Should governments Support the Private Terrorism Insurance Market?

Prof. Dwight M. Jaffee
Haas School of Business
University of California
Berkeley CA 94920-1900
email: jaffee@haas.berkeley. Edu

Prof. Thomas Russell
Leavey School of Business
Santa Clara University
Santa Clara, CA 95053
email: trussell@scu.edu

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1. Introduction

The governments of many countries in the developed world now provide some form of support to their private terrorism insurance market.[1] The argument for this intervention generally takes the following form.

1) Following a terrorist attack, private providers of terrorism insurance cease writing this line of coverage. For various reasons, terrorism risk is declared to be "uninsurable."

2) Lack of terrorism coverage increases the variance of corporate cash flows, notably in the construction and real estate, transportation, and tourism industries. This increase in volatility leads to an increase in the cost of capital, a reduction in supply, and therefore adverse macroeconomic consequences.

3) Facing a reduction in employment and GDP, governments act to support the private terrorism insurance market, this support being rationalized as a branch of stabilization policy, adding a new tool to the traditional channels of monetary and fiscal intervention.

Although this line of argument has some dissenters (for example, Hunter (2004), Smetters (2004), CBO (2005b) and in parts, Jaffee and Russell (2003)], it has been powerful enough to determine global public policy. In this paper we critically re-examine each of the three steps.

We begin by revisiting the question of why the private terrorism insurance market fails. Clearly, if terrorism insurance is really an "uninsurable risk", the question of an optimal government alternative needs to be raised. However, if the private market, after a period of temporary stress, is independently viable, a long term program of government support is not only unnecessary, but it may actually crowd out the private market recovery. Secondly, we examine the question of how GDP might be expected to develop in the worst case in which no private terrorism insurance is available. Lastly, assuming that some form of government intervention is desirable, we examine the efficiency of various forms of government support.

[1] For an overview of international arrangements see, e.g., the papers in the recent OECD (2004) conference.

2. Why Private Terrorism Markets Fail

The direct reason primary insurers withdraw coverage following a terrorist attack is the refusal of reinsurers to underwrite this risk. In the 9/11 attack in the US, for example, no domestic US insurance company suffered a loss in excess of $1b, but three foreign reinsurers, Lloyds, Munich Re, and Swiss Re, suffered combined losses of approximately $8b, and the largest single group loss (2.4b) was incurred by the domestic reinsurer Berkshire Hathaway. The collapse of the terrorism insurance market is thus primarily a collapse of the reinsurance market. The existing government programs all act as substitutes for the failing reinsurance markets.

Looking at the reinsurers, it is tempting to explain their unwillingness to underwrite the terrorism line by its unique statistical properties. Two such properties are often cited:

a) that the probabilities of terrorist attack are imprecise;
b) that terrorism losses are concentrated.

With respect to the first feature, imprecise probabilities may well lead to behavioral responses such as ambiguity aversion, see Kunreuther et al (1995). However, such a behavioral response is not fatal to the operation of this market. By adding an ambiguity premium, or, in the case in which insurers are Bayesian, an imprecision premium, the provider of insurance could be compensated for the uncertainty surrounding the estimates of the probability of loss.[2] Moreover, many large risks such as (for example) earthquake losses in California, are underwritten by reinsurers, even though the probability assessments in this case are recognized to lie within very broad bands.[3]

With respect to the second issue, it is not clear why an insurer cannot hold a diversified portfolio of risks some part of which is terrorism risk. It is true that all of the group life insurance policies on the North Tower of the World Trade Center were held by one small insurance company, but that was a voluntary business choice by the company, not a statistical imperative. Viewed from a reinsurer's global perspective, there seems nothing intrinsic to the risk of terrorism which makes

