. Macdonald, "Preparing for Catastrophes in the Workplace" (presentation given at the National Academy of Social Insurance Policy Research Symposium on "Health and Income Security for Injured Workers: Key Policy Issues," Washington, D.C., October 12, 2006), available at www.nasi.org/usr_doc/James_Macdonald_NASI_Presentation_10_12_06.pdf (Accessed 2/3/08)

Building owners and operators can reduce their risks from terrorism through private and public financial mechanisms.¹¹¹ Market-based incentives use rewards to encourage decision makers for selecting one choice over another in the marketplace.¹¹² Incentives can be transmitted via private relationships and transactions among building owners and insurers, tenants, employees, potential buyers, and lenders.¹¹³ Since all of these parties may benefit from a buildings' reduced vulnerability, each relationship is a potential transmission mechanism of rewards for risk mitigation activities.¹¹⁴ Public incentives are explicitly designed public policy instruments that encourage decision makers to make certain choices over others.¹¹⁵ The Department of Homeland Security National Infrastructure Protection Program (NIPP) Program is an example of one such instrument and will be discussed in the following section.

3.2.A. *Market-Based Financial Incentives (Insurance)*

Insurance is a private market solution developed to mitigate risk. Insurance firms can mitigate policyholder exposure to terrorism losses by offering coverage such as worker's compensation, property damage, business interruption, event cancellation, and liability insurance for acts of terrorism¹¹⁶ and by offering reductions in insurance premiums for buildings that have protective measures in place.¹¹⁷ "Experience pricing" is used to set the policyholder's premiums based both on the policyholder's individual actions and on its similarity to a group of other policyholders, while "mitigation-based pricing" is used offer policyholders the option to affect the premiums they pay by decreasing risky behavior or increasing precautions. Other private sector incentives include linking insurance premium reductions with long-term loans and offering more favorable insurance policies, such as those that are longer term, have lower deductibles, or have less exclusion. Among these, our focus is on mitigation-based pricing.

Insurance industry use of mitigation-based pricing is neither uniform nor widespread. Current terrorism insurance premiums are tiered to some extent. Policyholders can choose to adopt terrorism risk mitigation strategies such as placing concrete barriers in front of trophy targets to discourage truck bombs and the insurance industry will consider such information

¹¹¹ See *supra* note 8.

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ See *supra* note 106.

when underwriting and pricing risks.¹¹⁸ Security is taken into account when calculating loss costs for an area and for individual account at the time the company negotiates its insurance premium.¹¹⁹ When AIR calculates loss costs, for example, “there is a presumption of security in an area”, average “in territory based at the zip code level”.¹²⁰ Costs are based on models and engineering studies performed on specific buildings or a group of buildings and how an attack on one building affects damage on an adjacent building. Firms use these reports to lower their insurance premiums¹²¹ and insurers take their word without hiring inspectors to evaluate the safety and security of those seeking terrorism coverage.¹²² In the end, pricing will differ by type of structure, by surroundings, by industry and by state due to regulatory differences.¹²³

To date, acceptance of mitigation based pricing has been slow. Evidence suggests that mitigation measures have had minor impact on insurer prices due to insurer unfamiliarity with mitigation measures. For instance, even with the long established industry for hurricane insurance, it took time building codes to affect insurance pricing.¹²⁴ This may be due to a regulatory constraint and not unfamiliarity with mitigation measures, however, for it is unclear whether (and how) state rate restrictions on premiums that insurers are allowed to charge in hazard-prone areas impact the availability of coverage and their incentive to encourage mitigation. Insurance companies benefit from risk mitigation measures through fewer claims due to lower risk of an attack and lower loss claims should an attack occur.

At the same time, building owners and operators cannot fully rely on insurance markets to reduce terrorism risk. Terrorism is unique in that terrorists can alter their behavior to defeat mitigation efforts in ways natural disasters cannot (a hurricane will not change course to avoid an area with homes built to code), and places prone to loss may change on a moment’s notice.¹²⁵ The nature of terrorist threat makes it hard to provide strong mitigation incentives in locations other than metro centers (where take-up rates are the highest). For example, in rural areas the

¹¹⁸ Response to the President’s Working Group. April 21, 2006. Pg. 12 of 30.

¹¹⁹ See <http://www.air-worldwide.com/public/html/newsitem.asp?ID=1359> (Accessed 2/1/08)

[note that the distributions take into account injuries that result from damage to the building (airborne debris and collapsing building elements), and the direct effects of overpressure waves. The injury loss data in the updated model uses state average claim costs by injury type based on the latest three policy periods of historical claims, as reported to the NCCI. Benefits were brought to their current levels and medical costs and wages were trended using regional indices.] See also Conversation with Jack Seaquist, AIR, March, 2008.

¹²⁰ Conversation with Jack Seaquist, AIR, March, 2008.

