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OPTIONS FACING CONGRESS IN RENEWING THE TERRORISM RISK INSURANCE ACT (TRIA): A QUANTITATIVE ANALYSIS

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PUBLIC POLICY CONTEXT

On July 17, 2014, the U.S. Senate passed S. 2244¹, as amended, to extend the Terrorism Risk Insurance Act (TRIA) for seven years. The House is also expected to bring H.R. 4871², which reauthorizes TRIA for five years with different provisions, to the floor for a vote before the end of the summer. TRIA, a public-private partnership, was established in 2002 when most insurers and reinsurers stopped covering losses from terrorism attacks after they paid claims of \$32 billion (2001 prices; \$44 billion in 2014 prices; 2/3 of which was reinsured) from the damage caused on September 11, 2001 (9/11 hereafter).

The claims from 9/11 dwarfed those from previous terrorism-related property losses. By comparison, the truck bomb

detonated by Al Qaeda in the garage of the North Tower of New York City's World Trade Center in February 1993 caused just over \$750 million in insured losses; the bomb discharged by Timothy McVeigh outside the Alfred Murrah Federal Building in downtown Oklahoma City in April 1995 resulted in damages totaling \$650 million.

In the wake of the devastating coordinated attack by Al Qaeda on 9/11, most insurers and reinsurers—faced with the sudden realization that terrorist attacks could be catastrophic—stopped offering coverage for terrorism in the United States unless required to do so. As a result, many businesses operating in the U.S. found it increasingly difficult to purchase commercial property insurance that included the risk of terrorism. Real estate and commercial ventures stalled because of an inability to

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- In determining the future of TRIA in the coming weeks and months, Congress and the Administration will be making important decisions on the nature of risk-sharing arrangements between the public and private sectors.
- The authors perform an analysis of the exposure of 764 insurers to terrorism risk using the ratio of TRIA deductible over surplus as a proxy, and indicate how that exposure would change for different deductible levels.
- Using a terrorism risk model developed in collaboration with the modeling firm Risk Management Solutions, the authors also analyze how economic losses under different terrorist attack scenarios would be shared among key stakeholders, comparing the arrangements under the current TRIA program to alternative terrorism risk insurance designs articulated recently by the U.S. Senate and House.
- Renewing TRIA may limit the amount of disaster relief the federal government would contribute after a terrorist attack, but the different options under which TRIA might be renewed carry implications for how losses from any attack would be spread between commercial policyholders, insurers, and taxpayers.

obtain the requisite insurance protection. By law, insurance companies offering workers' compensation insurance cannot exclude the peril of terrorism, nor can insurers exclude terrorism from the "fire following" coverage in certain states. As a result, workers' compensation insurance premiums increased significantly after the 9/11 attack and many carriers did not renew some of their policies in major metropolitan areas.

Responding to these concerns, the Terrorism Risk Insurance Act (TRIA) was enacted at the end of 2002 as a temporary measure to increase the availability of coverage for terrorist acts. TRIA was designed to achieve a balance of risk sharing between the insurance industry, commercial policyholders and the federal government (taxpayers). TRIA requires that all U.S. insurance companies offer terrorism coverage to commercial firms—on the same terms and conditions provided by their commercial insurance policies for other perils—in exchange for free up-front reinsurance from the federal government against catastrophic losses. Firms may be required to purchase this coverage by state law. In fact, there was a strong demand for coverage by commercial firms due to lending requirements and/or a desire to be protected against losses from future attacks.³ TRIA was renewed for two years in 2005, and again for seven years in 2007, with the private sector assuming more of the risk with each extension of the program but with the federal government still providing reinsurance against catastrophic terrorist attacks at no charge. As a result of TRIA's passage, terrorism insurance is now widely available and many businesses in the United States have protected themselves against these losses. Market analysis by two large insurance brokers, Aon and Marsh, indicates that on average 60% of their clients (typically large firms) have purchased terrorism insurance today. But insurers have also indicated that they could not cover that risk on their own, so a large private market has not yet emerged.

