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The Insurability of Terrorism Risk and the Response of Insurance Law and Regulation—The U.S. Experience and Critiques on Present Taiwanese Regime

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The terrorist attacks on September 11, 2001 inflicted devastating damage resulting in death, injury, business interruption losses, and property damage. The characteristics of terrorism risk prove that in the absence of meaningful actuarial data, insurance coverage is not possible. Such finding may lead to a conclusion that terrorism risks are uninsurable. Owing to such characteristic, Terrorism Risk Insurance Act (TRIA) was signed into law by President Bush on November 2002, to protect consumers by addressing market disruptions and ensure the continued widespread availability and affordability of property and casualty insurance for terrorism risk. The TRIA program, originally destined to be tentative and expire on December 31st 2005, has been extended until Dec. 31, 2027. These extensions again incurred the debate over the appropriateness of the government intervention in terrorism insurance program as well as the length and form of the intervention. In Taiwan, terrorism risks are generally excluded from most all-risk insurance policies unless specifically stated and endorsed. In reality, Taiwan has a much higher population density than the United States, and its business districts are far more concentrated. Iconic structures like Taipei 101 could easily become targets for terrorist acts. Should an attack occur, the resulting damage and losses would likely be severe. This paper will define and examine the characteristics and impact of terrorism risk, analyze the insurability of terrorism risk from a theoretical perspective, explore the legal frameworks governing terrorism insurance in the U.S., focusing on the role of government in providing terrorism coverage and the duration of its involvement, assess the current situation in Taiwan, offering critiques of the existing system, after identifying the shortcomings of Taiwan's approach, and eventually explore potential solutions to the legal and practical challenges facing terrorism insurance in Taiwan.

Keywords: Terrorism Risk Insurance Act, catastrophic risk, terrorism risk, insurability

Introduction

The terrorist attacks on September 11, 2001 inflicted devastating damage resulting in death, injury, business interruption losses, and property damage. Estimated total monetary losses were between $30 billion and $70

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billion, with many analysts predicting the final amount to total around 50 billion (Miller, 2002). Though insurance companies did not and could not invoke war risk exclusions, insurers indicated that terrorism exclusions would be introduced to new policies and existing policies due to be renewed (Allyn, 2003). The characteristics of terrorism risk prove that in the absence of meaningful actuarial data, insurance coverage is not possible. Such finding may lead to a conclusion that terrorism risks are uninsurable. Yet on the other hand, the acceleration of the recovery and reconstruction is seriously in need of the support by insurers as a lack of terrorism coverage can cause genuine disruption in various markets including the capital market (Gron & Sykes, 2003). Hence, Terrorism Risk Insurance Act (hereinafter, the TRIA 2002) was signed into law by President Bush on November 2002, to protect consumers by addressing market disruptions and ensure the continued widespread availability and affordability of property and casualty insurance for terrorism risk (Allyn & Mcneff, 2003, p. 838). Nevertheless, December 31st 2014 through the enactment of the Terrorism Risk Insurance Program Reauthorization Act of 2007 (National Association of Insurance Commissioners (NAIC), 2024; Ball, 2008). The TRIA program was subsequently extended twice in 2015 and 2019 respectively by Terrorism Risk Insurance Program Reauthorization Act of 2015 (TRIPRA 2015) and Terrorism Risk Insurance Program Reauthorization Act of 2020 (TRIPRA 2019) (National Association of Insurance Commissioners (NAIC), 2024; Ball, 2008). The current reauthorization is scheduled to expire on Dec. 31, 2027 (U.S. Dept. of Treasury, 2019). These extensions again incurred the debate over the appropriateness of the government intervention in terrorism insurance program as well as the length and form of the intervention.

In Taiwan, terrorism risks are generally excluded from most all-risk insurance policies unless specifically stated and endorsed.[1] However, given the catastrophic and concentrated nature of terrorism risk, it is questionable whether the insurance industry in Taiwan fully anticipates and possesses the capacity to underwrite such risks. Relevant laws and regulations provide little guidance on this matter.

In reality, Taiwan has a much higher population density than the United States, and its business districts are far more concentrated. Iconic structures like Taipei 101 could easily become targets for terrorist acts. Should an attack occur, the resulting damage and losses would likely be severe.

With this framework in mind, Part I of this paper will define and examine the characteristics and impact of terrorism risk. Part II will analyze the insurability of terrorism risk from a theoretical perspective. Part III will explore the legal frameworks governing terrorism insurance in the U.S., focusing on the role of government in providing terrorism coverage and the duration of its involvement. Part IV will assess the current situation in Taiwan, offering critiques of the existing system. After identifying the shortcomings of Taiwan's approach, Part V will explore potential solutions to the legal and practical challenges facing terrorism insurance in Taiwan. Finally, Part VI will conclude the paper.

[1] For instance, see the Terrorism Insurance Endorsement provided by Mingtai Property Ins. Co., https://www.msig-mingtai.com.tw/MobileWeb/FilesToDownload/FireFighter/38-%E6%98%8E%E5%8F%B0%E7%94%A2%E7%89%A9%E5%82%B7%E5%AE%B3%E4%BF%9D%E9%9A%AA%E6%81%90%E6%80%96%E4%B8%BB%E7%BE%A9%E8%A1%8C%E7%82%BA%E4%BF%9D%E9%9A%AA%E9%99%90%E9%A1%8D%E7%B5%A6%E4%BB%98%E9%99%84%E5%8A%A0%E6%A2%9D%E6%AC%BE_110.pdf (last visited Apr. 28, 2024).

The Nature of Terrorism Risks and Its Impact on the Insurance Market

Characteristics of Terrorism Risks

The term "terrorism" is used strictly for reprehensible use of violence to achieve certain goals (Swiss Re, 2003). The Dictionary of Military Terms of the U.S. Department of Defense defines "terrorism" as "—The unlawful use of violence or threat of violence, often motivated by religious, political, or other ideological beliefs, to instill fear and coerce governments or societies in pursuit of goals that are usually political." (U.S. Department of Defense, 2017). However, perpetrators of such attack would never view themselves as "terrorists": they consider themselves as soldiers or fighters for a just cause for which they occasionally even gain support (Swiss Re, 2003, p. 7). Attackers and victims will therefore never agree on whether a particular attack is a terrorism act or merely another type of violence because they tend to see a single event from quite opposite viewpoints (Swiss Re, 2003). From the victims' point of view, terrorism is understood to consist of carefully and underground planned acts of violence against the existing political and societal order that shock the public at large (Swiss Re, 2003). Terrorism is distinguishable from ordinary crime of violence by its intention to produce shock to the public (Swiss Re, 2003). Such attacks not only aim to instill fear and insecurity in the society affected but also to drum up sympathy for attackers from their supporters (Swiss Re, 2003). In contrast, ordinary crimes do not serve either of these two purposes. In addition, terrorism attack is never spontaneous and eruptive, it is the result of careful and targeted planning (Swiss Re, 2003). As declared in the preface of the 9/11 Commission Report,

> the 9/11 attack was a day of unprecedented shock and suffering in the history of the United States. The nation was unprepared…the enemy is sophisticated, patient, disciplined, and lethal…Its purpose is to rid the world of religious and political pluralism. (National Commission on Terrorist Attacks upon the United States, 2002)

The attack resulting in the loss of approximately 50 billion U.S. dollars became the single most costly event ever recorded in the history of insurance and reinsurance industry worldwide, which thus drastically shifted the common perspective on future expected losses from terrorist actions as both insurers and reinsurers were unaware of the considerable underestimation of the exposure of their risk portfolio to terrorism attack (OECD, 2005, p. 29).

The terrorism risk consists of three components, namely the threat, the vulnerability, and the consequence (Williams, Morral, Kelly, & Medby, 2005, pp. 6-10). With regard to the threat, people or organizations manifest a terrorist threat when they have both the intent and capability to cause damages to a target (Williams et al., 2005, p. 6). Threat only exists when both are manifested together in a person or organization (Williams et al., 2005, p. 6). Allocating homeland security resources to protect critical infrastructure or cities from terrorism risks requires measuring the threats posed to specific targets or from specific types of attack (Williams et al., 2005, p. 6). The vulnerability is regarded as the capacity of a system to respond to the threat of terrorism (Williams et al., 2005, p. 7). A target's vulnerability can be articulated as the probability that an attack of a given type will be successful once it has been launched (Williams et al., 2005, p. 8). As for the consequence, it is expressed in terms of fatalities, injuries, economic losses, or other types of damage (Williams et al., 2005, p. 9). It represents the magnitude and type of damage resulting from successful terrorist attacks (Williams et al., 2005, p. 8). In short, terrorism risk is

known as "the expected consequences of attacks taking into account the likelihood that attacks occur and that they are successful if attempted"[2] (Williams et al., 2005, p. 10).