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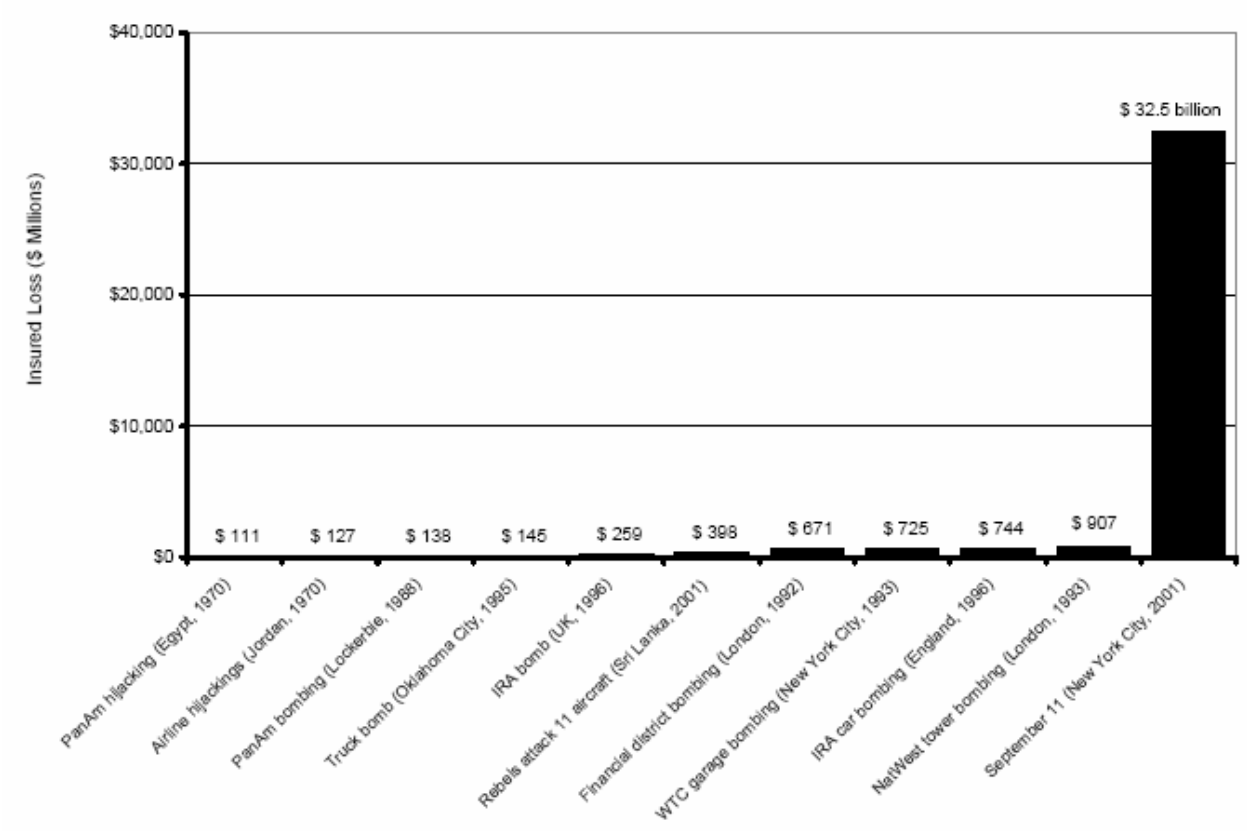
[2] As suggested by Froot and Posner (2002), a premium for parameter uncertainty need not be large.

[3] In testimony before the US Senate Banking Committee, the CEO of Swiss Re, Jacques Dubois, stated "As a reinsurer, we are not required to provide terrorism reinsurance coverage. And, for the most part, we do not now provide terrorism reinsurance *because we cannot quantify the frequency or severity of possible events."* (italics added, Dubois (2004)). Yet in January 2005, Swiss Re Capital Markets launched two new tranches of catastrophe bonds for the California Earthquake Authority from its Redwood program of issuance, Redwood Capital V and VI, worth $150m each. The bonds were well received by investors. The bonds, which will have a maturity of two years, will cover earthquake risk in California. The bonds were rated Ba2 by Moody's and BB+ by Standard & Poor's (S&P). Swiss Re Capital Markets was sole bookrunner for the deal. Eqecat modeled the deal's risk and expected loss, Reactions (2005).

this line non-diversifiable and therefore uninsurable on this score.