¹²¹ *Id.*

¹²² Statement of Peter R. Orszag, senior fellow, Brookings Institution, “Homeland Security and the Private Sector,” before the National Commission on Terrorist Attacks Upon the United States, November 19, 2003, available at www.brookings.edu/views/testimony/orszag/20031119.pdf (Accessed 2/3/08)

¹²³ *Id.*

¹²⁴ See *supra* note 120.

¹²⁵ See *supra* note 118.

terrorist threat may be perceived as low meaning that the insurance system may not provide strong economic incentives for expensive investments in mitigation.¹²⁶ These factors make it difficult for the insurance system to encourage mitigation to the same extent it can for natural disasters for instance.¹²⁷ It is possible, however, that in the long term our understanding of which mitigation efforts are effective will allow for more refined underwriting and pricing.¹²⁸

It is important to note that insurance mechanisms mitigate risk only to the extent that coverage is accurately priced. Investors want to know that their spending will have a return on their investment. Efficient incentives to mitigate risk can only be given when there are signals of the costs and benefits. Normally, insurance has the advantage that it rewards individuals prior to a disaster for investing in loss reduction measures through lower premiums thereby providing incentives to policyholders to take appropriate risk avoidance steps. The challenge lies in determining how responsive insurance markets are to pricing that rewards mitigation measures.

3.2.B. Government Financial Incentives

Does current federal regulation of terrorism risk insurance encourage the adoption of precautionary measures to mitigate risk? Surely the large retention and co-payment requirements for losses above the retention found in terrorism risk insurance legislation require commercial insurance companies absorb significant losses before the federal backstop is available provide incentive to encourage mitigation.¹²⁹ However, because TRIA's reinsurance coverage is essentially cost-free for insurers regardless of the degree to which insurers require and enforce mitigation measures, it does not provide incentives for insurers and individual policyholder to model, develop, and implement quantifiable risk mitigation measures, as has been done in other insurance markets.¹³⁰ By decreasing substantially the loss they must bear from an attack, terrorism risk insurance legislation provides a disincentive to mitigate post-event insurance losses by increasing moral hazard and risk-taking by businesses.¹³¹ A larger concern left for

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.* See also Business Insurance <http://www.businessinsurance.com/cgi-bin/news.pl?newsId=11066> (noting that the global governments should not rely on reinsurers to fill in capacity gaps should they decide not to back state terrorism insurance pools. Of particular concern is the German government's recent decision to not extend its 8 billion euro guarantee for the *Extremus*, Germany's national terror insurance pool.) (Accessed 2/1/08)

¹³⁰ This is not to say that insurers, reinsurers, and others are not engaged in efforts to more effectively model the terrorism risk. Rather, that the current TRIA structure does not provide an adequate incentive to do so.

¹³¹ For an early treatment of moral hazard see Kenneth Arrow, Uncertainty and Welfare Economics of Medical Care, *53 Am. Econ. Rev.* 941(1963). See also Congressional Budget Office, "Federal Reinsurance for Terrorism Risks: Issues in Reauthorization." August 2007. Pub. #2940

future study is the desire for local economic development—often in higher risk areas — which may conflict with long-term mitigation goals and the cost of mitigation may limit the amount of activities that occur.

The adoption of precautionary measures can be encouraged by modifying terrorism risk insurance legislation to include price-based incentives. Shortly after 9/11 and before passage of TRIA, mitigation measures were tied to underwriting acceptability, not to pricing.¹³² Today, we know more about reducing post-event losses, and the belief that pricing can be used to motivate consumer behavior – specifically to mitigate risk – is gaining appeal in terrorism risk insurance. Mitigation efforts can be improved by providing policyholders the option of “buying down” to different pricing levels based on mitigation investments, as well as motivating insurers to “buy down” to various lower deductible levels¹³³ or to set premiums at different rates to increase mitigation, a practice known as “mitigation-based pricing” or “tiered pricing”. Any of these approaches has the potential to reduce the government’s exposure to post-catastrophe payouts,¹³⁴ and accelerate the development of private terrorism insurance coverage, thereby reducing the need for Federal involvement over time. At the same time, identifying mitigation measures and linking them to pricing through discounts assumes the following: (1) that pricing terrorism insurance is possible, (2) that consumers are responsive to price discounts and (3) that mitigation measures are identifiable.

3.3. Improving Mitigation-Based Pricing

As previously discussed, acts of terrorism differ vastly from natural catastrophes and consequently, significant challenges exist to identifying, quantifying and implementing terrorism mitigation activities – much less pricing them. Mitigation-based pricing has been cited as a market-based and governmental solution to encouraging firm adoption of precautionary measures; yet, efficient incentives to mitigate risk can only be given when there are accurate signals of the costs and benefits which translate into pricing. In this way, only when pricing can be accurately predicted can insurers offer mitigation-based pricing. Pricing accuracy can be achieved through improving modeling techniques and easing regulatory constraints. Models can be improved by combining private and public data sources as well as by including scenarios that

¹³² See *supra* note 8.