Although terrorism risk, like other natural disasters, is categorized as catastrophic risks defined as infrequent events that can cause substantial financial losses, but are difficult to reliably predict (Lee & Yu, 2006), the main difference stem between the natural disaster and the terrorism risk lies in the random or non-intentional nature of natural disasters and the purposive nature of terrorism (Boardman, 2005). They differ from each other in three aspects: first, natural disasters can be predicted using history and science, while terrorist attacks cannot since the human planning component impedes the viability of predictions as to timing or severity of attacks (Boardman, 2005). Second, acts of terrorism are not distributed randomly across time. "Massive terrorism losses, for example, could occur in close succession temporally." (Jerry Jr., 2002a, p. 1067). Terrorists tend to incur a devastating cascade, maximizing psychological impact and stretching law enforcement thin (Boardman, 2005, p. 827). "Past experience strongly suggests that this is highly unlikely to occur with respect to natural disasters." (Jerry Jr., 2002a, p. 1067). Third, catastrophic natural disasters follow relatively random paths, but terrorists, by contrast, are interested in civilian-centric venues and aim for economic attacks (Chalk, Hoffman, Reville, & Kasupski, 2005, p. 15). Acts of terrorism, unlike natural disasters, are not random across time or place (Boardman, 2005, p. 828). Given these three differences, predicting terrorism risk is far more difficult than most natural disasters.

Impacts of Terrorism Risks on the Insurance Industry—The American Case After 9/11 Attack

Before 9/11, the insurance industry determined that terrorism posed merely a discrete risk of low intensity, high visibility violence so that the actuarial and pricing models did not recognize terrorism as an extraordinary risk comparing to nuclear contamination, war loss, or even earthquake loss for which either the risk is excluded or additional premiums are charged (Am. Acad. of Actuaries, 2002). Insurers covered terrorism risk in most "all risk" policies and reinsurers did not exclude the risk in their treaties (Rhee, 2005). Consequently, the risk was perceived to be so de minimis that it was covered for "free" (Rhee, 2005).

Although, after the events of September 11, concerns were raised regarding insurance companies' attempts to invoke war risk exclusions embedded in most standard insurance policies[3] (Everett, 2002). Yet insurers promised policyholders that war exclusions would not be invoked to deny coverage (Rizzo, 2002, p. 10). Congress also expressed that "any attempt to evade coverage obligations by either primary insurers or reinsurers based on such legal maneuvering would not only be unsupportable and unpatriotic—it would tear at the faith of the American people in the insurance industry."[4] (Rizzo, 2002, p. 12). Despite the abstention of war risk

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[2] "*The expected consequence of an existent threat, which for a given target, attack mode, and damage type can be expressed as* Risk = *P*(attack occurs) * *P*(attack results in damage | attack occurs) * *E*(damage | attack occurs and results in damage) = Threat * Vulnerability * Consequence".

[3] "A war exclusion clause is a provision in an insurance policy or rider thereto which relieves the insurance company of the full liability for the face value if the loss is caused by war…The standard Insurance Services Office (ISO) exclusion for commercial property provides an excellent example of the representative language found in a war exclusion clause. The ISO exclusion states: 1. We will not pay for loss or damage caused directly or indirectly by any of the following. Such loss or damage is excluded regardless of any other cause or event that contributes concurrently or in any sequence to the loss…f. War and Military Action: (1) War, including undeclared or civil war; (2) Warlike action by a military force, including action in hindering or defending against an actual or expected attack, by any government, sovereign or other authority using military personnel or other agents; or (3) Insurrection, rebellion, revolution, usurped power, or action taken by governmental authority in hindering or defending against any of these."

[4] Quoting Letter from the House Committee on Financial Services, to the National Association of Insurance Commissioners 1 (Sept. 17, 2001).

exclusions, insurers suggested that terrorism exclusions would be introduced to new policies and existing policies due to be renewed (Zager, 2005). The industry reacts to an event shock by withdrawing from the market (Dhooge, 2002). After the 9/11 attack, the reason that insurers withdraw from markets is fairly obvious: insurance companies do not know the maximum of terrorism risk exposure, they will protect themselves by charging very high premiums, significantly reducing coverage or simply denying the coverage by adopting the terrorism exclusion (Rappe, 2000; Rhee, 2005, p. 449). Insurers had to file their new exclusions with individual state regulators (For details, see Thomas, 2003). The new exclusion basically defines terrorism as the use of force that has the effect or intent to coerce a government or civilian population; and terrorism coverage is limited to losses that are $25 million or less with exclusions for losses exceeding this amount (Am. Acad. of Actuaries, 2002, pp. 14-15). The exclusion places terrorism risk squarely on the shoulders of policyholders and their financiers (Rhee, 2005, p. 451).

In addition, after September 11, reinsurers were reluctant to reinsure terrorism coverage because of the difficulty in pricing terrorism insurance (Zager, 2005, p. 550). The uncertainty regarding the frequency or magnitude of future attacks led reinsurers to decide that terrorism was an uninsurable risk due to the extraordinary potential exposure (Zager, 2005, p. 550). Since reinsurance provides additional capital to insurers and thus increases underwriting capacity, without reinsurance, insurers could not limit the exposure to severe liability and had no choice but to exclude coverage (Rhee, 2005, p. 450).

In addition to reduced capacity, 9/11 accelerated the increase of premium. Evidence reveals that post-9/11 prices increased in the range of 10% to 50% (Am. Acad. of Actuaries, 2004). Some insurers even cherry picked underwriting risks at greatly increased prices (Rhee, 2005, p. 452). “Although certain high-risk cities and trophy properties carried the greatest risk and saw the largest premium hikes, increases were seen across the board.” (Rhee, 2005, p. 451).

Owing to the shrunk capacity and increased prices, much fewer policyholders purchased terrorism coverage unless required by financial covenants in debentures (Rhee, 2005, p. 451). The new pricing of terrorism coverage and cost-benefit perceptions of policyholders also resulted in adverse selection (Am. Acad. of Actuaries, 2004, p. 5). That means policyholders who bear higher risks were the most likely to purchase terrorism coverage, while lower risk policyholders refrain from obtaining it. The greatest risk of terrorism was transferred to the insurance industry and it is unable to successfully diversify such risk because of the low “take up” by lower risk insureds who may have been priced out of the market (Gron & Sykes, 2003). Adverse selection and price distortions caused risk concentration (Am. Acad. of Actuaries, 2002, p. 4). Ultimately, a large portion of the terrorism risk was always borne by policyholders and their financiers (Dixon & Stern, 2004).

Although policyholders also assume some risk through deductibles, retentions, and policy limits is an essential part of risk management, September 11 attack made the insurance mechanism unavailable when they sought to transfer some of the risk in the ordinary course of corporate risk management (Rhee, 2005, p. 452). There was either no coverage or exorbitant prices (Gron & Sykes, 2003, p. 448). Due to the temporary mismatch of supply and demand, the economy became shaky. On top of the direct losses incurred by the attacks and the immediate consequences on the airline, hotel, and tourism industries, “high premiums had a trickle down effect on the rest of the economy” (Rhee, 2005, p. 453). Increases in financing costs led to higher cost of goods and services, resulting in higher prices and reduced profits (Rhee, 2005, p. 453). The real estate and financing

industries were hit the hardest. The lack of coverage and higher premiums increased the cost of capital and restricted capital flow to the real estate and construction sectors (Rhee, 2005, p. 453). As lenders refused to lend capital to properties unless they secure insurance coverage against all types of risk especially terrorism risk, large construction projects were abandoned, causing the loss of many jobs and postponement of investment opportunities, threatening future economic growth (Zager, 2005, p. 552).

In short, 9/11 led to material short-term economic losses on a national level. The insurance market was distorted in the short term because of the price increase, the capacity dislocation, adverse selection of risk, and concentrated risk.

The Insurability of Terrorism Risks

As mentioned above, terrorism risk bears unique characteristics and catastrophic nature that prevent insurance companies from providing coverage, but insurance coverage is one of the most crucial factors for the stability and fast recovery of the economy. To determine whether insurance coverage should be made available to terrorism risk, the first issue to be settled is the insurability of such risk. There is no simple answer for this issue (OECD, 2005, p. 29).

Arguments Denying the Insurability

To establish the insurability of a particular risk, insurance companies generally review the following criteria:

> (1) accessibility: the probability and severity of losses must be quantifiable; (2) randomness: the time at which the insured event occurs must be unpredictable and the occurrence itself must be independent of the will of the insured; (3) mutuality: numerous persons exposed to a given hazard must join together to form a risk community within which the risk is shared and diversified; (4) economic feasibility: for a risk to be insurable, private insurers must be able to charge a premium commensurate with the risk it covers (the "actuarially justified premium"). For the policyholder to be able to acquire the cover he needs (if insurance is not mandatory), premia must be adequate both for the insurer, who will assess whether it permits the insurance supplied to be profitable under given capital constraints, and for the insured, who should find it affordable and commensurate with his own perception of the risk. (OECD, 2005, p. 30)

Risks that do not satisfy the above criteria may be deemed by professional risk carriers as uninsurable so that coverage may become unavailable on the private market. It is argued that: "Terrorism insurance is not possible. The terrorism risk is a known unknown; we are aware of the risk but are still too ignorant to calculate and redistribute the risk in an insurance pool." (Boardman, 2005, p. 786). Since insurance risks must be calculated based on scientific or historical data, neither data regarding terrorism are virtually unavailable (Boardman, 2005, p. 815). Especially in the U.S., although there had been terrorist attacks within the United States before 9/11, for example, the 1993 bombing of the World Trade Center, the 1995 Oklahoma City bombing, and the 1996 Olympic Park bombing in Atlanta, the four existing data did not supply much for an actuarial analysis (Boardman, 2005, p. 815). Hence, no actuarial tables exist, nor could meaningful ones be created (Boardman, 2005, p. 815).