To assist Congress and the Administration in their evaluation of renewal options before the program expires at the end of 2014, this Issue Brief presents an analysis of how economic losses from terrorist attacks would be shared among the different stakeholders under the current TRIA program and the Senate and House alternative designs. To do this, we examined three different terrorist attack scenarios in four large cities located in different parts of the United States: Chicago, Houston, Los Angeles and New York. Our analysis complements recent publications on terrorism risk and insurance, several Congressional hearings that took place in the House and the Senate in 2012, 2013 and 2014, reports by the President's Working Group, the U.S. Government Accountability Office, the U.S. Congressional Budget Office, the Congressional Research Services, the Organization for Economic Cooperation and Development, as well as insurance industry studies on take up rates and terrorism pricing based on their portfolios of clients. A fuller discussion of the findings summarized in this brief can be found in the Wharton Risk Center's larger report, *TRIA After 2014*,⁴ available free of charge on the website of the Wharton Risk Center: <http://www.wharton.upenn.edu/riskcenter>.

RISK-SHARING STRUCTURE OF THE TRIA PARTNERSHIP AND PROPOSED LEGISLATION

We now contrast the current TRIA program with the legislation proposed by the Senate and House.

CURRENT DESIGN

Under TRIA's current design, the costs from "certified" terrorism events that result in over \$100 million (the *program trigger*) in insured industry losses in TRIA-eligible lines of business are shared as follows:

- Commercial policyholders are responsible for paying any losses within their standard

insurance policy deductibles.

- Insurance companies then provide coverage for all losses in excess of these policy deductibles, if total industry losses do not exceed \$100 billion.
- The federal government reinsures the insurer's terrorism loss in excess of a TRIA deductible percent (D^*) for losses equal to 20% of that company's prior year's direct earned premium (DEP) for the lines covered under the program. D^* has increased from 1% in 2002 to 20% since 2007.
- Losses in excess of each insurer's deductible (D^*) are shared 15/85 between the insurers and the federal government. This coinsurance arrangement was 10/90 when TRIA was first passed.
- Should total insurance industry losses exceed \$100 billion, primary insurers are responsible for reimbursing policyholders only for their proportionate share of losses up to \$100 billion, and Congress shall determine the procedure and source of any payments for the uninsured losses.
- The federal government recoups its payments under TRIA by levying surcharges on all commercially insured policyholders at a rate of 133% of its payments below the *insurance marketplace aggregate retention* – an amount currently set at \$27.5 billion – and above the aggregate insurers' uncompensated outlays (i.e., insurer losses within the deductible and coinsurance) during the calendar year.

PROPOSED LEGISLATION

The Senate bill modifies the current program in several ways:

- Insurers' coinsurance percentage on certified terrorism events would gradually increase over 5 years **from the current 15% to 20%**.
- The marketplace aggregate retention would increase from the current \$27.5 billion by \$2 billion annually until it reaches **\$37.5 billion**.⁵

¹ "Terrorism Risk Insurance Program Reauthorization Act of 2014," <https://beta.congress.gov/bill/113th-congress/senate-bill/2244>.

² "TRIA Reform Act of 2014," <https://beta.congress.gov/bill/113th-congress/house-bill/4871>.

³ Kunreuther, H., and Michel-Kerjan, E. (2004). "Policy Watch: Challenges for Terrorism Risk Insurance in the

United States," *Journal of Economic Perspectives*, 18: 4, pp. 201-214.

⁴ Kunreuther, H., Michel-Kerjan, E., Lewis, C., Muir-Wood, R. and G. Woo (2014). *TRIA After 2014. Examining Risk Sharing Under Current and Alternative Designs*. Center for Risk Management, The Wharton School, University of Pennsylvania, Philadelphia, PA.

⁵ For purpose of our analysis we assume a \$37.5 billion market retention for the Senate bill. This figure might vary depending on the date of the attack, since the bill increases the retention incrementally by \$2 billion a year over 5 years up to \$37.5 billion.

The House bill differs from the Senate bill in the following ways:

- It would increase the **program trigger** from **\$100 million to \$500 million**.
- The **marketplace aggregate retention amount** would now be calculated as the sum of the deductible amounts of all insurers participating in TRIA for the year in which a terrorist attack occurs, rather than a fixed amount (as an example, this amount would be **\$32 billion** for the 764 insurers we analyzed if based on 2012 market data).
- The **percentage that the federal government recoups** against all commercial policyholders would increase from **133% to 150%** for losses subject to mandatory recoupment.