¹³³ See *supra* note 97.

¹³⁴ U.S. Government Accountability Office (GAO), July 31, 2007, Statement of William O. Jenkins, Jr. Director, Homeland Security and Justice Issues, Testimony Before the Committee on Oversight and Government Reform, House of Representatives, GAO-07-1142T

are non-conventional and interdependencies. Regulatory constraints can be removed by easing pricing rules and allowing for the widespread use of catastrophic modeling outputs.

Also, while terrorism risk modeling presents certain complexities different from modeling natural catastrophes, pricing models for terrorism risk insurance may take time to develop, they are possible.¹³⁵ Insurers are limited in their ability to accurately price their insurance products by lack of full understanding of costs of terrorist events. Difficulties also surround the acquisition of data – and particularly classified as well as privately held data – that is required to price terrorism risk insurance and mitigation measures. While traditional insurance assumes that emerging issue information is available and shared, in the case of terrorism modeling, information sharing is "asymmetric" in that classified information cannot be shared. Finally, terrorist events are intentional, premeditated, and there is difficulty in identifying what losses may occur. Nonetheless, existing models can be improved to include regional data or firm-level data, and public emergency response data used in input-output, time-series, and computable general equilibrium (CGE) models to estimate local, state, regional and national impacts of catastrophic events.¹³⁶

While the models discussed above are used to estimate economic losses and consequences, insurance industry models are probabilistic, combining measures of threat, vulnerability and consequence. Insurance industry models can be improved by adapting current models for swarm attacks of conventional weapons and NCBR. While it is likely that the insurance industry could absorb the losses in most cases, there are some scenarios that could cripple the insurance industry.¹³⁷ For example, using conventional weapons, it is likely that the industry aggregate retention under TRIPRA would only be reached in case of an extreme swarm attack; yet when we consider NCBR, where there are numerous scenarios that not only exceed the aggregate industry retention but cause more loss than the industry has capital.¹³⁸ Based on the 2006 parameters of TRIEA, RMS estimates that 90% of average annual losses will be retained by the insurance industry, with this share increasing as the retention share increases, and

¹³⁵ Robert H. Jerry, II. Insurance, Terrorism, and 9/11: Reflections on Three Threshold Questions, *9 Conn. Ins. L. J.* 103, 113 (2002) ("There is no obvious reason why pricing models for terrorism coverage cannot be developed").

¹³⁶ Greenberg, Michael R., Lahr, Michael, and Nancy Mantell, (2007) Understanding the Economic Costs and Benefits of Catastrophes and Their Aftermath: A Review and Suggestions for the U.S. Federal Involvement. *Risk Analysis*, Vol 27(1): 83-95 For a discussion of these models.

¹³⁷ Statement prepared by Risk Management Solutions, Inc. (RMS) for the NAIC Terrorism Insurance Implementation Working Group, Public Hearing on Terrorism Risk Insurance Matters, March 29, 2006.

¹³⁸ *Id.*

that in the event of an attack, and the industry aggregate retention will be exceeded less than 10% of the time.¹³⁹ Further research needs to be encouraged in the area of swarm attacks and NCBR.

Finally, modeling techniques can be improved by including interdependency. Structures that are interdependent by geography and and/or by function will differ from buildings that are geographically distributed and independent. For instance, in the standard case, buildings are geographically dispersed but independent from one another such that their physical security and vulnerability are not interdependent. The owner of these facilities will allocate risk mitigation resources among all locations so that the marginal reduction in costs from each additional dollar of protective investment is equal across all facilities. More heavily occupied buildings or buildings in higher risk cities will receive more protective resources than low risk or low value facilities, because the marginal reduction in cost per dollar of protective investment would be highest in these areas.¹⁴⁰ Now consider the case when structures are geographically distributed but interconnected by function, such as telecommunications or data hubs. A cyber terrorism attack or other physical damage at such a facility could adversely impact operations and business continuity at locations that extend the immediate area. When interdependence of structures occurs, building owners and managers are likely to allocate protective resources considering the consequences to all locations of damage to that particular facility. Finally, one could consider structures or systems that are interconnected by geography, such as bridges which are targets which house cables linking telecommunication systems, or rail lines as well, or a trophy skyscraper which has an underground subway connecting point. In these examples, several targets share a common footprint or geographical space.

Easing regulatory restraints would also lead to improvements in pricing. First are legal rules that curb the use of catastrophe modeling such as statutory rules preventing insurers from raising rates based on catastrophe model outputs.¹⁴¹ By law, the rates charged by insurers may not be excessive, inadequate or unfairly discriminatory.¹⁴² When included as part of a rating plan by insurers, catastrophe models are subject to approval by state insurance regulators.¹⁴³ Different states take different approaches when it comes to the use of catastrophe models by insurers in the rate-making process.¹⁴⁴ For instance, Florida and Louisiana expressly limit catastrophe modeling. In 1995, the Florida legislature created the Florida Commission on Hurricane Loss

¹³⁹ *Id.*

¹⁴⁰ *See supra* note 8.