Of course, it is true that terrorism losses can be large, and size itself is an issue in questions of insurability, see Gollier (2002). Any one insurance entity, even a global reinsurer, has finite resources. When the size of a potential loss is large enough, the subdivision of loss, the essential economic explanation for why insurance works, could still leave any one insurance company with an unmanageably large fraction of the loss relative to its finite reserves. In this case, a major event could bankrupt the reinsurer. Given the deadweight costs of bankruptcy, it thus may be imprudent to write such coverage. Whether or not the size of potential terrorism insurance losses fall in this category is an empirical question.[4]

Figure 1: Distribution of Terrorism Insured Losses (In Millions of 2001 dollars)
Source: Hubbard and Deal (2004)



[4] Cummins et al (2002) provide qualified support for the view that the industry can handle similar magnitudes of loss for natural catastrophes, particularly if it moves towards the use of more sophisticated financial instruments.

In Figure 1 (from Hubbard and Deal (2004)), we show the size distribution of recent terrorism losses. Are these losses unmanageable? Clearly the distribution is highly skewed, but to put the largest of these losses in perspective, the $32.5b loss of 9/11 is less than the annual growth in property /casualty policy holder surplus in the US in each of the last two years (see Figure 2). Furthermore, aggregate insured annual losses from natural catastrophes in several years since 1992 have exceeded the "man-made" insured losses in 2001 (see Figure 3).

Figure 2: US Property Casualty Policy Holders' Surplus ($ Billions)
Source: Insurance Information Institute

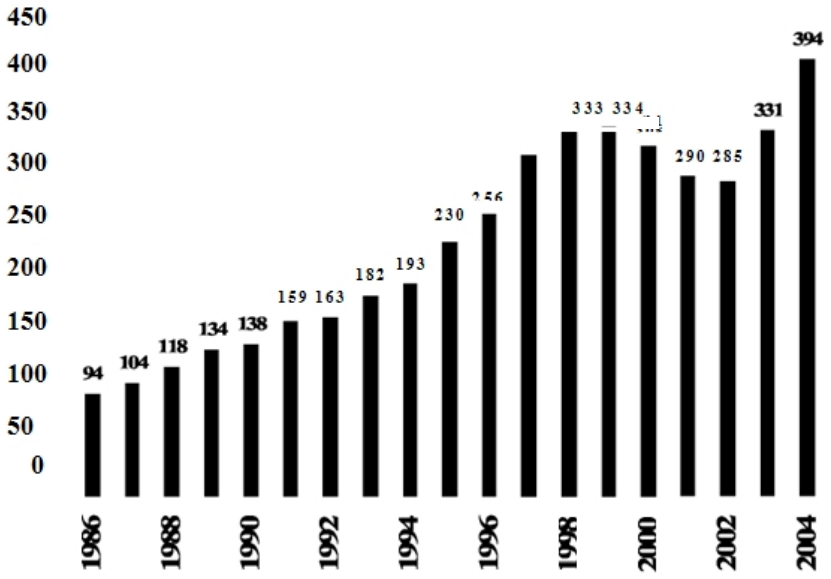
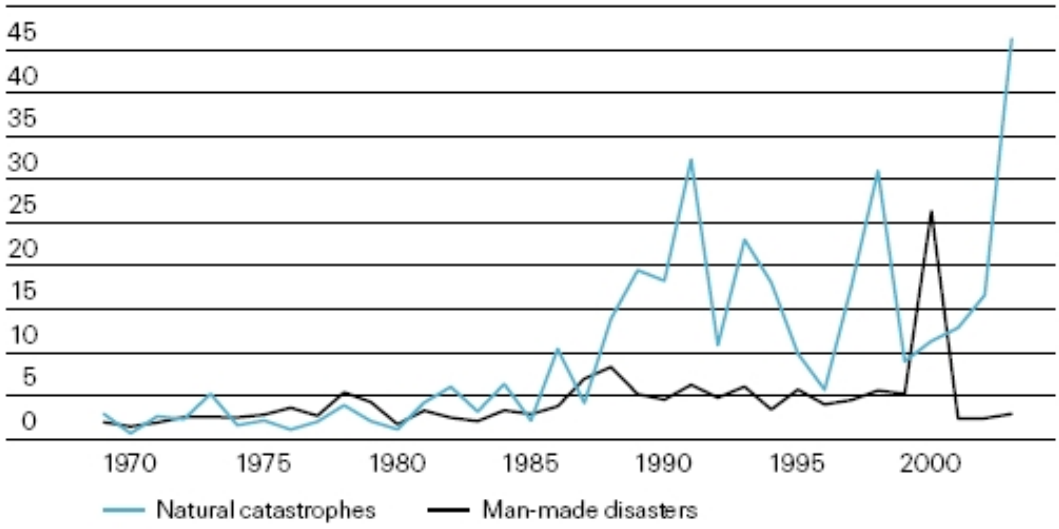


