FEDERAL TERRORISM REINSURANCE:
AN ANALYSIS OF ISSUES AND PROGRAM DESIGN ALTERNATIVES

By

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I. EFFICIENT INSURANCE MARKETS - RISK SHARING VERSUS EFFICIENCY

Can Private Markets Insure Terrorism Risk?

Insurance functions well when individual losses are not enormous and when they are random and uncorrelated. Under such circumstances, risk can be spread across policyholders with little chance of insolvency to the insurers. Conditions are never quite that perfect and the market can tolerate some lumpiness of losses and some correlation. Reinsurance helps to overcome such imperfections and allows primary insurers to operate with tolerable risk of failure. Thus, private insurance markets protect those who suffer sudden losses by spreading the burden over a very large population.

Private insurance markets have covered terrorism risk effectively and without fanfare. This has worked because losses have been small. When losses are individually very large (September 11th) or a sustained run of smaller correlated events occurs (such as a terrorist campaign), risk spreading does not work so smoothly. The ideal arrangement for dealing with this type and degree of risk, is well understood.[1] While there is a big overall impact, we are all going to have to bear, we can spread this impact as widely as possible and protect any one individual from suffering more than their proportional share of the loss. Thus, we can compensate the few who suffering a particular loss knowing that the total burden of such compensation will have to be paid by all the rest in increased insurance premiums or taxes.

This can be done by a mutual insurance arrangement in which the policyholders are also the owners of the insurance company and receive the profits in the form of dividend payments. When unusually large loss experience occurs, individuals suffering losses are paid their claims, but all policyholders must pay for the spike in claims by a reduction in their dividends. But this only works if the existing insurer capital is sufficiently large. Failing this, the insurer can still fail and those unfortunate to suffer losses will not get paid.[2] With events (singly or collectively) of the enormous scale now known to be possible from terrorism, this model breaks down and insolvencies will prevent those suffering losses from being fully paid the coverage due under their policies. Faced with such an event, the only way to compensate terrorism victims ex post would be through implicit government guarantees which would be funded by taxpayers.

This reasoning suggests that the insurance market can provide terrorism cover up to some limit. This limit may not be a bright line and will be defined with respect to a single loss or a series of

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[1]The basic ideas were first laid out in the path breaking work of Karl Borch (1962) and were developed later in the work of John Marshall (1974), Georges Dionne and Neil Doherty (1993), and others.

[2]Technically, the mutual could call for new capital contributions from its members, but if this is too large, then many will simply walk away. Nor can mutuals easily secure new capital from capital markets. Stock insurers also are likely to have difficulty raising capital following a large loss shock due to informational asymmetries between insurers and the capital market regarding reserve adequacy and exposure to similar future losses (Cummins and Danzon 1997).

losses occurring over a short period (long enough for the industry to replenish its capital). To get some handle on the industry's capacity to write this risk we have run the insurance market capacity model of Cummins Doherty and Lo (2001). These results suggest that the U.S. property-liability insurance industry could withstand a loss of $40 billion with minimal disruption of insurance markets – a high proportion of the loss would be paid, either directly by insurers or through insurance guaranty funds, and about 20 insurer insolvencies would occur. For larger losses, however, the market disruption would be significant. For example, a 100 billion loss would cause about 60 insolvencies. Putting this number in perspective, the maximum number of insolvencies ever to occur in the U.S. property-liability insurance market during the past thirty years was 42 (in 1989). However, even a relatively small terrorist event would lead to significant price increases and supply shortages in insurance and reinsurance markets.