In fact, "it is the structure of the terrorism risk, not simply the high cost of 9/11, that makes the risk abnormally expensive to insure." (Boardman, 2005, p. 816). Two types of uncertainties may impede the measurement of terrorism risk—parameter uncertainty and model uncertainty (Boardman, 2005, p. 816). Parameter uncertainty occurs because an unexpected spike in losses is likely to reveal new information about the frequency and severity of insured losses (Cummins & Lewis, 2002, p. 2).

> Although following past events the market converged on new estimates of expected losses in which insurers have confidence, the period immediately following a shock is usually characterized by significant parameter uncertainty, making it difficult for insurers to develop credible prices. (Cummins & Lewis, 2002, p. 2)

This effect can be aggravated when losses are triggered by rare events such as terrorist attacks (Cummins & Lewis, 2002, p. 2). In the terrorism context, there is possibility that the accurate prediction of a serious attack in a major city in the next ten years is high. It is unlikely that an insurer ignores this possibility because it is also possible that the accurate prediction is much lower unless it has reason to disbelieve the first prediction. Therefore, an insurer cannot responsibly offer terrorism coverage without reserving adequate capital for the serious attack; otherwise it may face the erosion of its reserve for other non-terrorism risks, which may ultimately bankrupt it (Boardman, 2005, p. 817). Therefore, a responsible insurer will calculate premiums and reserves based on the high boundary of possible predictions (Boardman, 2005, p. 817).

With respect to model uncertainty, it refers to the class of models composed of a range of models that may provide a proxy for a more complex reality about which the modeller has little or no prior knowledge (Carin, 2000). As the OECD report regarding terrorism insurance indicated,

> Both terrorist attacks and natural hazards result in losses that are potentially high and very uncertain. The procedure for estimating the probability that a certain level of loss will be exceeded during a given timeframe has evolved from a rather simplistic deterministic basis to a more sophisticated methodology based on loss exceedance probability (EP) curves, generated using dedicated catastrophe modeling software. For LPHC (low probability high consequence) events, [like terrorist attacks] however, analysis of past events reveals wide variations in loss distribution; this hinders insurers ability to predict the severity and frequency of future events, and thus to set premia commensurate with such risks. (OECD, 2005, p. 29)

Indeed, in the absence of scientific data, as for natural disasters, or historical data, as for most risks, building a model for the terrorism risk is more like a myth than mathematics (Boardman, 2005, p. 817). For terrorism risk, frequency and severity data are scarce as there have been relatively few terrorist attacks in the United States (Insurance Information Institute, 2024). There are few data to be utilized as basis for estimation of future losses, not to mention the range of possible severity of terrorism claims is exceedingly larger than in other lines of insurance (Insurance Information Institute, 2024). Uncertainty will never end unless a history of both the model and the risk has been built, so the two can be compared. Before 9/11, property insurance modeling in the United States did not include terrorist attacks at all, a “model” that reflected reality for many years (Miller, 2002, p. 3) so that any model created to assess the terrorism risk today would be open to wide model uncertainty (Boardman, 2005, p. 817).

In addition, the customer base for terrorism insurance is not large enough for insurance companies to effectively spread their expected losses (Marrés, 2005). There is wide variation among potential buyers in the perceived risk of terrorist attacks (Dixon, Arlington, Carroll, Lakdawalla, Reville, & Adamson, 2004, p. 6). When there is no way for buyers to substantiate their perceived level of risk, only those who consider their properties are at high risk of being attacked will purchase policies (Dixon et al., 2004, p. 6). Without being able to allocate risk from high-risk policyholders among low-risk policyholders, it would be difficult for insurers to offer affordable policies (Marrés, 2005, p. 147).

Furthermore, terrorist acts are often geographically concentrated, aiming to create a significant economic or psychological impact. For insurance to function economically, losses must not be so concentrated that many or

all policyholders in a single location suffer the same loss, which could lead to the insurer's bankruptcy. The localized nature of terrorism makes it challenging to effectively distribute the risk of losses across a broader geographic portfolio (Marineau et al., 2020).

In summary, parameter and model uncertainty render uninsurable terrorism risk. The potential for unpredictable, multi-billion-dollar losses from terrorist acts presents a threat that cannot be insured against without risking severe financial destabilization of the insurance industry and possible insolvency of individual insurers (Kendall, 2002). Additionally, when terrorism coverage is offered to a limited number of policyholders due to the geographically-concentrated nature of terrorism risk, insurers face challenges in risk spreading, which contradicts the fundamental principle of risk diversification in insurance. Moreover, the exceedingly high and unaffordable premiums associated with terrorism insurance undermine its economic viability. Therefore, it is reasonable to conclude that terrorism risk is uninsurable.

Arguments in Support of the Insurability

Arguments advocating the insurability of terrorism risk base primarily on observations on the practical aspect. Professor Robert Jerry Jr. opined that:

> catastrophic loss is not new to the insurance industry, and terrorism arguably stands as simply another kind of catastrophe, a peril neither quantitatively nor qualitatively different from the various kinds of natural disasters… The insurance world's order did not change on 9/11, even as the industry confronted an event unprecedented in magnitude. (Jerry Jr., 2002b, p. 103)

It might be true that the upper boundary of possible loss from terrorism changed on 9/11, it is also correct to assert that before 9/11 insurers pondered and anticipated single-day or single-event losses similar as those suffered on 9/11 (Jerry Jr., 2002b, p. 103). For example, hurricanes, earthquakes, volcanic eruptions, and other natural disasters are all possible to cause financial losses in the tens and even hundreds of billions of dollars (Jerry Jr., 2002b, pp. 103-104). Before 9/11, Hurricane Andrew resulted in approximately $16 billion in losses, and it was estimated that the amount of losses would have increased three to four times if the hurricane had directly struck the Miami metropolitan area.[5] While hurricane's landfall is completely random, it is apparent that damages caused by hurricane mostly concentrated on Miami, New Orleans, or another large city and greatly exceeded that which occurred in New York City on 9/11 (Jerry Jr., 2002b, p. 104).

Similarly, in the case of catastrophic earthquake, a 1995 study estimated that if an earthquake similar to the 1906 San Francisco quake struck the same area today, fatalities could reach 8,000 and total damages could reach $225 billion, a sum nearly three times all economic loss suffered in New York City on 9/11[6] (Jerry Jr., 2002b, p. 106, citing Shah, 2002).

Therefore, it does not seem logical to claim that the terrorism risk deserves special treatment pursuant to the arguments that terrorism losses are large and uninsurable in contrast to the kinds of losses caused by natural disasters (Jerry Jr., 2002b, p. 108). Some terrorism events are accompanied by losses well within the capacity of the insurance industry, and the same is true with respect to natural disasters (Jerry Jr., 2002b, p. 108). Conversely, it is also possible that losses resulting from terrorist acts or natural disasters would surpass the industry's capacity

[5] Insurance Information Institute, FACT BOOK 2001 93 (2001).

[6] Citing Haresh C. Shah, *Earthquake Risk Management: A Crucial Ingredient in Reducing Death, Injury, and Economic Disruption*, at http:// www.anglia.ac.uk/geography/radix/gujarat2.htm (last visited Nov. 9, 2002).

(Jerry Jr., 2002b, p. 108). These events known as "mega-catastrophes"[7] (Kerney, 2010) are distinguishable from the "smaller catastrophes" that the industry can manage (Jerry Jr., 2002b, p. 108). Private risk-spreading mechanisms are irrelevant to losses in the mega-catastrophic category; when losses of this magnitude occur, government institutions must become the source of compensating loss and spreading the risk of future similar losses (Jerry Jr., 2002b, p. 108). The fact that terrorism does not present a unique challenge to the insurance industry can be verified by the industry's success in dealing with the effects of 9/11 (Jerry Jr., 2002b, p. 109). Regardless of the incomplete final accounting, the 9/11 losses were within the industry's capacity, and the industry continues to demonstrate that it was well prepared before 9/11 to absorb an event of such scale without default or insolvency (American Academy of Actuaries, 2006, pp. 4-5).

Furthermore, the markets' response to 9/11 is similar to what happened after Hurricane Andrew struck southern Florida in 1992. As commercial reinsurers restricted coverage and raised prices, primary insurers, attempting to transfer the increased reinsurance expense and to limit their exposure, charged higher premiums, canceled some policies on properties in coastal areas, and raised deductibles for insureds with higher risks (Jerry, 2002b, p. 109). Yet couple of years later, following the settle-down of the reinsurance industry, a new period of stability in the primary market also appeared (Jerry, 2002b, p. 109). That means, "transitory capacity problems in insurance are not uncommon, and, in the absence of multiple 'shocks' in a short period of time, these problems are generally self-correcting" (For details, see Gron & Sykes, 2003, pp. 453-454).