Figure 3: Insured Losses, 1970 t0 2004, $ Billions Indexed to 2004
Source: Swiss Re (2005)



Moving to the level of the individual firm, AIG, one of the largest US primary insurance companies had terrorism losses due to 9/11 of $820m. Again to give perspective, in the second quarter of 2002, AIG had stock market losses of $629m, $356m alone in losses on the stock of Worldcom.[5] Also, there can be no expectation of losses of this magnitude each year. As noted above, it is impossible to give precise estimates of the annual probabilities of loss, but recognizing this, the CBO has proposed that annual losses could average $4.5b with a 1% chance of reaching $40b.

Of course, it is possible to imagine doomsday scenarios producing losses limited only by the vividness of the estimator's imagination.[6] But it is also *possible* that on a given day both towers of the World Trade Center could have collapsed due to a traditional high-rise fire. This possibility applies to any number of mega high-rise buildings around the world, but never leads to calls for government intervention. Indeed, if anything, it leads to regulatory standards for fire safety imposed by the government on the private sector, not vice versa.

The question of the size of loss is highly relevant to current discussions in the US regarding renewal of the Terrorism Risk Insurance Act (TRIA) of 2002. At the moment, the private primary insurance market deductible on government provided reinsurance is 15% of direct written premiums. Assuming that the premiums relevant to the TRIA deductible are around 50% of total P/C premiums of $412b, say $200b[7], the current 2005 deductible puts primary insurers at risk for a loss of $30b, comparable in magnitude to the 9/11 loss of $32b. Thus, unless they have found private reinsurance for the TRIA deductible, primary insurers are, in aggregate, as exposed today to terrorist attack as they were to 9/11.This situation will only worsen if the deductible is raised (as proposed by some legislators) to 20% as well as if the premium base goes on rising.

Aggregates can be deceiving, since the deductible is applied on a company by company basis. However, even on an individual firm basis, deductibles can be large. Dowling & Partners has published their estimates of TRIA retentions for major publicly held insurance companies for 2005 and notes that AIG has a deductible of $3.25 billion, St. Paul Travelers has a deductible of $2.4

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[5] Insurance Journal Sept. 2 2002.

[6] Some elements of the insurance industry have not been shy in using doomsday visions to promote the renewal of TRIA. As a good example, Ramani Ayer (2004), CEO of Hartford Financial Services, refers to a "suitcase nuclear bomb in Times Square..,.could kill 500,000 people….with even odds in the next ten years (and) a loss of $586 billion.

[7] $200b is almost certainly an underestimate. In 2003, commercial line direct written premiums totaled $229b (IIABA 2005) and in 2004 they will have grown by a further 5%. This puts the industry aggregate deductible closer to $36b.

billion, and three other companies (CNA Insurance, Hartford, and Chubb) have TRIA deductibles between $900 million and $1.15 billion. It would appear that those firms in the US writing terrorism insurance now (in effect all primary insurers offering commercial line) are doing so with no government reinsurance whatsoever for dollar losses of the 9/11 magnitude and even higher. This is prima facie evidence that terrorism losses of this magnitude are in fact insurable without any government intervention. It is thus apparent that in discussing the possible renewal of TRIA, the relevant domain of aggregate losses is only in the mega catastrophe range above $40b, events that would create a very real possibility of bankruptcy. Thus, there may well be grounds for government support for this extreme top layer of risk. We return below to the question of how such low probability, government-provided, reinsurance should be priced.