The ability of the insurance market to write terrorism insurance up to some rather limit is clear. But where is the limit? This limit is cannot be assessed with pinpoint accuracy because it involves a trade off between supply and solvency. Moreover, the trade off can change as market conditions change and as losses accumulate. For example, the market is responding to a loss which is estimated to be in the order of $40 billion property an related losses plus unknown liability exposure and which seemed in the early days after the loss to have been aggravated by a concurrent decline in asset values (though asset markets have subsequently recovered).[3] Thus, the accumulated loss, including the asset hit, could well be much higher. The ability of the market to respond to the September 11th loss is determined by its "capacity", which rests upon the spread of business, the risk management practices of firms and the level and distribution of capital across the industry. And the ability to respond to future losses will also depend on capacity which depends, ceteris paribus, on the inflow of capital.

Even if the insurance market can respond to a terrorist attack of moderate size, there is some question about the efficiency of spreading this risk through the insurance market rather than sharing it more broadly through taxation. While it is true that widely held insurers are owned by diversified shareholders who also hold stock in many other types of firms, many insurers are closely held stock companies or mutuals, whose owners may be sub-optimally diversified. Insurance generally works well in terms of resource allocation by imposing the costs of losses on the enterprises and activities generating loss events, e.g., drivers who drive more or less carefully have to pay higher auto insurance premiums and firms engaged in hazardous activities causing more work injuries pay higher workers' compensation premiums. In the case of a terrorist attack, however, the connection between the loss and the behavior of the insured individuals and business firms is more tenuous. Spreading such costs through the insurance system is likely to create incentives for firms not to construct "target" buildings such as the World Trade Center or the Sears Tower in Chicago and not to locate in high-profile areas such as lower Manhattan. Such incentives may or may not be socially desirable from a public policy perspective and the decision about whether to create this type of incentive is probably best made through the political process rather than through insurance markets.

Market Response and Recovery

[3]For example, as of 11/8/01, the S&P 500 was 2.38% higher than on 9/10/01.

The insurance industry has previously been hit with sudden large losses. The closest recent U.S. illustration was Hurricane Andrew in 1992. In response to losses to the industry that totaled around $19 billion, reinsurance prices for catastrophe insurance in particular (and to a lesser extent other lines) soared and capacity was severely reduced. The price rise was further stimulated on the demand side of the market as customers now saw the salience of storm risk. In response to these price rises caused by demand and supply shifts, new capital entered the industry largely in the form of new Bermuda cat insurance, which in time led to resurgence of supply and a moderation of prices (Cummins and Weiss 2000). A similar sequence was seen in response to the Northridge earthquake.

But our understanding of market behavior under stress is not limited to these anecdotes; it has been modeled and tested. In the "capacity constraint" and "arbitrage" models, various researchers have shown that these responses to sudden shocks do follow a direct economic logic and may represent rational behavior in strained circumstances. Moreover, these models (more specifically refinements of these models) do appear to be supported by empirical data.[4]

Early indications are that the responses to Andrew and Northridge are being echoed after 9/11/01. Reinsurers are not renewing existing coverages, cancelling terrorism risk or raising prices sharply. The prospect of higher reinsurance prices after a long period of soft prices appears to have raised the level of optimism of investors and insurance stock prices have performed well, gaining over 6.5% since the day before 9/11/01 and beating the market.[5] Moreover, capital is currently flowing into the industry, reflecting an expectation by investors that hardening markets bode well for future profitability.[6] By way of comparison, around $4 billion of new capital entered the Bermuda reinsurance market in response to the $19 billion Andrew event. As of early November, new capital of around $18 billion has entered the industry in response to the $40-plus billion loss. Thus, one can infer that restoration of capacity will lead to some lightening of reinsurance prices and improvement in availability.

But in the meantime, primary insurers are being squeezed. While they are often constrained by state regulation to offer terrorism coverage for many lines, they are unable to obtain such coverage from reinsurers (or can only do so at very high prices).[7] In such a regulatory vice, the solvency of the primaries is put at some risk. In unregulated lines, the cost or unavailability of

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[4]Winter (1994), Gron (1994), Doherty and Garven (1995), Cagle and Harrington (1995), Cummins and Danzon (1997), and Doherty and Posey (1997).