Thus, right after the 9/11 attack, even though reinsurers and insurers decided to exclude terrorism risk as uninsurable to preserve their solvency because of the explicit threat of potential future major terrorism acts, and the fear of new and imminent attacks, there is still a large array of solutions which can help restore insurability after a disaster (OECD, 2005, pp. 35-36). For example, advancements in catastrophe risk modeling have enhanced both risk assessment and management strategies. U.S. experiences in the post-9/11 era demonstrate that even when insurers offer terrorism risk coverage, they can still effectively limit their exposure in various ways. Insurers can manage their terrorism risk through pricing strategies, by refusing to underwrite specific risks, or by excluding coverage for certain types of terrorism-related losses (U.S. Department of Treasury, 2024, p. 17). Moreover, to support the process of managing and underwriting the terrorism risk, insurers and reinsurers continue utilizing data management and modeling tools to analyze the risk. Modeling methodologies for terrorism have been continually refined and updated since the three major modeling companies—AIR Worldwide (AIR), EQECAT, and Risk Management Solutions (RMS)—released their first terrorism models in 2002 (Carpenter, 2014). Currently, there are three primary and relatively mature techniques to model terrorism risk, namely the probabilistic modeling, exposure concentration analysis, and deterministic modeling (Carpenter, 2014). Thus, the insurability of terrorism risks has never been an insurmountable issue.

Comments

Advocates against the insurability of terrorism risk questioned the scarce of scientific and historical data in developing effective models for assessing such risk. In fact, the FBI has been maintaining statistical records on

[7] "For insurers and reinsurers, the consequences of megacatastrophes are both major and unique. The term "megacatastrophe"—used to describe 1992's Hurricane Andrew and 2005's Katrina—also describes the ultimate effects of four hurricanes that struck Florida in 2004. The impact of those events is measured in billions of dollars", http://www.iso.com/Research-and-Analyses/ISO-Review/Megacatastrophes-Risk-Acceptance-and-Claims-Management.html (last visited March 20, 2010).

terrorist events, both in the U.S. and worldwide (For details, see Federal Bureau of Investigation, 2006), and such data set might well serve for the development of a pricing model. A 2006 report, jointly issued by the U.S. Department of Treasury, the Board of Governors of the Federal Reserve System, the U.S. Securities and Exchange Commission, and Commodity Futures Trading Commission, revealed that actuarial analysis in modeling terrorism frequency by using data from the Department of State, Federal Bureau of Investigation, and other sources which provide information on attacks, prevented attempts, weapons, and terrorist groups (U.S. Department of Treasury et al., 2006). "In addition to this historical data, modeling firms use counter-intelligence experts (many with intelligence backgrounds) who specialize in terrorism threat assessment. Various methodologies are used to determine the probabilities of attack" (U.S. Department of Treasury et al., 2006). Private sectors since 2001 have also devoted to develop highly complex and wide-ranging models; they involve extensive data and information collection and analysis in an attempt to assess the terrorism threat, develop inventories of values and people at risk and estimate the vulnerability of targets (For details, see LaTourrette, Kelly, Hickey, & Neill, 2006; Risk Management Solution Inc., 2003). Similarly, reinsurers like Swiss Re, as predicted by Professor Jerry, were making efforts in improving their risk pooling and techniques of accessing of terrorism risks (Swiss Re, 2003, pp. 20-23).

Accordingly, the accessibility of terrorism risk has no longer been an issue concerning the insurability. Recent empirical studies indicate that the use of terrorism risk models must lead to a clarification of terrorism threat for those using them, allowing them to offer coverage more efficiently (Mitchell & Silke, 2023). Therefore, even if none of the models can reasonably claim to be the most credible in all categories of risk projection, it appears that the results provided by the models are "good enough" for insurers to use.

It is the affordability and temporary capacity shortage that hinder the availability of terrorism insurance (Gron & Sykes, 2003, p. 448). To illustrate, the primary long-term obstacle to underwrite terrorism risk is economic feasibility of premiums. Given that catastrophe risks, pose higher capital costs than other insurance events, insurers must keep sufficient reserves to cover their anticipated losses (Rhee, 2005, p. 474). Despite that catastrophic terrorism is a low frequency event, insurers must hold sufficient capital as a buffer for the potential for high severity so as to minimize insolvency risk (Rhee, 2005, p. 474). The higher costs of capital will certainly be passed to the insureds in the form of higher premiums (Jaffee & Russell, 1997). Otherwise, insurers may choose to cede this risk than assuming more due to the capital shortage (Gron & Sykes, 2003, p. 454). In this regard, it is not a radical notion to launch a scheme such as government-backed terrorism insurance to allow for a transitional period for the private markets to stabilize, resume pricing of such insurance, and build capacity to absorb any future losses (Rhee, 2005, p. 456; Zager, 2005, p. 551). The possibility and feasibility of government intervention in the terrorism insurance will be discussed in the following part.

Government's Role in Terrorism Insurance—The TRIA 2002 Model of the U.S. and Its Critiques

Overview of the U.S. Terrorism Risk Insurance Act (TRIA)

The U.S. Congress passed and President Bush signed the Terrorism Risk Insurance Act (TRIA) on November 26, 2002 (Allen, 2002). The TRIA 2002 was promulgated, as stated in Section 101(b), for two purpose:

(1) to address "market disruptions and ensure the continued widespread availability and affordability" of insurance and (2) to "allow for a transitional period for the private markets to stabilize, resume pricing of such insurance, and build capacity to absorb any future losses".[8]

TRIA 2002 does not directly cover terrorism losses; instead, it reimburses private insurers for a portion of their losses. While the act does not require private insurers to pay premiums for government coverage, it does mandate that they offer commercial insurance for terrorism risk—something they were largely unwilling to do before TRIA 2002 was enacted.[9]

What qualifies "terrorism" under TRIA 2002? In TRIA 2002, Federal assistance to private insurers is made available at the occurrence of an act of terrorism when the following three criteria are fulfilled: first, to constitute terrorism, the act should be "a violent act or an act that is dangerous to human life, property or infrastructure."[10] Second, the act must cause damages within the United States or to air carriers, vessels, and U.S. missions.[11] Third, the act must be

> committed by an individual or individuals acting on behalf of foreign interests in an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.[12]

The requirement of "acting on behalf of any foreign person or foreign interest" has been removed since the enactment of Terrorism Risk Insurance Program Reauthorization Act of 2007.[13]

Insurers duties under TRIA 2002. TRIA 2002 mandates all commercial insurers write policies in the United States to participate in the program established by this Act and write policies covering terrorism.[14] In addition, "any terrorism exclusion in a contract for property and casualty insurance that is in force on the date of enactment of this Act shall be void to the extent that it excludes losses that would otherwise be insured losses".[15] For receiving government reimbursement in the event of a certified terrorism loss, insurers are required to "provide clear and conspicuous disclosure to the policyholder of the premium charged for insured losses covered by the Program and the Federal share of compensation for insured losses under the Program".[16] In the case of policies purchased before the enactment, such notice was required to be given to policyholders no later than 90 days from the effective date—February 24, 2003.[17] With respect to policyholders who obtained the new coverage within ninety days of the effective date of the TRIA 2002, notice must be provided at the time of the policy's purchase or renewal.[18] "In the case of any policy that is issued more than 90 days after the date of enactment of

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[8] Terrorism Risk Insurance Act of 2002 (hereinafter TRIA 20022002) §101(b).
[9] Congressional Research Service, Statement of Baird Webel Specialist in Financial Economics Before Committee on Financial Services Subcommittee on Housing, Community Development, and Insurance Subcommittee on National Security, International Development, and Monetary Policy U.S. House of Representatives at 1 (2019).
[10] TRIA 20022002 §102(1)(A)(ii)(I)-(III).
[11] *Id.* §102(1)(A)(iii)(I)-(II).
[12] *Id.* §102(1)(A)(iv).
[13] 110th Congress Public Law 160, an act to extend the Terrorism Insurance Program of the Department of the Treasury, and for other purposes, Dec. 26, 2007 [H.R. 2761].
[14] TRIA 20022002 §103(a)(3).
[15] *Id.* §105(a).
[16] *Id.* §103(b)(2).
[17] *Id.* §103(b)(2)(A).
[18] *Id.* §103(b)(2)(B).

this Act, on a separate line item in the policy", policyholders should be notified at the time of offer, purchase, and renewal of the policy.[19]

Reinstatement of preexisting exclusions. An insurer may reinstate a preexisting terrorism exclusion "if the insurer has received a written statement from the insured that affirmatively authorizes such reinstatement; or if the insured fails to pay any increased premium charged by the insurer for providing such terrorism coverage".[20]

Particulars of the federal assistance.

Insurer deductible. The percentage of the insurer deductible varies with the time of loss. For losses occurring during the transition period, specifically November 26 to December 31, 2002, insurers are liable for the initial amount of covered losses up to 1 percent of the insurer's direct earned premiums for the preceding calendar year.[21] For losses occurring during 2003, this deductible increases to 7 percent of the previous calendar year's direct earned premiums.[22] In 2004, the deductible increases to ten percent, and, in 2005, the deductible increases to 15 percent of the previous year's direct earned premiums.[23] Currently, TRIA 2002 provides directly for an "insurer deductible" equal to twenty percent of each company's direct earned premiums for TRIA-eligible lines of insurance.[24] In addition, TRIA 2002 includes a "program trigger", the amount of aggregate insured losses must be clear before any funding flows out of the Treasury.[25] The program trigger is $180 million in 2019 and increases to $200 million in 2020.[26] If the program trigger is not cleared, an insurer would receive no federal funding even if its individual deductible is exceeded.