3. The Costs of Non-Intervention

Given that there may be grounds for government intervention at the extreme tail of the loss distribution, the question arises what would happen if the government in fact did nothing. In the US, Hubbard and Dean (2004) have argued that removal of the government subsidy granted by TRIA will lead to a annual GDP loss of 0.3%-0.4 % in perpetuity. The Hubbard and Dean study assumes that if the government subsidy is removed, terrorism insurance will continue to be offered, but the premium rate will double. This doubling of the rate leads to

a) a reduction in consumer wealth and hence a reduction in consumption;
b) an increase in the cost of capital and hence a reduction in investment;
c) an increase in the cost of labor and hence a reduction in employment.

The analysis of Hubbard and Dean, however, can be challenged on both empirical and theoretical grounds. On empirical grounds, a doubling of terrorism premiums following removal of the subsidy seems highly unlikely. As we have noted, all of the costs of a 9/11 size attack are in any case being borne by primary insurers now, there being, for losses up to this magnitude, effectively no government assistance. Of course primary insurers may have purchased some private reinsurance against their TRIA 15% deductible, but this will be reflected in the current premium. The Hubbard and Dean conclusion of a premium doubling in the absence of TRIA is also contradicted by the detailed expected loss analysis by the ISO.[8] Based on work by their modeling

[8] Insurance Service Office Inc., since 1971, a leading provider of information for and about the property casualty insurance industry in the US.

arm AIR, ISO divides the US into 3 risk tiers, with distinctly different degrees of reliance on the TRIA subsidies:

Tier 1 High Hazard--New York City (all boroughs) San Francisco County, CA Washington, D.C. Cook County IL (Chicago).

Tier 2 Moderate Hazard--Suffolk County, MA (Boston), King County, WA (Seattle) Los Angeles County, CA Harris County, TX (Houston) Philadelphia County, PA.

Tier 3 Low Hazard--Remainder of U.S.A.

ISO calculated for 2005 that the government premium subsidy provided by TRIA was 30% in Tier 1, 5% in Tier 2 and zero in Tier 3, see, for example, CFA (2004). These numbers will have been further reduced by the unexpectedly large growth in premiums, so that the only tier likely to be affected in any material way by the government subsidy is Tier 1, and even here, withdrawing this subsidy would only cause premiums to go up a maximum of 40%. Thus the Hubbard and Deal premise of a premium doubling seems to be biased on the upside.

Regardless of the magnitude of the subsidy, however, the analysis in Hubbard and Deal seems flawed on the grounds of basic economic theory. Any increase in premium is not a loss to society but is rather a transfer from the wealth of the stock holders of the insured company to the stockholders of the companies providing the insurance. If investors are optimally diversified, this is the same person, so this is a wash. If investors hold different portfolios, this transfer will have distributional consequences, but these will be second order.

By the same token, the Hubbard/Deal study provides no analysis of the effect of the subsidy on the taxpayer who provides the resources. As noted by the CBO (2005b).

> "Indeed, the cost—in terms of risk and uncertainty—of having the federal government provide terrorism reinsurance is approximately the same as the cost of having the private sector provide it. With a Federal program, however, that cost is shifted from shareholders of insurance companies and owners of commercial properties to taxpayers. The shift in cost would occur even if surcharges ultimately offset all cash outlays under TRIA."

3.A A Financial Framework for Analyzing the TRIA Subsidy

The forgoing suggests we need a general equilibrium framework for the analysis of the welfare effects of a government insurance subsidy. Moreover, this framework must recognize the place of insurance in the spectrum of hedging vehicles, including stock, futures, and option markets. Clifford Smith and his co-authors, using the ideas of modern portfolio theory, have provided such a framework, the key insights of which we now summarize; also see Smith (2005) for an overview.

One of the fundamental insights of the finance approach is the observation that since the owners of a widely held corporation can already hedge risky cash flows by stock market diversification, an insurance market is largely redundant. As Smith notes:

> "appropriately priced, risk management still will not affect firm value. To illustrate, consider a capital asset pricing model framework. To increase firm value, the firm must acquire an asset that plots above the security market line. But a fairly priced asset will plot on the line. Thus even if hedging changes the firm's beta, a fairly priced hedge would simply move the firm along the security market line ŋ it would not increase firm value."

This argument is a specialized form of the classic Modigliani Miller Theorem. It implies that whether terrorism risk is diversifiable or not, the purchase of insurance at a fair price has no effect on the firm's required rate of return, its value, its real decisions, and therefore, by aggregation, on total GDP. By the same token, therefore, the absence of insurance has no effect on GDP.