¹⁴¹ *See supra* note 42.

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.*

Projection Methodology to “consider any actuarial methods, principles, standards, models, or output ranges that have the potential for improving the accuracy of or reliability of the hurricane loss projections used in residential property insurance rate filings.”¹⁴⁵ The Commission reviews models and decides to accept, accept subject to modifications, or reject a particular model, model specifications or output ranges. While the Commission’s findings are not binding on the Florida Department of Insurance, they are admissible and relevant when a rate filing is being considered by the Department or in any arbitration, administrative, or judicial proceeding. Similarly in Louisiana, insurers are permitted to use catastrophe computer modeling in formulating rates.¹⁴⁶ While there are no specific laws regarding use or approval of the models, the state requires that the modeling company complete a questionnaire and file the model with the state. Insurers are also required to file a form identifying the model and its direct effect in the calculation of the insurer’s rates. In addition, to help regulators evaluate the use of the models in the rate-making process the Catastrophe Insurance Working Group of the NAIC published the *Catastrophe Computer Modeling Handbook* in 2001 to discuss issues that have arisen or can be expected to arise from using catastrophe computer models.¹⁴⁷ The handbook provides advice to regulators on evaluating the appropriateness of catastrophe models in establishing rates.

Reforming regulatory and tax treatment for insurers would also improve pricing accuracy. Government taxes increase insurers’ cost of capital and that the government could increase insurance capacity through a combination of tax and regulatory reforms. For example, many state governments cap insurance rates or require insurers to underwrite various lines below cost. Some of these regulations force insurers to provide terrorist-related workers’ compensation, property and casualty coverage at premiums well below actuarial costs. Rates are often restricted in other property and casualty lines as well. Tax laws impede efforts by insurance companies to raise enough capital to cover catastrophic risks. Insurers are required to pay taxes on income earned on its capital reserves even though it is also taxed as corporate income.

4. TWO SUGGESTIONS FOR FUTURE REGULATION

Modifying terrorism risk insurance legislation to include price-based incentives is certainly one approach to reducing moral hazard and motivating adoption of risk mitigation

¹⁴⁵ Florida Statute s. 627.0628., <http://www.flsenate.gov/Statutes/> (Accessed 2/3/08)

¹⁴⁶ The Louisiana Property and Casualty Insurance Commission, A Summary of Legislative Considerations Annual Report 2006-2007, Louisiana Department of Insurance.

¹⁴⁷ NAIC Catastrophe Computer Modeling Handbook, January 2001, <http://www.naic.org> (Accessed 2/3/08)

measures. This section describes conditioning insurance benefits upon adherence to national risk mitigation programs such as the National Infrastructure Protection Program (NIPP). This suggestion introduces a continuing a federal role in terrorism beyond 2014 based on the unique role and responsibility of government to protect our nation against terrorist attacks. By creating TRIA, the federal government created a system that spreads the cost of terrorism risk across all taxpayers. Set aside that that the legislation was crafted to forestall economic crisis in the insurance and housing industries; another justification for spreading the cost across all taxpayers is that, similar to the Patriot Act, TRIA was a piece of “emergency” legislation, passed in reaction to the events of 9/11 to help our nation respond and recover to acts of terrorism.¹⁴⁸ Considering TRIA as part of the national preparedness program or similarly, our nation’s antiterrorism policy, the costs should be borne by taxpayers just as other national security expenses are.¹⁴⁹ Along similar lines, to some degree, victims of terrorism are mostly surrogate targets for attacks mainly aimed at government, and the government is in a unique position to influence the likelihood of attack based upon foreign policy.¹⁵⁰

Conditioning terrorism risk legislation upon the adoption of mitigation measures that are directly tied to national plans and priorities (such as the NIPP) would provide two key benefits, (1) curb moral hazard concerns, and (2) increase insurance market viability (through improvements in pricing). Firm adoption of mitigation measures as required in the NIPP or other national programs would invariably reduce moral hazard concerns which would, in turn, increase market viability as mitigation measures decrease terrorism risk and insurers re-enter the market. As an added benefit, mandating the adoption of mitigation measures will lead policyholders to pressure insurers for pricing discounts, thereby accelerating the use of “mitigation-based pricing”. Catastrophe modelers will be prompted to advance their modeling techniques to include more mitigation measures in their pricing models in order to provide mitigation-based pricing products for their insurer clients (or advisory loss costs that include mitigation measures). Tiered pricing may increase take-up rates (insurers can expand their scope of coverage for a pre-specified probability of insolvency) and risk spreading. As mitigation-based pricing becomes

¹⁴⁸ Alexia Brunet, “Vulnerabilities to Terrorism”, working paper 2008. (noting similarity with grant regulation passed to fund state and local programs to prevent, prepare, respond and recover from acts of terrorism).