[5]Morgan Stanley's market weighted Property and Casualty companies index increased by 6.65% between 9/11/01 and 11/8/01 compared with 2.38% for the S&P 500.

[6]Schroeder et al Update on WTC Related Issues, Morgan Stanley, 11/9/2002, p8. By early November, over $18 billion in new capital had been raised.

[7]U.S. regulators can require domestic insurers to include terrorism coverage in their policies. However, because the reinsurance market is largely international, regulators have little control over the supply of reinsurance for terrorist events.

terrorism reinsurance is forcing many primaries to cancel coverage to their own policyholders or pass on the sharply increased reinsurance prices. It is these pressures, along with the salience of terrorism risk, that created the demand for Federal reinsurance.

The arguments of this section leave open a potential role for the Federal Government as a risk bearer, or source of funds. For the moment, we think there is a prima facie case against market failure for losses in the "low tens-of-billions" and so the potential attachment point for Federal activity, would seem to lie in the "mid to high" tens-of-billions. However, the potential attachment point is not fixed but depends on the capital of the industry and its perceived ability to recapitalize following the loss. Thus, in proceeding with our analysis we are thinking about an attachment based on cumulative losses, or a second loss facility or an attachment set relative to industry capital. But , even if one can establish high end market failure, the case for Federal involvement is not self evident but depends on efficiency advantages.

II. POTENTIAL MODELS FOR FEDERAL RISK BEARING

Having establishes a potential case for government role in insuring terrorism risk, we will outline several generic options. The first is

The Federal Government As Reinsurer. In this role, a government reinsurance facility is established which will provide reinsurance coverage to primary companies. We assume that such coverage would indemnify primary insurers. Indemnification would be desirable because the levels of terrorist loss would impact primaries to widely varying degrees. There would be a high attachment point which would be set as a percentage of the primary insurer's premiums.[8] Basing the trigger on company-specific variables is important in order to avoid basis risk. For example, if the trigger were based solely on an industry-wide loss measure, specific insurers could suffer substantial terrorism losses evan when the total industry loss does not exceed the trigger.

We also assume that such contracts would need to provide some incentive for the primary company to underwrite and settle claims efficiently. This would be accomplished by coinsurance with primaries bearing some percentage (say 20%) of the loss and the government facility paying the remaining 80%.

PAYOUT = MAX {c(L - mP) ; 0 } where c = 1 - coinsurance rate
L = actual loss from terrorism
mP = attachment level of loss expressed as a multiple, m of current surplus, S

The Federal Government As Retrocessionaire. Alternatively, the government could "insure the reinsurer" a contract known as a retrocession. The advantage of this structure is that it would permit considerable standardization of contracts and payouts. Particularly, contracts could be

[8]The trigger should be based on premiums, which are not subject to manipulation, rather than net worth (surplus), which insurers can easily manipulate by restating their loss reserves. Such loss reserving "errors" are virtually undetectable in the short-run.

written in relation to an index of aggregate market losses. Most reinsurers will have a spread of business and can absorb the basis risk associated with an aggregate payout. This indexing device has been used in catastrophe options and in many insurance securitizations. Moreover, the basis is risk is often quite small for reinsurers whose book of business is widely spread.[9] Reinsurers, protected by such indexed retrocessions, will have expended capacity to offer indemnity reinsurance to primary insurers. In this fashion, the reinsurer is said to "intermediate the basis risk". Given the fact that indexing controls moral hazard,[10] there will be little need for a coinsurance percentage (Doherty and Richter 2001).[11] However, the attachment should still be set at a high level and in relation to aggregate market premiums.