Of course, widely held firms do engage in risk management and hedging, and in particular they do purchase insurance. To understand the costs of not having this insurance market available, however, it is necessary to understand the reasons for using this form of risk transfer. Smith suggests four possibilities, two of them connected with special features of the US tax code:

i) The tax function is not linear. If the function which maps income into tax liability is convex, then reducing the volatility of earnings by purchasing insurance reduces taxes and thus increases firm value. The magnitude of this effect depends on the degree of convexity in the tax code.

ii) Since the tax code in the US favors debt, the purchase of insurance, by reducing volatility and/or the costs of financial distress, facilitates the issuance of debt, and so increases firm value, Stultz (1996), Ross (1997), Leland (1998).

iii) Even though diversified investors in the firm may not benefit from the purchase of insurance, other stakeholders in the firm, managers, workers, and suppliers, for example, may be undiversified and therefore risk averse. The purchase of insurance increases the probability of survival of the firm, and thus (from the firm's perspective) improves the terms of trade of the owners with these stakeholders, and in this way increases firm value.

iv) Insurance corporations may have comparative advantage in risk assessment, risk mitigation etc., and so even at a fair price, the purchase of insurance may increase firm value.

In this framework, an estimate of the cost of government inaction requires an assessment of the magnitude of these various effects. On the tax issues, a study by Graham and Porter (2002) found "no evidence that firms hedge in response to tax convexity" but did find that "firms hedge to increase debt capacity, with increased tax benefits averaging 1.1% of firm value." In their study, firms hedged by using derivatives, but the same issues arise with respect to the use of insurance. With respect to (iii) as far as we know, there has been no study which quantifies the extent to which the absence of terrorism insurance affected managerial and other salaries. With respect to (iv), although governments are unlikely to develop the expertise in mitigation methods which give private insurers an edge, it is likely that governments will be better informed than firms on the probabilities of terrorism attacks. That would be a valid argument for government provision of all terrorism insurance not just reinsurance of the high loss tail, but it is unlikely a government would allow its classified intelligence information to be used to set risk-based insurance premiums.

Within this finance framework, government support for the terrorism insurance market has real effects because insurance compensates for market imperfections. In particular, insurance has real effects because it enables firms to take increased advantage of the favorable tax treatment of debt. This explains why debt intensive industries such as real estate investment and mortgage markets lobby so hard for government subsidies for their insurance, but it does not imply that the absence of government support will lead to a fall in GDP. For example, suppose that the traditional weapons of monetary and fiscal policy are used to ensure full employment. Then if insurance subsidies cause industries relying on debt to expand inefficiently, then the absence of such insurance will paradoxically lead to an increase (not a decrease) in GDP.

While the existence or absence of terrorism insurance is unlikely to have a significant macroeconomic effect on GDP relative to its potential, it may have an important impact on how the economy adjusts its allocation of resources to the discernible terrorism threat. For example, if

terrorism insurance is unavailable from any source, then the owners of capital assets, including real estate, will take special efforts to safeguard their assets, including locating them in safer locations. A similar incentive is provided when private insurance markets use risk-based pricing for their premiums. Government insurance programs, in contrast, tend not to use risk-based pricing and therefore fail to have these allocational benefits. The bottom line is that the existence of government terrorism insurance programs will actually raise the economy's expected loss due to a terrorist attack.[9]

3.B <u>A Growth Framework for Analyzing the TRIA Subsidy</u>

A second way to analyze the effect of terrorism insurance (or its absence) on GDP is to embed the insurance function in a model of long run growth. Here we will use the Solow/Swan growth model. As is well known, in this model "the tail of investment is wagged by the dog of saving." To compare the growth path of an economy with no insurance with the growth path of an economy with insurance, we note that the absence of insurance will cause an increase in the savings propensity *s* through the effect of increased volatility on precautionary saving. To calibrate the effect of an increase in s on the growth rate of GDP, we need to know

a) by how much will the absence of insurance cause the savings rate s to rise;
b) what effect will this increase in *s* have on the growth rate of GDP.