¹⁴⁹ Lloyd Dixon and Robert Reville, “National Security and Private- Sector Risk Management for Terrorism,” in Philip Auerswald and others, eds., *Seeds of Disaster, Roots of Response: How Private Action Can Reduce Public Vulnerability* (New York: Cambridge University Press, 2006), pp. 292–304; and Peter Chalk and others, *Trends in Terrorism: Threats to the United States and the Future of the Terrorism Risk Insurance Act* (Santa Monica, Calif.: Rand Corporation, Center for Terrorism Risk Management Policy, 2005), available at www.rand.org/pubs/monographs/MG393/ (Accessed 2/1/08)

¹⁵⁰ Statement submitted by William P. Bowden, Jr., General Counsel, Willis Group Holdings Limited to NAIC at a Public Hearing on Terrorism Insurance Matters, March 29, 2006.

more widespread, terrorism risk will become more insurable ultimately obviating the future role of federal regulation.

4.1. Motivating Mitigation through Direct Regulation

Terrorism risk insurance legislation does not directly mandate insurers to require or policyholders to adopt mitigation measures to reduce terrorism risk. One way to ensure that policyholders adopt mitigation measures, however, without altering current terrorism risk insurance legislation, would be to pass industry-specific legislation requiring regulation of security practices. The Chemical Facility Anti-Terrorism Standards, the new chemical security regulation passed in conjunction with the 2007 Homeland Security Appropriations Act¹⁵¹, exemplifies how a combination of data collection needs and uses places the federal government in the capacity to share the risk with the owner-operator outside of the way in which other, statutory risk sharing mechanisms such as TRIA were designed. It also shows how direct legislation can motivate mitigation investments.

While still in its infancy, the Chemical Facility Anti-Terrorism Standards legislation has already improved information sharing which can be used to mitigate state, regional, and firm-level risk. For instance, the chemical legislation first screens companies to determine if they are considered high-risk; if it is high risk, companies are required to complete a Security Vulnerability Assessment and develop a Site Security Plan, both accessible only to federal regulatory authorities.¹⁵² At each step, federal authorities gain information that was previously unavailable to them and valuable to efforts to mitigate community and regional level risk. In return for sharing information, owner-operators receive site security advice and qualify for grant funding. Whether or not the investments are co-funded by federal authorities, they nonetheless will qualify for insurance pricing discounts, thereby reducing their expected tort liability. It may appear as if mandating adoption of mitigation measures at the industry-level may be a simpler solution than modifying current terrorism risk insurance legislation; however, note that it took many years for the Chemical legislation to pass in Congress, and it only applies to one industry.

4.2. Leveraging Existing Models: The National Infrastructure Protection Program (NIPP)

¹⁵¹ The National Association of Chemical Distributors for a discussion of the chemical security legislation, available at: <http://news.thomasnet.com/companystory/540337>

¹⁵² *Id.*

One key advantage to linking terrorism risk insurance legislation with an existing program is to take advantage of synergies among programs. Such linkages would help with information sharing and create public-private cooperation. In addition, linkages would support the federal programs themselves as the owners/operators of our nation's critical infrastructure adopt mitigation measures, thereby bolstering federal national preparedness goals.

Already, multiple public sector incentives such as well-enforced building codes and design standards, hazard mitigation planning, hazard control structures (levees) help to encourage mitigation measures. Levees help protect existing at-risk areas and strong building codes and design standards can protect structures from a catastrophe.¹⁵³ This section introduces linking TRIPRA with the National Infrastructure Protection Plan (NIPP), developed by the Department of Homeland Security (DHS) in 2005 to protect our nation's critical infrastructure and key resources (CI/KR)¹⁵⁴, in an effort to strengthen the insurance industry, reduce federal government involvement in regulating the terrorism insurance industry over time, and improve national preparedness. Two other insurance programs that focus on natural catastrophes (floods and earthquakes) are provided as examples of how mitigation can be motivated through tiered pricing and lower deductibles.

The NIPP was developed in response to 9/11, after realization that protection of critical assets requires knowledge of terrorist tactics and targets, combined with a comprehensive understanding of critical asset vulnerabilities and the protective measures that can effectively eliminate or mitigate those vulnerabilities and that nearly 85% of the nation's critical infrastructure is privately owned. The NIPP defines the nation's Critical Infrastructure (CI) as "those systems and assets, whether physical or virtual, so vital to the U.S. that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters," and the term 'key resources' (KR) as "publicly or privately controlled resources essential to the minimal operations of the economy and government."¹⁵⁵ The NIPP establishes government and private

¹⁵³ Government Accountability Office (GAO), Report to the Ranking Member, Committee on Financial Services, House of Representatives, "Natural Hazards Mitigation" August, 2007, GAO-07-403