Government's share of loss. The TRIA 2002 introduces the federal loss sharing for commercial property and casualty insurers in the event of a certified terrorist attack. The Federal share of compensation to be paid by the government for insured losses of an insurer during the Transition Period and each Program Year shall be "equal to 90 percent of that portion of the amount of such insured losses that exceeds the applicable insurer deductible required to be paid during such Transition Period or such Program Year."[27] Insurers should pay for the remaining 10 percent of such aggregate losses beyond their deductibles.[28] The Federal share of compensation for insured losses under the Program shall be less the amount of compensation provided by the Federal Government to any person under any other Federal compensation for those insured losses.[29] The cap Federal assistance to insurers is 100 billion dollars annually.[30] The U.S. Congress is responsible for determining procedures for the source of any payments to be made to insurers in excess of 100 billion dollars.[31]

Recoupment. Private insurers and policyholders do not receive Federal assistance for free. The Federal government may recoup payments to insurers with two approaches, namely the mandatory recoupment and the

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[19] *Id.* §103(b)(2)(C).
[20] *Id.* §105(c)(1)-(2).
[21] *Id.* §101(7)(A).
[22] *Id.* §101(7)(B).
[23] *Id.* §101(7)(C)&(D).
[24] Terrorism Risk Insurance Program Reauthorization Act of 2015 (hereinafter TRIPRA 2015) §106(B).
[25] TRIA 2002 §103(b)(3).
[26] TRIPRA 2015 §103(3).
[27] TRIA 2002 §103(e)(1)(A).
[28] *Id.*
[29] *Id.* §103(e)(1)(B).
[30] *Id.* §103(e)(2)(A)(i)&(ii).
[31] Terrorism Risk Insurance Program Reauthorization Act of 2007 [hereinafter TRIPA 2007] §4(c)(2).

discretionary recoupment. Mandatory recoupment of payments is based upon the difference between the sum paid for losses resulting from a certified act of terrorism by insurers, specifically the earned premium deductibles and ten percent participation payment, and the insurance marketplace aggregate retention amounts.[32] If the sum of earned premium deductibles and insurer participation payments is less than the aggregate retention amount for a given year of the program, insurers are mandated to remit the difference to the Federal government.[33] As for discretionary recoupment, it can be assessed to the extent that federal assistance exceeds any mandatory recoupment amount.[34] Criteria on which the Treasury Secretary base to determine the amount of such discretionary recoupment include:

> (i) the ultimate costs to taxpayers of no additional recoupment; (ii) the economic conditions in the commercial marketplace, including the capitalization, profitability, and investment returns of the insurance industry and the current cycle of the insurance markets; (iii) the affordability of commercial insurance for small- and medium-sized businesses; and (iv) such ether factors as the Secretary considers appropriate.[35]

Recoupment is to be collected in the form of policy surcharges on property and casualty insurance policies in force and effect after the date of establishment of the recoupment amount (Masters & Fallow, 2003). This surcharge is determined by the Secretary based upon a percentage of the premiums charged to such policyholders.[36] However, the surcharges "may not exceed, on an annual basis, the amount equal to 3 percent of the premium charged for property and casualty insurance coverage under the policy".[37] Insurers are obligated to collect such surcharges and remit them to the Treasury Secretary.[38] A civil fine would be imposed if an insurer failed to collect or remit surcharges.[39]

Effective period and the extension of TRIA 2002. The TRIA 2002 was not intended to be a permanent program (John, 2007). As the original bill stated, TRIA 2002 would:

> provide temporary financial compensation to insured parties, contributing to the stabilization of the United States economy in a time of national crisis, while the financial services industry develops the systems, mechanisms, products, and programs necessary to create a viable financial services market for private terrorism risk insurance.[40]

The initial TRIA 2002 was destined to sunset on December 31, 2005.[41]

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[32] TRIA 2002 § 103(e)(6) ["[T]he insurance market-place aggregate retention amount shall be—(A) for the period beginning on the first day of the Transition Period and ending on the last day of Program Year 1, the lesser of—(i) $10,000,000,000; and (ii) the aggregate amount, for all insurers, of insured losses during such period; (B) for Program Year 2, the lesser of—(i) $12,500,000,000; and (ii) the aggregate amount, for all insurers, of insured losses during such Program Year; and (C) for Program Year 3, the lesser of—(i) $15,000,000,000; and (ii) the aggregate amount, for all insurers, of insured losses during such Program Year."]. Also, see TRIPRA 2015 § 103 ["(i) $100,000,000, with respect to such insured losses occurring in calendar year 2015; (ii) $120,000,000, with respect to such insured losses occurring in calendar year 2016; (iii) $140,000,000, with respect to such insured losses occurring in calendar year 2017; (iv) $160,000,000, with respect to such insured losses occurring in calendar year 2018; (v) $180,000,000, with respect to such insured losses occurring in calendar year 2019; and (vi) $200,000,000, with respect to such insured losses occurring in calendar year 2020 and any calendar year thereafter."].

[33] TRIA 2002 §103(e)(7)(A)(i)&(ii).

[34] *Id*. §103(e)(7)(D).

[35] *Id*. §103(e)(7)(D)(i)-(iv).

[36] TRIA 2002 §103(e)(8)(A)(i)-(iii).

[37] *Id*. §103(e)(8)(C).

[38] *Id*. §103(e)(8)(B).

[39] *Id*. §104(e)(1)(A) & (2).

[40] Terrorism Risk Insurance Revision and Extension Act of 2007, H.R. 2761, 110th Cong., 1st Sess., §5.

[41] TRIA 2002 §108(a).

Subsequently, given that terrorism catastrophe exposure continues to be significant for various lines of insurance (WCRIBMA, 2019), the TRIA 2002 had been extended four times respectively by the Terrorism Risk Insurance Extension Act of 2005 (TRIEA),[42] the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPA 2007),[43] Terrorism Risk Insurance Program Reauthorization Act of 2015 (TRIPRA 2015) (WCRIBMA, 2015), and Terrorism Risk Insurance Program Reauthorization Act of 2019 (TRIPRA 2019) (WCRIBMA, 2020).

The Terrorism Risk Insurance Program was recently extended for seven years, up to December 31, 2027, under the authorization of TRIPRA 2019. This extension introduces three significant amendments to the original TRIA 2002 legislation:

(1) The Secretary of the Treasury is now required to include an assessment of the availability and affordability of terrorism risk insurance, with a specific focus on places of worship, in its biennial report to Congress.[44]

(2) The U.S. Government Accountability Office (GAO) must conduct a study on cyberterrorism risks. This study will examine whether state definitions of cyber liability under property and casualty insurance provide adequate coverage for acts of cyberterrorism, assess the potential costs of cyberattacks, evaluate the private market's capacity to price cyber risks accurately, and consider the suitability of the TRIA 2002 framework for addressing cyberterrorism.[45]

(3) The timing for mandatory recoupment has been adjusted.[46]

Pros and Cons of Government's Involvement in Terrorism Insurance

TRIA 2002 has undoubtedly achieved several critical objectives. First, it stepped into replace withdrawing private reinsurers, with the government assuming the role of reinsurer (Kaptzis, 2004). Second, the program has provided the insurance industry with the necessary liquidity to underwrite terrorism risks (Suarez & Abrams, 2002, p. 4). By enabling the insurability of terrorism risk, TRIA 2002 has protected insurers until they regained the capacity to underwrite such risks independently (Kaptzis, 2004, p. 878). Moreover, the premiums for terrorism insurance have decreased (Epstein & Keyes, 2003, p. 3), allowing insurers to offer the coverage needed for major construction projects and commercial property mortgages at affordable rates (Kaptzis, 2004, p. 878). Despite these accomplishments, the debate over the appropriateness of government intervention in terrorism insurance remains unresolved.

Arguments against governments intervention.

Moral hazard issues. One of the major critiques to the TRIA 2002 is the potential of moral hazard (Zager, 2005, p. 558). "Moral hazard means that people may take greater risks than they would do without it because they know they are protected" (The Economist, 2010). The possibility that government interventions may obstruct private actions to mitigate damages may be created by terrorist actions (OECD, 2005, p. 71). Reduced incentives to mitigation can be understood as an application of the principle of moral hazard, in which excessive government subsidies or regulations could result in behavior in risky and inefficient ways (OECD, 2005, p. 71).

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[42] Terrorism Risk Insurance Extension Act of 2005, PUBLIC LAW 109–144—Dec. 22, 2005, 109th Congress.
[43] Terrorism Insurance Program Reauthorization Act 2007, PUBLIC LAW 110–160—Dec. 26, 2007, 110th Congress.
[44] TRIPRA 2019 § 502(c) [an act making further consolidated appropriations for the fiscal year ending September 30, 2020, and for other purposes. Public Law 116–94—Dec. 20, 2019].
[45] *Id.* § 502(d).
[46] *Id.* § 502(b).

"Long-standing government programs in areas such as flood insurance and banking have been criticized on such grounds." (Miller, 2002, p. 15). Therefore, the TRIA 2002 could lead to the unintended effect of increasing damage and loss suffered in future terrorist attacks (Zager, 2005, p. 558).