At this time, even the size of the precautionary savings effect, let alone the effect of a lack of insurance on its volatility, is the subject of continued debate. A recent study by Kennickell and Lusardi (2004) states that

> "Even though this motive does not give rise to large amounts of wealth for young and middle-age households, it is particularly important for two groups: older households and business owners. Overall, we provide strong evidence that we need to take the precautionary saving motive into account when modeling saving behavior."[10]

Based on this study, for these groups, particularly business owners, one may expect the provision of terrorism insurance to lead to a measurable decline in saving.

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[9] See CBO (2005b) and Jaffee (2005) for a further discussion of the allocative impacts of terrorism insurance.

[10] The view that the size of precautionary saving is substantial is taken by Hubbard in Hubbard et. al. (1995), a paper which points out the negative effect of a different government program on saving. No mention of the negative effect of TRIA on saving appears, however, in Hubbard and Deal (2004).

What effect will a decline in saving have on the log run growth rate of the economy? As is well known, in the Solow/Swan model with a Cobb-Douglas production function, (elasticity of substitution = 1.0) the growth rate of output is given by *n* the technical change augmented rate of population growth. It is, therefore, independent of the savings rate *s*. However, if, as the evidence seems to suggest, the elasticity of substitution exceeds 1.0, Klump and la Grandville (2002) have shown that the rate of growth is positively influence by the rate of saving. In this case, the absence of terrorism insurance will lead to an increase in the growth rate of GDP.

The Solow/Swan model is just one version of the long run growth story, and one may expect different predicted outcomes in different models. For example, if, for some reason, decision makers are risk averse, the absence of insurance will affect which projects are chosen. To the extent that the precautionary motive is important, however, it must be recognized that an insurance market failure will produce an increase in the propensity to save.

4. Optimal government Intervention

As we have seen, there is no obvious reason why the private insurance industry should not be able to provide terrorism insurance against losses at least up to the magnitude of those sustained on 9/11. And even if insurance is not available, the diversification provided by existing equity markets prevents any serious decline in firm value. Nevertheless, immediately following a terrorism attack, the loss in surplus in the insurance industry and the potential for insurance firm bankruptcy, if that is how the risk is managed, is likely to cause serious and costly disruptions. What should a government do in these circumstances? Here we consider two issues.

4.A Should Government Support be Permanent or Temporary?

In some countries e.g. Spain, and the UK, government support for the terrorism industry is permanent.[11] In other countries, e.g. the US, France, and Germany, the enabling legislation contains sunset clauses.[12] This raises the question of whether government support should be permanent or temporary. In policy discussions, this question has unfortunately been answered with

[11] See, for example, Michel-Kerjan and Pedell, (2004).

[12] TRIA legislation in the US was quite clear as to its purpose: "the United States government should 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 (underlining added).

an apparently reasonable but actually false argument that since the threat of terrorism has now become permanent, so should a government subsidy. Indeed if we agree with the many terrorism experts who do believe that we will live under the threat of global terrorism for many years to come, this is all the more reason for making a subsidy temporary. The provision of permanent government subsidized reinsurance removes all incentives for the private sector to develop alternative risk transfer mechanisms[13] and all but guarantees that the private sector will never be able to handle mega catastrophes. What is needed are measures designed to encourage financial innovation by the private sector, and this requires sunset provisions on subsidies.

On the other hand, even if private insurers and reinsurers develop financial instruments to cope with a $100b loss, it is unreasonable to suppose that the loss itself will not be disruptive. In equity security markets, for example, there are circuit breakers to slow trading on days of large losses, and in money markets, the Central Bank stands ready to deal with losses due to runs on commercial banks. Responsible governments, therefore, need to stand ready to deal with the surplus depletion which would inevitably follow a mega loss. But this does not at all require that governments offer free reinsurance. We have argued elsewhere, Jaffee and Russell (1997), that the fundamental problem caused by catastrophic loss is a temporary difficulty in raising new external capital.[14] To remedy this, all that is needed is for a government to state that it is prepared to make temporary funds available, acting to the insurance industry as a lender of last resort, a role which governments have long played with respect to the banking system.

4.B Should Government Support be Free or Priced?