¹⁵⁴ The Homeland Security Act of 2002 established the Information Analysis and Infrastructure Protection (IAIP) Directorate to undertake a major outreach effort to engage all the stakeholders necessary to make the national Critical Infrastructure Protection program a success. Currently, the Office of Infrastructure Protection is under the National Programs and Protection Directorate. For a version of the NIPP see <http://www.educause.edu/ir/library/pdf/CSD3754.pdf>. For a description of the plan, see <http://homeland.house.gov/SiteDocuments/20070726123036-42647.pdf> and <http://www.dtic.mil/ndia/2006hls/dinanno.pdf> (all accessed 2/3/08)

¹⁵⁵ For a description of NIPP, see <http://homeland.house.gov/SiteDocuments/20070726123036-42647.pdf> and <http://www.dtic.mil/ndia/2006hls/dinanno.pdf> (all accessed 2/3/08)

sector councils to identify their most critical assets, to assess the risks they face, and to identify protective measures, in sector-specific plans that comply with the NIPP.

While implementation of the NIPP is still in its infancy, the NIPP provides mitigation objectives for the seventeen CI/KR sectors listed in Table 1, which can be tied to insurance deductibles and premiums. According to the NIPP, the protection of our nation's critical assets includes "actions to mitigate the overall risk to physical, cyber and human critical assets, systems, networks, functions, or their interconnecting links resulting from exposure, injury, destruction, incapacitation, or exploitation"¹⁵⁶ In the context of the NIPP, this includes actions to deter the threat, mitigate vulnerabilities, or minimize consequences associated with a terrorist attack or other incident. Protection can include a wide range of activities such as improving business protocols, hardening facilities, building resiliency and redundancy, incorporating hazard resistance into initial facility design, initiating active or passive countermeasures, installing security systems, leveraging self-healing technologies, promoting workforce surety programs, or implementing cyber security measures, among many others. The NIPP and its complementary sector specific plans provide a consistent unifying structure for integrating both existing and future critical asset protection efforts (the NIPP is also tied to the chemical security legislation discussed earlier).

Under the NIPP, owners and operators generally represent the first line of defense for the CI/KR under their control. The CI/KR protection responsibilities of specific owner-operators vary widely within and across sectors. Some sectors have regulatory or statutory frameworks that govern private sector security operations within the sector; however, most are guided by voluntary regimes or adherence to industry-promoted best practices. In general, owner operators are responsible for taking action to support risk management planning and investments in security and perform activities such as: reassessing and adjusting continuity-of-business and emergency management plans, building increased resiliency and redundancy into business processes and systems, protecting facilities against physical and cyber attacks and natural disasters, guarding against the insurer threat and increasing coordination with external organizations to avoid or minimize the impacts on surrounding communities or other industry partners.¹⁵⁷ While all 17 critical infrastructure sectors have established their respective government councils, and nearly all sectors have initiated their voluntary private sector councils, council progress has varied due to their characteristics and level of maturity. The public health

¹⁵⁶ See *supra* note 105 at 7.

¹⁵⁷ *Id.* at 26.

sector for example, is quite diverse and collaboration has been difficult as a result; on the other hand, the nuclear sector is quite homogenous and has a long history of collaboration.¹⁵⁸

Despite the variance in industry practices, the NIPP is the only existing Federal program with the highest potential for promoting mitigation of terrorism risk and can be linked with TRIPRA. The NIPP unifies national needs and priorities, outlining mitigation measures and goals which can be leveraged and combined with TRIPRA to provide owner-operators with mitigation-based insurance pricing and insurance deductibles. Meanwhile, the NIPP is not the only tool within DHS that can be leveraged for mitigation efforts. DHS, in collaboration with Sector Specific Agencies and other security partners, undertakes a number of protective programs, initiatives, activities and reports that support CI/KR protection such as the Buffer Zone Protection Program (BZPP), Assistance Visits, Training Programs, Control System and Security.¹⁵⁹ This menu of mitigation programs are all linked to the NIPP in one form or another, uniquely position the Federal government to help inform critical security investment decisions and operational planning. Owners and operators already look to the government as a source of security-related best practices and for attack indications, warnings, and threat assessments and rely on government entities to address risks outside of their property or in situations in which the current threat exceeds an enterprise's capability to protect itself or mitigate beyond a reasonable level of additional investment. This encourages public and private sector security partners at all levels to collaborate to address the protection of national level CI/KR. These collaborations and sources of sector-specific mitigation information can be used to provide pricing discounts and lower deductibles for terrorism risk insurance coverage.

¹⁵⁸ Government Accountability Office (GAO), Testimony Before the Subcommittee on Homeland Security, Committee on Appropriations, House of Representatives, "Critical Infrastructure: Challenges Remain in Protecting Key Sectors", March 20, 2007. Report # GAO-07-626T.