AN ANALYSIS OF INSURERS' DEDUCTIBLE/SURPLUS (D/S) RATIOS

One measure of particular interest to insurers, regulators and rating agencies alike is the ratio of the insurer's TRIA deductible amount in relation to its surplus. A higher deductible/surplus (*D/S*) ratio implies that the insurer is more exposed to losses from a terrorist attack. While there is no specific threshold that applies to all insurers given their different portfolios, a *D/S* ratio greater than 0.15 is generally regarded as a high measure of relative exposure to terrorism.

Accessing market data from the rating agency AM Best, we were able to determine the *D/S* ratios of 764 insurance companies operating in the United States and then calculate changes in the *D/S* ratio for each of the top 30, top 50, top 100, and top 450 insurers as the TRIA deductible percent (*D**) is varied from 15% (2005 level) to 20% and 25%.

- Only 3 insurers among the top 30 would have a *D/S* ratio of 0.15 or greater when *D**=15%; this increases to 7 insurers under the current *D**=20% and to 11 insurers should *D**=25% (see Table 1).
- For our sample of 450 insurers, when *D**=15%, 95 of them would have a *D/S* ratio greater than 0.15; this would increase to 140 insurers when *D**=20% and to 175 insurers if *D**=25%.

Should *D** be increased from its current 20% level, some insurers could face a significant risk of insolvency or financial distress after a severe terrorist attack if they do not increase their levels of capital or obtain private reinsurance in response to the policy change.

QUANTIFYING LOSS SHARING UNDER DIFFERENT TRIA DESIGNS

We worked closely with modeling firm Risk Management Solutions (RMS), which constructed the following three specific attack mode scenarios based on their terrorism risk model: (a) a 10-ton truck bomb; (b) 1-ton Sarin gas release; and (c) 1-kiloton nuclear detonation bomb. Key high-profile targets were identified in the central business districts of the four major cities of Chicago, Houston, Los Angeles and New York.

Using the 10-ton truck bomb scenario, we undertake a series of analyses varying four TRIA design parameters: (a) insurers' deductibles; (b) level of coinsurance for insurers; (c) insurance industry retention level, to determine what part of the insured losses paid by the federal government will be mandatorily recouped against all commercial policyholders in the U.S.; and (d) percentage of the federal payment that is mandatorily recouped.

ASSUMPTIONS ON TERRORISM INSURANCE MARKET SHARE AND TAKE-UP RATES

We have utilized *market shares* of insurers in individual states in which the four cities are located to allocate losses from a terrorist attack among the 764 largest insurers. These firms account for virtually 100% of the terrorism insurance policies placed with U.S. licensed primary insurance carriers at the end of 2012. Property insurance lines have been separated from workers' compensation lines.

As discussed earlier, terrorism cannot be excluded from workers' compensation insurance, which is required for all firms, so we assume a 100% take-up rate for terrorism-related workers' compensation losses. Based on studies by insurance brokers, we assume a 50% take-up rate for terrorism insurance

for the property lines, recognizing that the actual percentage may vary from one city to another as well as by the type of firm.

KEY FINDINGS

Figures 1, 2 and 3 depict the distribution of terrorism losses between non-insured firms, insurers, all commercial policyholders (recoupment) and taxpayers under the current TRIA program, and the Senate and House bills respectively. In the analysis below, we use the case of an attack (10-ton truck bomb) in New York City. The full report, *TRIA After 2014*, shows the results from Chicago, Houston and Los Angeles as well.

Based on TRIA's current design, our analysis reveals that under the current loss-sharing arrangement, the federal government (taxpayers) will not be responsible for any payments after mandatory recoupment until the losses from a terrorist attack exceed \$40 billion, as shown in Figure 1.

Commercial policyholders will always have to pay a portion of the cost of a terrorist attack under the current TRIA program if the total loss to all industrial firms is less than \$80 billion, and they could end up paying as much as \$11.3 billion. The significant exposure of commercial policyholders has not been widely discussed.

Based on the Senate bill, American taxpayers would not be responsible for any payments after mandatory recoupment by the federal government until the total losses from a terrorist attack (insured or not) exceed **\$59 billion**.

When damage reaches \$100 billion, the federal government will be responsible for nearly \$31 billion in payments, insurers for \$33 billion, commercial policyholders for over \$5.7 billion, and the remaining \$30 billion would be uninsured.

Commercial policyholders could pay more than \$10 billion when total losses from terrorist attacks are in the range of \$38 billion to \$82 billion, with a maximum of \$17.9 billion when total losses are \$54 billion, as shown in Figure 2.