Market distortion. An issue associated with the moral hazard is the inefficient distortion to the free market triggered by government's "subsidizing insurance company profits" (Miller, 2002, p. 15). The generous assistance provisions may also discourage insurers from implementing necessary reforms of their risk assessment, pricing, and coverage policies with respect to terrorism (Dhooge, 2002, p. 57). The industry's lack of incentive and delay in performing reform, including risk mitigation and risk assessment, will impact policyholders who may not receive sufficient encouragement to minimize their risk of incurring losses as a result of future terrorist attacks (Dhooge, 2002, p. 57). Risk-based premiums provide an incentive to mitigate, which at least offsets the negative incentive created by the availability of insurance (OECD, 2005, p. 214). Unfortunately, the failure to apply risk-based premiums in most government reinsurance programs creates an incentive against mitigation (OECD, 2005, p. 214). In fact, there is decisive likelihood that the private insurance industry would have eventually found a solution for the problem arising from a temporary capacity shortage and associated complications and eventually proceed toward self-correcting (Gron & Sykes, 2003, p. 448).

Impediment to innovation. The government intervention may prevent the emergence of possible innovative solutions such as terrorism insurer pools or terrorism risk securitization (OECD, 2005, p. 71). After 9/11, scholars, primarily from the insurance and finance disciplines, suggested the possibility of transferring catastrophic terrorism risk to the capital markets though securitization (Woo, 2005; Gerrish, 2011). The benefits would be significant. The rationale is: "the capital market may be able to price the risk better than any individual insurer or a pool of insurers, and some of the vast amount of capital available in the capital markets could support terrorism risk underwriting" (Rhee, 2005, p. 505). Aside from the federal government, only the market can readily absorb mega-catastrophes that exceed $100 billion (Smetters, 2004, p. 4). Lastly, when the risk is transferred to the market, the government may still participate in the process as an investor rather than as an insurer or welfare provider (Rhee, 2005, p. 506). Such participation would increase liquidity and stabilization of the market in times of crisis (Rhee, 2005, p. 506).

The TRIA 2002 increases burdens of insurers. Under TRIA, insurers have been forced to take on more risk (Allyn & McNeff, 2003, p. 842). Although the insurance industry was able to reduce its exposure to acts of terrorism by reinstating exclusions under limited circumstances in accordance with the TRIA, insurers are compelled to make terrorism coverage available (Allyn & McNeff, 2003, p. 842). Because insurers' provision of terrorism insurance is mandatory, they cannot choose not to accept help from the government on a voluntary basis (Zager, 2005, p. 558).

In addition, insurance industry also argued that deductibles set in TRIA 2002 are too high, especially in the later stages of the Terrorism Insurance Program (Allyn & McNeff, 2003, p. 842). They regarded the deductible requirements as "more positive for the industry in the first year than in the second and third year." (Ha, 2002, p. 5).

Arguments supporting governments intervention.

National security justification. Government involvement in the compensation of terrorism related losses may be justified on political grounds. Terrorism risk is a specific exposure in that the choice of the compensation system and the degree in which it promotes mitigation in particular, may impact not only on the extent of losses

incurred, but also on the likelihood of the hazard itself (Dixon et al., 2004, p. 4). Therefore, the organization of the compensation of losses caused by terrorist attacks and the type of compensation chosen may feed back into the frequency and effectiveness of terrorist attacks so as to have an impact on national security (Dixon et al., 2004, p. 4). It is established that foreign policy choices have a decisive impact on transnational terrorism (for details, see National Commission on Terrorist Attacks upon the United States, 2002, pp. 375-377). Since terrorism compensation is a matter of national security, the government is responsible for providing or participating in a national insurance program indemnifying economic losses caused by terrorist attacks as part of its national security mechanism (Levmore & Logue, 2003, p. 268).

> Recent trends in terrorism suggest increased risk of economically-motivated attacks against private sector targets, government support of the compensation system may be a means of protecting financial assets in a manner that is complementary to the physical protection of targets and the direct disruption of terrorist activities. (Dixon Reville, 2005, p. 201)

Establishing a federal role now would alleviate the potentially devastating effect of another catastrophic terrorist attack (Miller, 2002, p. 15).

Terrorism coverage stays unattractive to private insurers. Despite improvements in modeling, terrorism risk remains largely uninsurable on the open market (Reiter, 2007). While risk modelers support the TRIA 2002 program and its extension, there are still arguments that even with improved terrorism risk models, large-scale terrorist attacks will lead the "large majority of insurers to quit the terrorism market"[47] (Reiter, 2007). "It is not simply imperfection in modeling that makes terrorism unattractive to insurers; it is the sheer enormity of loss that could result from terrorist attacks that sends insurers running" (Reiter, 2007). There is also possibility that the industry would be incapable of performing its obligations to its other insureds of different lines of coverages other than terrorism insurance[48] (Reiter, 2007). Should the losses be such tremendous, the private market of terrorism insurance would not be able to sustain itself through better modeling (Reiter, 2007). The insurers would either become insolvent or unable to pay claims (Reiter, 2007). Private market initiatives could never replace TRIA 2002 as it provides good "solvency protection", whereas without TRIA, private reinsurers "are unlikely to fill the void left by" TRIA, and primary insurers will consequently leave the insurance market[49] (Reiter, 2007). The most recent information reported to Treasury in 2023 reflects that terrorism risk reinsurance capacity, while continuing to increase, is not increasing at the same rate as reinsurance purchased for natural catastrophe hazards (U.S. Department of Treasury, 2024, p. 43).

Moreover, although capital markets can play a role in the terrorism insurance market, the research conducted by American Insurance Association and its members suggests that they are unlikely to supply for the capacity needed (American Insurance Association, 2014, p. 3). The capital markets have shown minimal interest

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[47] Citing *Terrorism Threats and the Insurance Market: Joint Hearing Before the Subcomm. on Oversight and Investigations of the H. Comm. on Financial Serv. and the Subcomm. on Intelligence, Information Sharing, and Terrorism Risk Assessment of the H. Comm. on Homeland Sec.*, 109th Cong. 34 (2006).

[48] Citing *Protecting Americans From Catastrophic Risk; Joint Hearing Before the Subcomm. on Capital Markets, Insurance, and Gov't Sponsored Enterprises and the Subcomm. on Oversight and Investigations of the H. Comm. on H. Financial Serv.*, 109th Cong. 131 (2006).

[49] Citing *Terrorism Threats and the Insurance Market: Joint Hearing Before the Subcomm. on Oversight and Investigations of the H. Comm. on Financial Serv. and the Subcomm. on Intelligence, Information Sharing, and Terrorism Risk Assessment of the H. Comm. on Homeland Sec.*, 109th Cong. 34 (2006).

in absorbing a risk that is poorly understood, uninsurable, lacks a rating from a Nationally Recognized Statistical Rating Organization, and is highly correlated with their other investment portfolios (American Insurance Association, 2014, p. 3). Additionally, investors may hesitate to purchase terrorism bonds due to their correlation with broader equity markets and the risk of adverse selection. The reluctance of rating agencies to assign ratings to these bonds further diminishes potential investor interest (American Insurance Association, 2014, p. 4).

The need for terrorism insurance. Regardless of the fact that writing terrorism insurance is unattractive to insurers, terrorism coverage is needed in the modern world. The Department of Homeland Security's Homeland Security Advisory System (HSAS) created by the U.S. government demonstrated that the terrorism threat level has never rated below yellow from 2002 all through 2011 (U.S. Department of Homeland Security, 2024). A threat level of yellow means that there is "significant risk of a terrorist attack" (The White House, 2002). Furthermore, the Department of Homeland Security (2024) had raised the threat level from yellow to orange nationwide on five separate occasions, meaning that the country was exposed to "high risk of terrorist attacks" (The White House, 2002). In August 2006, after intercepting a threatening intelligence that passengers would carry explosives onto a plane traveling from the United Kingdom to the U.S., the Department of Homeland Security of the U.S. government raised the nation's threat level to the highest level, "red", for commercial flights originating in the United Kingdom and bound for the United States (U.S. Department of Homeland Security, 2024). HSAS was replaced by Terrorism Advisory System (NTAS) in 2011. NTAS recently released the 2024 Homeland Threat Assessment (HTA), which continues to verify a high risk of foreign and domestic terrorism in 2024 (U.S. Department of Homeland Security, 2023). Apparently, the threat of terrorist attacks has never ceased to exist. Owing to such continuous threat, the insurance industry and the Federal government need to take affirmative steps to protect the economy from the impacts of another major attack (Reiter, 2007, p. 251). Also, as mentioned in Part II, constant threats of terrorism have made terrorism insurance a prerequisite for real estate and construction businesses to obtain loans from banks and other lenders (Miller, 2002, p. 14). The scarcity and cost of terrorism insurance could inhibit recovery from the recession that began in early 2001 (Miller, 2002, p. 15). Given that terrorism coverage, unwelcome among private insurers, is essential to the economy, the government intervention seems to be the sole solution for providing the necessary coverage.

Comments.

Government intervention is indispensable.

Responses to objections of government involvement. The foremost concern specified by objectors of government involvement is the problem of potential moral hazard. Such issue is over emphasized as government compensation programs, like the one created by the TRIA 2002 which still stipulates private insurers to share significant portion of losses so that they have great incentive to make policyholders minimize their risks (Wirzbicki, 2006). Insureds, who are risk averters, may somewhat reduce their exposure to terrorism risk by investing in better security systems and by moving to safer locations with or without government compensation (Lakdawalla & Zanjani, 2003).