¹⁵⁹ U.S. Department of Homeland Security, National Infrastructure Protection Program, p. 47. For a version of the BZPP see <http://sema.dps.mo.gov/BZPP%20Grant%20Program%20Overview%20&%20FAQs%203-1-05.doc> (Accessed 2/3/08)

Table 1: Critical Infrastructure and Key Resource Sectors, Homeland Security Presidential Directive 7

<i>Critical Infrastructure Sectors (CI):</i>	<i>Key Resources (KR):</i>
Agriculture, Food	Commercial Facilities
Public Health	Government Facilities
Drinking Water, Water Treatment	Dams
Defense Industrial Base	Commercial Nuclear Reactors, Materials and Waste
Energy	
Banking and Finance	
National Monuments and Icons	
Transportation Systems	
Information Technology	
Telecommunications	
Chemical	
Emergency Services	
Postal and Shipping	

Source: <http://www.dtic.mil/ndia/2006hls/dinanno.pdf>

The National Flood Insurance Program (NFIP) and the California Earthquake Authority (CEA) present two examples how mitigation can be motivated through insurance using tiered pricing and lower deductibles. First, the NFIP provides an example of how insurance premium discounts can promote mitigation by rewarding property owners for actions they take to reduce the effects of natural catastrophes.¹⁶⁰ Established by the National Flood Insurance Act of 1968 and managed by the Federal Emergency Management Administration (FEMA), the NFIP makes protection against flood losses available to property owners in participating communities.¹⁶¹ The NFIP Community Rating System (CRS) is a voluntary incentive program encourages communities to reduce their flood risks by providing discounts on flood insurance for individuals in communities that establish floodplain management programs that go beyond the minimum requirements of NFIP. Depending on the level of activities that communities undertake in four areas—public information, mapping and regulatory activities, flood damage reduction, and flood preparedness—communities are categorized into 1 of 10 CRS classes.¹⁶² A Class 1 rating provides the largest flood insurance premium reduction (45%) to communities, while a

¹⁶⁰ The National Flood Insurance Program's (NFIP) Community Rating System (CRS) available at: <http://www.fema.gov/business/nfip/crs.shtm> (Accessed 2/3/08)

¹⁶¹ The National Flood Insurance Act of 1968, Pub. L. No. 90-448, title XIII, 82 Stat. 572 (codified as amended at 42 U.S.C. §§ 4001 *et seq.*).

¹⁶² See *supra* note 153.

community with a Class 10 rating receives no insurance premium reduction.¹⁶³ Risk mitigation officials claim that CRS insurance discounts are an effective means of encouraging communities that participate in NFIP to undertake more aggressive flood mitigation.¹⁶⁴ According to FEMA, approximately two thirds of NFIP flood insurance policies contain food insurance discounts.¹⁶⁵ While the CRS program presents a model for tiered pricing that can be encouraged through future insurance legislation to promote risk mitigation, industries can benefit from a rating system such as presented in the CRS program. After all, fire insurance coverage is already linked to an Insurance Service Office (ISO) fire rating system for fire departments. And as previously mentioned, the insurance industry already rates communities according to aggregation of terrorism risk (zones 1- 4) with zone 1 containing the highest risk (New York City, Washington D.C., and Chicago, for example). This suggests that discounts could be provided at the community level by meeting certain mitigation requirements.

Second, states have also developed programs to incentivize mitigation measures through promoting insurance discounts. California state law requires the California Earthquake Authority (CEA) – a privately financed but publicly managed state agency – to offer a 5% discount on retrofitted homes built before 1979 that meet other specifications.¹⁶⁶ The CEA was created in 1996, two years after the Northridge Earthquake. In terms of insured losses, Northridge cost more than three times the total earthquake premiums that California insurers had collected in the quarter-century prior to Northridge and were so great that, fearing insolvency from another massive earthquake, insurance companies dropped some types of coverage and some companies withdrew from the market.¹⁶⁷ This did not seem to have affected the overall supply of insurance, however, as insurers only drop types of coverage that they feel are too risky for them.¹⁶⁸ Nonetheless, to ensure the availability of homeowners’ coverage and end a serious threat to the

¹⁶³ *Id.*

¹⁶⁴ *Id.* (Noting that officials from Palm Beach and Napa River were able to improve their CRS ratings, thereby achieving 10%-25% reductions in their flood insurance premiums. For a contrasting view on the CRS program, see Robert Rhee, (2008). “Terrorism Insurance is Corporate Welfare” (noting that government subsidized flood insurance motivates people to continue to take risks such as continued habitation of high risk areas).

¹⁶⁵ GAO. (2006). “Hurricane Katrina- GAO’s Preliminary Observations Regarding Preparedness, Response, and Recovery,” Washington, D.C.: GAO

¹⁶⁶ Cochrane, H. (1997). Indirect Economic Losses in Development of Standardized Earthquake Loss Estimation Methodology, Vol. 2. Menlo Park, CA: Risk Management Solutions.

¹⁶⁷ Petak, W. and Elahi, S. (2001). The Northridge earthquake, USA and its economic and social impacts. Paper presented at EuroConference on global change and catastrophic risk management earthquake risks in Europe, IIASA, Luxemburg, Austria, July 6-9, 2000. *See also* Cochrane, H. (1997). Indirect Economic Losses in Development of Standardized Earthquake Loss Estimation Methodology, Vol. 2. Menlo Park, CA: Risk Management Solutions.