TABLE 1: D/S ANALYSIS FOR THE TOP 30 INSURERS (2012 DATA)

Insurers	Surplus (in \$ billion)	Direct Earned Premiums in TRIA Eligible Lines (in \$ billion)	20% TRIA Deductible (in \$ billion)	D/S Ratio (20% Deductible)	D/S Ratio (25% Deductible)
1. Liberty Mutual Insurance Companies	\$16.8	\$12.0	\$2.39	14.26%	17.82%
2. Travelers Group	\$19.3	\$10.9	\$2.18	11.29%	14.12%
3. American International Group	\$29.2	\$10.4	\$2.08	7.14%	8.93%
4. Zurich Financial Services NA Group	\$7.7	\$6.7	\$1.35	17.57%	21.97%
5. Hartford Insurance Group	\$14.2	\$5.8	\$1.17	8.22%	10.28%
6. Chubb Group of Insurance Companies	\$13.8	\$4.9	\$0.98	7.10%	8.87%
7. CNA Insurance Companies	\$10.0	\$4.6	\$0.92	9.23%	11.54%
8. Nationwide Group	\$13.8	\$4.5	\$0.89	6.45%	8.06%
9. ACE INA Group	\$5.7	\$4.1	\$0.82	14.41%	18.02%
10. State Farm Group	\$65.3	\$3.1	\$0.62	0.95%	1.19%
11. Allianz of America Companies	\$3.6	\$3.0	\$0.61	16.93%	21.17%
12. FM Global Group	\$7.5	\$3.0	\$0.60	7.99%	9.98%
13. W. R. Berkley Insurance Group	\$4.7	\$2.7	\$0.54	11.64%	14.55%
14. Assurant P&C Group	\$1.4	\$2.7	\$0.53	38.09%	47.61%
15. Farmers Insurance Group	\$5.6	\$2.6	\$0.53	9.33%	11.66%
16. Philadelphia Ins Cos/Tokio Marine US	\$4.2	\$2.3	\$0.46	11.00%	13.76%
17. QBE Americas Group	\$2.3	\$2.2	\$0.44	19.08%	23.84%
18. Cincinnati Insurance Companies	\$3.9	\$2.1	\$0.43	10.90%	13.63%
19. Berkshire Hathaway Insurance Group	\$106.7	\$1.9	\$0.38	0.35%	0.44%
20. Fairfax Financial (USA) Group	\$5.2	\$1.9	\$0.38	7.24%	9.05%
21. NY State Insurance Fund WC Fund	\$3.1	\$1.9	\$0.38	12.01%	15.01%
22. Old Republic Insurance Group	\$2.8	\$1.8	\$0.35	12.77%	15.96%
23. Auto-Owners Insurance Group	\$6.6	\$1.7	\$0.34	5.15%	6.43%
24. Great American P& C Insurance Group	\$2.1	\$1.6	\$0.32	15.14%	18.93%
25. Hanover Insurance Group P&C	\$1.5	\$1.6	\$0.31	20.63%	25.79%
26. Citizens Property Insurance Corporation	\$6.3	\$1.5	\$0.30	4.79%	5.99%
27. Allstate Insurance Group	\$17.1	\$1.2	\$0.24	1.42%	1.77%
28. Munich-American Holding Corp	\$5.9	\$1.2	\$0.24	4.06%	5.08%
29. Erie Insurance Group	\$5.6	\$1.1	\$0.22	3.84%	4.80%
30. Selective Insurance Group	\$1.0	\$1.1	\$0.21	20.10%	25.12%

Based on the House bill, American taxpayers would not be responsible for any payments after mandatory recoupment by the federal government until the total losses from a terrorist attack (insured or not) exceed \$52 billion (Figure 3).

At a \$100 billion loss, the insurers will be responsible for the same \$33 billion as they would be under the Senate bill, but the commercial policyholders will not pay anything because the industry retention of \$32 billion is below the value of insurers' payments. Hence, the government recoups nothing from the policyholders and is left paying the entire \$36.84 billion.

Despite the higher 150% recoupment rate, commercial policyholders would typically be less exposed to the mandatory recoupment under the proposed House legislation than the Senate bill. They could pay more than \$10 billion when losses from terrorist attacks are between \$36 to \$59 billion, with a maximum of \$15.3 billion when losses are \$46 billion, as shown in Figure 3. We used \$32 billion as market retention in the above analysis based on the sum of insurer deductibles for the 764 insurers we analyzed.