> For example, the notion that the owners of the Sears Tower will eschew valuable precautions against terrorism on the grounds that they expect something approaching full compensation from the government in the event of its destruction seems uncompelling. It is also uncompelling that Sears Tower owners can avoid any market penalty for lax security because

> its tenants are secure in the knowledge that their decedents will receive compensation for their deaths. (Gron & Sykes, 2003, p. 448)

After all, what the insured can do to prevent the occurrence of mitigating terrorism risk is extremely limited. It is the Federal government alone who is most competent in minimizing a nation's exposure to terrorist attacks (United States Gen. Accounting Office (GAO), 2016). Furthermore, moral hazard arguments seem to ignore the fact that human lives are the most significant loss in any terrorist attack; hence in spite of the money, policyholders will take care to ensure their own survival (Reiter, 2007, p. 251).

As for the issuance of catastrophe bonds or terrorism bonds as an alternative to enlarge the insurer's capacity of absorbing losses incurred by terrorist attack, it is currently impractical (GAO, 2003, p. 30). First, the catastrophe bond is a financial instrument that spreads the risk of catastrophic loss among investors in capital markets (Marré, 2005, p. 156). Because of the problems associated with quantifying terrorism risk, these bonds would offer a relatively high rate of return due to the higher risk associated with such product (Marré, 2005, p. 156). The higher yield leads to the increase of the capital costs. In addition, the current regulatory and tax environments increase the transaction costs, namely the regulatory, accounting, tax, and information costs, of securitization as well (Davidson Jr., 1998). These costs traditionally do not appear in traditional insurance and reinsurance, and so securitizations historically have been more costly (Rhee, 2005, p. 505). Second, information on terrorism risk is relatively scarce, and the present data are still insufficient to extrapolate "accurate" actuarial models (GAO, 2003, p. 7). "Capital markets demand an even higher degree of precision in risk pricing than conventional insurance markets because they are more transaction based and place a premium on tradability" (OECD, 2005, p. 60). But, risk uncertainty and the perception that terrorism risk modeling is too new and subjective to be fully relied upon may slash investors' interests in terrorism bonds (OECD, 2005, p. 60). Consequently, rating agencies will not be able to rate the terrorism bond without an understanding of the underlying risk, and investors therefore will refrain from investing in terrorism bonds under such circumstance (American Insurance Association, 2014, p. 3).

Necessity of government intervention. If businesses continue to bear substantial amounts of terrorism risk, political realities imply that a federal bailout would be unavoidable in case of another catastrophic terrorist attack (Miller, 2002, p. 15). "In such a circumstance, the federal intervention would likely by hastily constructed, involve larger amounts of aid, and would not have the same beneficial economic effects as would a program implemented today" (Miller, 2002, p. 15). Accordingly, present governmental involvement would ensure that insurers stay engaging in covering terrorism losses in order to limit potential future government (and hence taxpayer) liabilities (Miller, 2002, p. 15).

Also, Professor Anne Gron of Northwestern University, Kellogg School of Business, articulates the comparative advantage of the government reinsurance program in terms of the risk premiums:

> [P]rivate reinsurers facing capacity constraints will charge substantial risk premiums to write coverage that may result in large losses. These risk premiums relate to the concavity of the profit function with respect to internal capital, which derives from the high cost of external capital (and perhaps bankruptcy costs), as previously noted. Arguably, government does not face these problems. In the event of a large, unanticipated call on the resources of the government as reinsurer, the government can still borrow in the capital markets at an attractive rate…It need not pay the sort of premium that private insurers must pay to attract external capital, and it need not worry about costs of financial distress… [A]fter a large shock that creates risk overhang accompanied by large risk premiums to compensate private insurers for writing new coverage,

> the government has a substantial, albeit temporary, advantage in risk bearing, and should enter the market to exploit it. (Gron & Sykes, 2003, p. 459)

As far as the information needed for risk assessment is concerned, the government is likely to have better information than the private markets concerning the probability and location of a future terrorist attack (OECD, 2005, p. 202). This advantage should allow the government to assess risks more accurately than private insurance firms can, and could enable the government to set more accurate prices for terrorism insurance (OECD, 2005, p. 202). However, two concerns make the government unlikely to release its very detailed information for the use of setting insurance premiums. On the one hand, terrorists could then infer what the government knew by probing the pattern of posted insurance premiums (OECD, 2005, p. 202). On the other hand, owners and residents in locations that received high risk ratings would want to know the basis for these valuations, creating pressure for the government to disclose confidential information (OECD, 2005, p. 202). In consequence, if insurance premiums reflect detailed risk ratings at all, then they are likely to be based only on information directly available to the private insurers (OECD, 2005, p. 202). These insurers are well aware that more accurate evaluations could be made using the government's information, and such knowledge would likely lead to higher premiums to compensation for the ambiguity created by the firm's limited access to information (OECD, 2005, p. 202). In that case, the government can at least serve as the "insurer of last resort" and "commit the resources to make payments if and when a terrorist attack occurs", will generate credibility to its compensation programs that have the goal to stop terrorism attacks from occurring in the first place (OECD, 2005, p. 202).

In short, the government compensation program for losses caused by terrorist attack has both advantages and unique duties in several regards with which private insurance industry cannot compare. Government's involvement in terrorism insurance program, despite the form, is inevitable.

Forms of government intervention. Governmental intervention in the management of terrorism risk may be categorized into the following forms.

Ex ante government insurance v. ex post government subsidy. There are policy choices between and *ex ante* government insurance of terrorism risk and *ex post* aid, neither of which carries definitive merits or demerits. The former aims at providing foreseeable, efficient, and possibly rapid allocation of the resources accumulated for the compensation of terror-related losses, while the risk of crowding out private market initiatives will need to be addressed (OECD, 2005, p. 72). To illustrate, since premiums for terrorism insurance provide regular reminders of the terrorism threat and may encourage appropriate precautionary measures, collecting premiums up in advance also creates a pool of resources that can be used to help speed economic recovery when financial resources are in deficit (Dixon et al., 2004, p. 15).

The ex post subsidy is often adopted to enforce a certain degree of redistributive justice; meanwhile the government would retain flexibility on the forms of the aid it provides (OECD, 2005, p. 202). Also, premiums are lower in this model than they are in the ex ante model, at least before a major attack occurs (Dixon et al., 2004, p. 15). Lower premiums stimulate higher insurance take-up rates and perhaps less overprotection, overavoidance, and adverse selection (Dixon et al., 2004, p. 15). Similar as the ex ante model, it needs to contemplate various potential negative effects, and mainly crowding out effects on insurance and induced disincentives on mitigation (OECD, 2005, p. 202). Besides, ex post may have aroused equity issues in which "the

losses may be spread over a population other than the one that is most at risk, and the burden of funding the coverage may be pushed forward in time to younger members of the population" (Dixon et al., 2004, p. 15).

As the primary objective of government-provided terrorism insurance is to help insurance industry to gradually restore and enlarge its capacity in taking terrorism risk and eventually assume longer role in terrorism insurance coverage (Kaptzis, 2004, p. 878; Jerry Jr., 2002a, p. 1067), either model more or less produces disincentive for private insurers to strive for carrying our necessary reforms of their risk assessment, pricing, and coverage policies with respect to terrorism (Dhooge, 2002, p. 57). Therefore, what really matters is not the timing of assessment, but the corresponding approaches associated with both model to elevate the level of private involvement. For the ex ante model, the government's role can be decreased over time through providing tax-free incentives for insurers to more quickly build up reserves for terrorism risk with lower costs (Dixon et al., 2004, p. 23). The ex post model may also reach the same goal through the incremental increase of insurers' deductibles every year (Kaptzis, 2004, p. 878).

Proper role of the government in terrorism insurance. First, the government may act as the primary insurer to offer terrorism coverage directly to policyholders; this is the most comprehensive form of direct government intervention, but also the most intimidating to the private sector (crowding out effects) (OECD, 2005, p. 202). Such public intervention would most probably be motivated by specific political context with regard to terrorism (OECD, 2005, p. 202). However, "once the government takes over a particular market, private insurance mechanisms cease to exist, and it is extremely difficult, and perhaps impossible, to restore such mechanisms once they are dismantled" (Jerry Jr., 2002b, p. 117). There is possibility that government may set the price too low due to political pressure so that taxpayers ultimately have to bear all the losses (Jerry Jr., 2002b, p. 117).

Second, the government may serve as the reinsurer of last resort to provide a backstop to private sector exposures; governmental backing may take the form of excess of loss or stop-loss reinsurance coverage (OECD, 2005, p. 202). Private insurers would be mandated to participate in the funding of this company, which would have the effect of pooling the industry's risk while capping industry losses through a government backstop (Jerry Jr., 2002b, p. 119). The backstop reinsurer may be offered free of charge by the government but subject to some degree of recoupment or may be paid for (OECD, 2005, p. 202). This approach also receive couple critiques: (1) although, under this approach, a new regulatory entity is necessary, once it is established, dismantling will be more difficult; (2) such entity would set the premium for the government reinsurance by assessing private insurers, but there is no guarantee that government regulators would do a better job of setting these rates than private markets (OECD, 2005, p. 202).