¹⁶⁸ *See supra* note 74.

vitality of the state's housing market, the California Legislature established the CEA.¹⁶⁹ At its inception the CEA lacked reserves, so the original agreement called for participating companies to cover up to \$2.2 billion in claims before the state made \$8 billion available in the event of a catastrophic quake.¹⁷⁰ While that agreement was set to expire in December 2008, in the summer of 2007 the 17 participating companies pushed for reducing the amount they would be responsible for before the CEA's contribution kicked in.¹⁷¹ Since the CEA has paid out only \$3.5 million in losses for 130 claims since 1996, they argued, the CEA had sufficient reserves to cover even an earthquake similar to the 1906 San Francisco earthquake, which would generate between \$5 billion and \$6 billion in claims in today's dollars.¹⁷² An agreement was reached in September, calling for participating insurers to commit \$1.3 billion to the fund.¹⁷³

While there are many similarities between the framework for regulating terrorism risk insurance legislation and CEA, such as requiring a certain private sector contribution before a government guarantee kicks in, there is much we can learn from the triumphs and failures of the CEA. The CEA was successful early on, yet participation has decreased since then. In 2006 only roughly 12 % of California residents had purchased earthquake insurance, down from about 30% in 1996.¹⁷⁴ To encourage more Californians to purchase coverage, the CEA approved a 22% rate cut in the end of 2006, made possible by a buildup of reserves which came from a drop in the cost of reinsurance and several years without a major earthquake.¹⁷⁵ Another concern is that it is unclear to what extent insurance premium discounts are an incentive to encourage individual homeowners to undertake earthquake mitigation activities.¹⁷⁶ Still, the CEA program presents a model for a private-public sector partnership on insurance matters which is similar to TRIPRA.

5. CONCLUSION

Terrorism presents a unique challenge to the insurance industry. Even after three rounds of terrorism risk insurance legislation, capacity has not been restored, modeling continues to face

¹⁶⁹ *Id.*

¹⁷⁰ Insurance Information Institute white paper, available at <http://www.iii.org/media/hottopics/insurance/earthquake/> (Accessed 2/3/08)

¹⁷¹ *Id.*

¹⁷² *Id.*

¹⁷³ *Id.* (noting that the bill, SB 430, was approved by the Legislature and signed by the Governor on 10/8/07). For a full version of the bill see: http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0401-0450/sb_430_bill_20070917_enrolled.pdf

¹⁷⁴ *Id.* (noting that according to Highline Data LLC, direct premiums written for earthquake coverage in California, excluding the CEA, totaled \$1.06 billion in 2006, or roughly 52% of total U.S. earthquake premiums of \$2 billion. The CEA, the largest provider of earthquake insurance in California, accounted for \$454.5 million of the total earthquake premiums in 2006, down 9.7 % from \$503.4 million in 2005.

¹⁷⁵ *Id.*

¹⁷⁶ *Id.*

obstacles, pricing accuracy has not been achieved, and notably moral hazard is a problem. Current terrorism risk insurance legislation provides a reinsurance backstop to primary insurers with no provisions that influence mitigation decisions. In fact, it provides a disincentive for adoption of precautionary measures. This article suggests that a public-private partnership that exploits the strengths of both sides continues to be the best way forward. For, both government and private markets have their own advantages and disadvantages in the task of providing insurance for terrorism.

One recommendation is to condition terrorism risk insurance legislation benefits upon adherence to other existing risk mitigation programs such as the National Infrastructure Protection Program (NIPP). Insurers would have to provide incentives through tiered pricing and lower deductibles tied to adoption of mitigation measures. An alternative to modifying TRIPRA would be to strengthen federal legislation on mitigation by mandating industry-wide adoption of mitigation measures, as proposed by the 2007 Chemical Legislation. While encouraging mitigation through either plan will increase firm-level, community level, and national preparedness, it also stands to reduce terrorism risk thereby possibly increasing take-up rates and industry capacity. Yet, the fact that FEMA, other federal agencies, and nonfederal stakeholders have collaborated on natural hazard mitigation, but the current approach is fragmented and does not provide a comprehensive national strategic framework for mitigation shows that collaboration for the mitigation of terrorism risk will take time.¹⁷⁷ Finally, other recommendations are noted. Government initiatives to reform the regulatory and tax treatment of the insurance industry (i.e., to remove current market impediments) would better equip the private sector to provide terrorism coverage with decreasing government involvement.

In sum, terrorism risk legislation can be used as a tool for driving risk mitigation and reduction measures by communities and individual high-risk facilities while encouraging maturation of terrorism risk models, ultimately aiding the federal terrorism risk reduction mission while also spurring the development of a private terrorism risk insurance market.

¹⁷⁷ See *supra* note 155.