The actual mandatory recoupment threshold may be higher than \$32 billion depending on actual market conditions at the time of the attack and if other risk-bearing entities, such as captives, had been included in our study. For instance if one considers market retention of \$44 billion (estimates by the Congressional Budget Office for the year 2016) instead of \$32 billion, then the House bill would be such that American taxpayers would not be responsible for any payments after mandatory recoupment by the federal government until the total losses from a terrorist attack (insured or not) exceed \$74 billion; the maximum payment by the commercial policyholders would then be much higher at \$26.8 billion.

FIGURE 1: AMOUNT PAID BY STAKEHOLDERS FOR DIFFERENT LOSSES FROM TERRORIST ATTACKS TO NEW YORK CITY UNDER CURRENT TRIA LOSS-SHARING ARRANGEMENTS

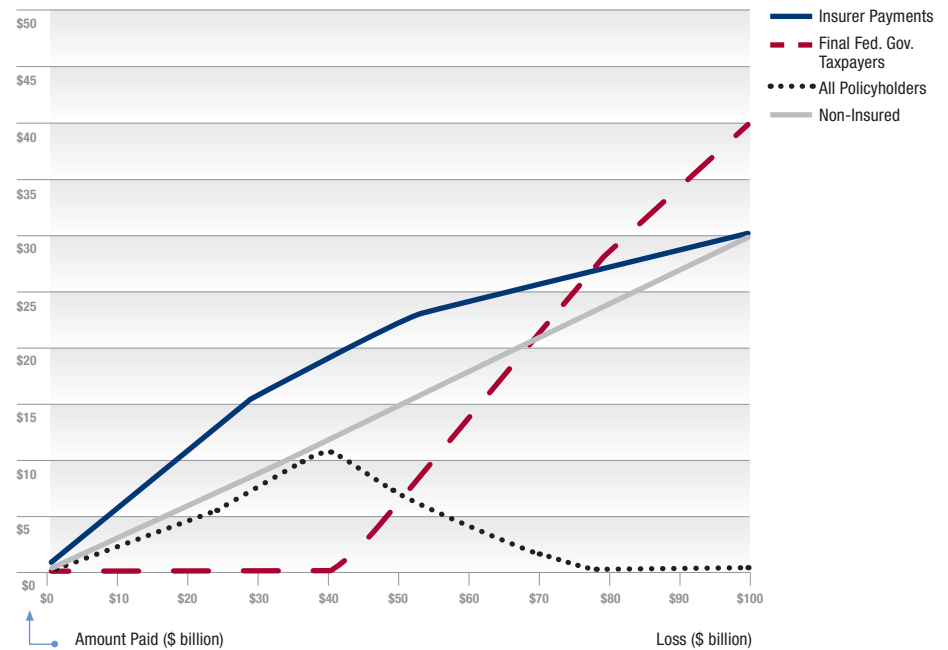


FIGURE 2: AMOUNT PAID BY STAKEHOLDERS FOR DIFFERENT LOSSES FROM TERRORIST ATTACKS TO NEW YORK CITY UNDER SENATE BILL S. 2244