How a government raises the funds to provide this capital is a standard problem in public finance, but again by analogy with central banking, there is no reason why a loan should be free to the recipients. The arguments for providing risk transfer at prices which reflect the underlying probabilities of loss are very powerful. Not only does risk based pricing provide the correct

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[13] Financial innovation which taps into global bond and equity markets is one obvious way in which insurance companies could expand their reach to the $100b event. In these markets one day losses of $100b are almost routine. For a discussion of this issue in relation to natural catastrophes, see Doherty (1997).

[14] This absence of capacity provides a profit opportunity to the nimble. “Within weeks of Sept. 11, March & McLennan formed Axis Specialty, through its private equity subsidiary MMC Capital, and Bermuda-based RenaissanceRe Holdings Ltd. Started DaVinci Reinsurance to address the industry's capacity shortage. In all, nine new insurers have moved into Bermuda since the terrorist attacks. The other seven are Allied WorldAssurance, Endurance Specialty Insurance, Arch Reinsurance, Montpelier Reinsurance, Goshawk Reinsurance, Olympus Reinsurance and Queens Island Reinsurance” (Best Wire, March 1, 2002).

incentives in choosing risky projects, it also provides the correct incentives with regard to mitigating the loss. It is therefore surprising that governments which support the provision of terrorism insurance typically do not apply risk-based pricing, and in the US, there is no pricing at all, relying instead on taxes and levies on general insurance as a source of funding.[15] The shifting of the burden to the general taxpayer is facilitated by the fact that this item is off budget.[16]

Again the analogy with central banking is worth considering. Central banks stand ready to provide liquidity, but at a price (the discount rate) and under strict conditions. Nothing in this precludes the existence of a private market in liquid funds, and in fact the Federal Funds market serves this role. Comparably, a government agency could be charged with making capital available to the private insurance and reinsurance market under strict conditions, one of which would be that the loan was temporary, and a second of which would require the loan to be priced. With these conditions, nothing would prevent the existence of a private markets which would perform the same function.

One argument sometimes raised against risk-based pricing of terrorism insurance is the difficulty of assessing the probability of loss. There are, however, at least two responses. First, the government could auction access to its reinsurance facility, thus allowing the market participants to determine the price.[17] Second, if acting as a lender of last resort, a government which wishes to charge the market rate does not need to assess terrorism risk, only the credit risk, i.e. if it makes a temporary loan to an insurance company, how likely is it that the loan will be repaid? Credit risk is not independent of terrorism risk, in that another attack would place a strain on an insurance firm's ability to repay a loan, but following 9/11 no major insurance company went into bankruptcy suggesting that credit risk may be quite low.

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[15] For European countries operating under European Union rules, a failure to charge for the government reinsurance would be considered an illegal subsidy. The European country plans thus all have a price, but it is not risk-based.

[16] The CBO has attempted to quantify these taxpayer costs in the case of one proposed extension of TRIA, CBO (2004).

[17] The concept here is similar to how Treasury departments auction Treasury securities to the investing community. Jaffee and Russell (2003) and Jaffee (2005) have proposed, specifically, that a government purchase catastrophe bonds as the specific instrument to achieve the risk transfer. A competitive auction among the insurance firms would determine the sale price of the catastrophe bonds.

5. Conclusions

In this paper we have argued that private insurers are capable of handling terrorism losses up to the magnitude of those incurred on 9/11. In the US, this fact underlies the structure of the TRIA government subsidy program, which now provides no support for industry losses at or below the $39b magnitude. Moreover, we have argued that, to first order, even if terrorism insurance became unavailable, the equity market alone would provide enough of a risk transfer mechanism, the decisions by large widely held firms being largely unaffected. The benefits of insurance flow primarily from the distortions brought about by agency problems and tax favoring of debt. Thus, in our view the case for a permanent program of government support to the insurance industry has not been made.

On the other hand, the large transfers of ownership of capital which a terrorist attack would inevitably cause, will put a temporary strain on financial markets, and there are valid arguments for governments taking steps to ease this strain. This can be done most easily by a permanent program which provides temporary loans to the insurance industry until such time as its surplus is replenished. Put simply If these loan are offered at a market rate reflecting credit risk, all the benefits of risk-based pricing continue to flow.

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