Third, the government may create a risk-sharing backstop program like the TRIA. For example, a large deductible could be set for insurer contributions to terrorism losses beyond which the government assumes all risk (Jerry Jr., 2002b, p. 119). A potential problem with this approach is that beyond the deductible, insurers have little incentive to prevent losses as the government is responsible for 100% of all losses above the cap. Thus, the prerequisite of this approach is the careful design of a system that requires insurer participation in compensating loss without placing disincentives on the creation of terrorism coverage (Jerry Jr., 2002b, p. 119).

Should the government involvement be permanent? Although supporting views regarding the government intervention in terrorism insurance has prevailed, the issue whether the government assistance should be offered temporarily or permanently remains unsettled.

Supporters of the permanent government intervention argue that because the war against terrorism as a long-term problem in which the best outcome is a stalemate[50] (Rhee, 2005, p. 487) once the governments withdraw from providing terrorism coverage, there remains no guarantee that insurers would offer terrorism coverage at rates that are attractive to policyholders and that insurance coverage would be widespread (Dixon et al., 2004, p. 26). As terrorist attacks aim to inflict maximum damage and devastation, they simultaneously achieve maximum exposure for their own cause (Woo, 2002, p. 3). For this reason, the issue of terrorism insurance coverage is targeted on most dramatically the security of properties that either have great symbolic or practical value (Kaptzis, 2004, p. 867). In consequence, as the cost of terrorism insurance remains extremely high, owners of lower potential risk property, in absence of government intervention, refrain from obtaining terrorism coverage (Jaffe & Russell, 2002, p. 20). The government program does not insure the entire nation against terrorism; instead, it basically functions as a mechanism for providing government reinsurance coverage for insurers attempting to cover properties that are commercial or have a high profile status—either symbolically or economically (Jaffe & Russell, 2002, p. 20; Woo, 2002, p. 10). Hence, completely leaving the terrorism risk insurance problem to the market can only make terrorism coverage more unattractive and unaffordable, or insurers will decide to abandon terrorism insurance altogether by re-introducing pre-existing terrorism exclusions (Reiter, 2007, p. 248).

Arguments advocating the sunset of the government intervention first reiterate the market mechanism. "The increase in both the mean and the variance of insurers' subjective distribution of terrorism losses creates a short-term crisis in the availability of terrorism coverage through the risk overhang phenomenon" (Gron & Sykes, 2003, p. 456). Insurers in the short term have increased the estimates of their exposure to terrorism risk. Past experience indicated that the problem insurance crises is likely to go away with time (Gron & Sykes, 2003, p. 456). Professor Gron explained that:

> Barring massive new terrorist attacks, insurers' capital will increase, the perceived uncertainty about the distribution of losses will diminish, and insurers' risk premia for covering terror-related losses will fall. Upward repricing of future coverage for terror-related losses will then afford insurers a substantial degree of confidence that the coverage will be profitable. (Gron & Sykes, 2003, p. 456)

There are still couple additional arguments favoring the expiration of government intervention: first, passing the risk of property insurance losses caused by terrorist attacks to taxpayers does nothing to increase security (John, 2007, p. 3). Second, programs like TRIA 2002 encourage insurance companies to dodge the proper pricing of coverage, with the expectation that federal reinsurance under TRIA 2002 will enable them to leave significant losses to taxpayers (John, 2007, p. 3). Given that TRIA 2002 is thus a pre-approved bailout for insurance companies, the friend of corporate welfare only, it should neither be extended nor expanded (John, 2007, p. 3).

This article suggests that concluding the debate at this stage is premature, even though more than twenty years have passed since the 9/11 attacks. The pricing of terrorism coverage heavily relies on the assessment of terrorism risk, which involves using actuarial tables to reflect both the frequency of such events and the costs associated with the resulting damage in order to calculate appropriate premiums (Boran, 2003). Achieving precise pricing, however, depends on the advancement of terrorism risk modeling. Unfortunately, terrorism can only become more predictable through the occurrence of more attacks, as accurate patterns require multiple data points

[50] Citing Letter from Warren Buffett, Chairman, to Shareholders of Berkshire Hathaway, Inc. 9 (Feb. 28, 2002).

for analysis (Boardman, 2005, p. 815). Although models have been evolving, as discussed in Part II, their accuracy and effectiveness have not yet undergone thorough and repeated examination. A common limitation among all these models is their reliance on qualitative inputs and interpretations for determining modeled frequencies, and they also suffer to some extent from the generalization of effects (Mitchell & Silke, 2023, p. 176). Therefore, until a credible model reaches maturity, it is too early to make hasty judgments about whether the current government intervention should remain indefinitely. If a "truly precise" prediction of future terrorist attacks were to make insurers even more reluctant to provide coverage, it might be time to consider a long-term government backstop plan.

Review of Present Insurance Coverage for Terrorism-Risk in Taiwan

In Taiwan, government currently does not implement any backstop plan or provide any coverage for terrorism risk. The supply of terrorism coverage counts completely on the private insurance sector. Terrorism risk is generally excluded by the ordinary all-risk property insurance policies unless otherwise insured in the form of endorsement (Non-Life Insurance Association of ROC, 1991a). Most property and casualty insurance companies in Taiwan do offer add-on coverage for terrorism risk that indemnifies the insured's amount of loss exceeding the agreed deductible (Non-Life Insurance Association of ROC, 1991b). The policy definition of "terrorism" does not deviate from the common understanding toward terrorism of the international society[51] (Non-Life Insurance Association of ROC, 1991). After 9/11, recognizing the potential severity of loss incurred by terrorist attack, 16 out of 22 property insurance companies established the "Coinsurance Association for Terrorism Insurance (CATI)" which is a loss-sharing pool for personal accident insurance (Liao & Cheng, 2017, p. 185). Established in 2004, the CATI, administered by Non-Life Insurance Association in Taiwan, provides terrorism coverage for personal accident business in order to share the risk among 16 property insurance companies and the Central Reinsurance Corporation (Central Re) (Willis Towers Watson, 2019, p. 41).

Perhaps due to Taiwan's lack of experience with large-scale losses from terrorist attacks, most private insurers remain willing to offer terrorism coverage. However, compared to the U.S. system, Taiwan's current approach to terrorism insurance is extremely fragile in several key areas. First, much like the U.S. before 9/11, insurers in Taiwan may not consider terrorist attacks to be high-frequency or high-consequence events. They seem to underestimate the real risks associated with a single major terrorist incident in Taiwan. In reality, several characteristics of Taiwan could make the island particularly vulnerable to such attacks, potentially leading to devastating property damage and loss of life. These include: (1) high population density, (2) its status as one of the world's major IT manufacturing centers, (3) the presence of Taipei 101, the second tallest building in the world, (4) the ongoing threat from China, and (5) its isolation in the international community. As an island situated along the critical waterway connecting the Pacific and Indian Oceans, Taiwan also faces the threat of maritime terrorism, which could target its ports (Hsu, 2007). In the event of a 9/11-like terrorist attack, insurers' failure to adequately assess the potential for large-scale losses could trigger a chain reaction of insolvencies

[51] "Terrorism refers to any individual or organization, acting independently or conspiring with any individual, organization or the government of foreign nation, by using force or violence, intend to overturn, threat or influence any government or cause fear to the public or particular group of people so as to fulfill his purpose of politics, religions, beliefs or values."

among Taiwan's relatively small insurance companies.[52] Second, since the most severe losses from a terrorist attack typically involve property damage and long-term economic impacts, the property insurance sector would be hit hardest if an attack occurred. The current coverage by the CATI, which focuses only on personal accident insurance, does not align with this risk profile. A single attack could bankrupt one or several insurers offering terrorism coverage in the property insurance sector.

Given the vulnerability of Taiwan's insurance industry to terrorism risk, which could destabilize the entire economic foundation with a single strike, the establishment of a government backstop system similar to the U.S.'s TRIA 2002 program is strongly recommended.

Concluding Remark

Based on the discussions in the preceding paragraphs, this paper presents the following conclusions:

First, terrorism risk can be insured, provided that sufficient information is available for risk assessment and that sophisticated models are developed for precise analysis. However, even when terrorism risk is quantifiable, the uptake of terrorism coverage may remain low due to prohibitively high premiums and limited availability. Government intervention, in the form of a reinsurer or a backstop compensation program, could address these challenges. The TRIA 2002, TRIEA 2007, TRIPRA 2015, and TRIPRA 2019, despite facing various criticisms, have proven effective in accelerating economic recovery and reducing the costs of terrorism coverage.

Second, while arguments in favor of government intervention are valid, determining the appropriate duration for such programs is premature due to the lack of reliable modeling.

Third, although some insurance companies in Taiwan currently offer terrorism coverage, this may be an illusion stemming from their underestimation of the threat level. The sooner Taiwan establishes a government backstop program similar to TRIA, the less impact the insurance industry and the broader economy will face in the event of a terrorist attack.

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[52] The largest Property Insurance Company in Taiwan, Fubon Insurance Co. holds total assets approximately USD $3.6 billion while Traveler's Insurance Co. owns total assets approximately USD $125.9 billion at the end of 2023. See Insurance Bureau of Financial Supervisory Commission (2024) and Traveler's Insurance (2010).

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