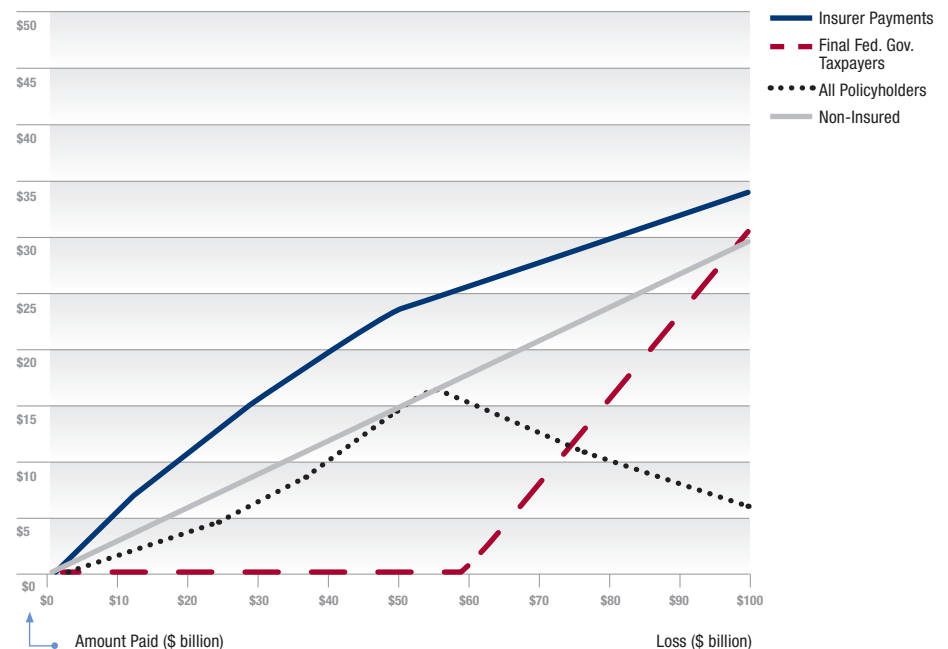
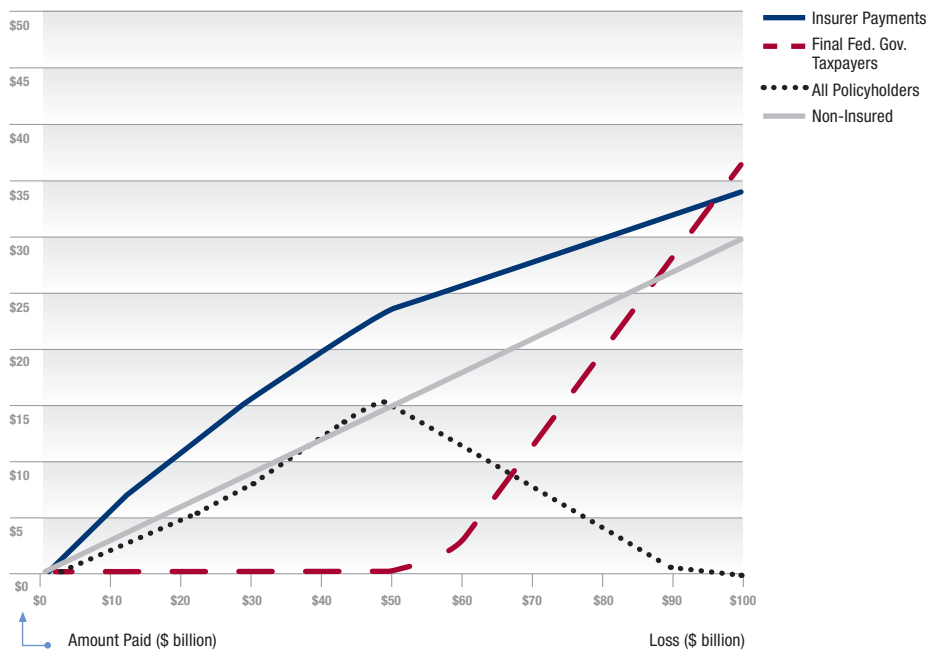


FIGURE 3: AMOUNT PAID BY STAKEHOLDERS FOR DIFFERENT LOSSES FROM TERRORIST ATTACKS TO NEW YORK CITY UNDER HOUSE BILL H.R. 4871



CONCLUSIONS

Our analysis assumes that firms suffering losses from a terrorist attack will not receive compensation from the federal government for the uninsured portion of their loss. However, experience from 9/11, the financial crisis and recent natural disasters suggests that the government may assist firms suffering uninsured losses, and the amount of federal disaster relief is likely to depend on the magnitude of the losses.

In analyzing each of these scenarios, we have focused solely on the insurable losses under the scenario and not the broader economic loss that would have to be addressed. To the extent that a terrorist attack causes indirect impacts, one needs to consider the

role that insurance and other protective measures undertaken by firms can play in cushioning these longer-term economic effects.

In the coming weeks and months, Congress and the Administration will make a decision about the future of TRIA after 2014 and the nature of the risk-sharing arrangements between the private and public sectors. Over the past decade, our research team at the Wharton Risk Center has published over 20 studies on terrorism insurance markets based on discussions with many of the key stakeholders interested in these issues in the United States and abroad. We hope the analysis in this brief helps to inform decision makers.

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