$$\text{PAYOUT} = \text{MAX}\ \{(\textstyle\sum L_i - m\sum P_i) ; 0\ \}$$

where subscript *i* refers to i^{th} insurer

A potential limitation of the government as retrocessionaire model arises from the fact that the reinsurance market is truly international. There is likely to be significant political resistance to providing Federal retrocession capacity for reinsurers headquartered in Europe, Japan, and other foreign countries. Among other factors, it would be very difficult for the U.S. government to audit foreign reinsurers in order to prevent fraud and maninpulation of the coverage. Providing retrocession capacity solely to U.S. reinsurers also would be inefficient because U.S. primaries would likely be limited to reinsuring with U.S. companies for lines of insurance subject to significant terrorism risk. Because the U.S. reinsurers account for a relatively small fraction of total world reinsurance coverage, limiting U.S. primaries to dealing with U.S. reinsurers reduces their access to the global diversification provided by the world reinsurance market.

Federal Securitization of Terrorism Loss Options. The idea here is similar to the retrocession and the formula is the same. The difference is in the instrument. Rather than establishing a contract to provide as indexed payout to the reinsurer, the government would offer standardized

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[9]Cummins, Lalonde and Phillips (2001).

[10]Doherty and Richter (2001.

[11]Consider whether the facility should cover 100% of losses over one attachment point, or less than 100% of losses over a lower attachment point. Both schemes might offer the same expected value of coverage. A strong argument for the coinsurance model is insurer moral hazard. But as we shall see, this will be largely addressed in the retrocession and securitization designs. A second line of argument is based on what is the most effective way of spreading risk. There are different models we can appeal to. Arrow (1963) shows that when there is a risk averse policyholder and risk neutral insurer, and there is no moral hazard, the optimal structure is a deductible. Refining this, Raviv (1979) shows that when both parties are risk averse, the optimal structure involves coinsurance above a deductible. However, as the insurer approaches risk neutrality, the coinsurance level will disappear. We believe that the conditions approximate the risk neutral insurer case and would thus favor no coinsurance. A further argument for no coinsurance can be made by appeal to the mutuality model discussed above.

indexed instruments directly on the capital market. These could be purchased by anyone, though they are designed (and priced) to appeal to reinsurers. The basis risk on such contracts would render them ineffective hedges for most primary insurers.

$$\text{PAYOUT} = \text{MAX}\ \{(\sum L_i - m\sum P_i)\ ;\ 0\ \} \qquad \text{where subscript } i \text{ refers to } i^{th} \text{ insurer}$$

An advantage of the securitization approach is that establishing an auction market would serve a price discovery role, potentially resulting in more efficient pricing than in some of the other designs. If the auction approach were adopted, it probably would be necessary to establish a reservation price below which the contracts would not be issued.

The Federal Government As Lender/Finite Reinsurer. Another model of Federal involvement is provide a loan to insurers which will be repaid over a number of years, thus enabling insurers to spread this risk over time. The need for such a loan will be determined by the relationship between the size of the insurer's loss and its surplus. This may be a straight loan or hybrid loan/insurance contract. Contracts known as "finite reinsurance" are essentially loans to which some small level of insurance is attached. We will consider here the generic case of a straight loan, though if this option is pursued, there may be some virtue in grafting on a modicum of insurance such that the government bears some small amount of risk. Because the primary will ultimately pay for its own losses, there is little need for co-payments and these are dropped in this model.

$$\text{LOAN PRINCIPAL} = \text{MAX}\ \{c(L - mP)\ ;\ 0\ \}$$

In effect, the loan option can be envisioned as the government's providing a type of "letter of credit" for insurers. If a loss occurs that triggers the coverage, insurers are permitted to borrow money at the risk-free rate of interest in order to cover the losses. The government thus provides a subsidy equal to the credit risk premium that would be incurred if the insurers were to borrow in private capital markets. This subsidy is likely to be valuable, especially in the case of large terrorist events, when private capital is likely to be very costly or unavailable to many insurers. A downside of this approach is that it has an adverse effect on the capital structure of insurers by increasing their leverage following a loss event, raising the cost of capital and leading to higher insurance prices.

No Role for the Federal Government. This is the default

We will now discuss criteria for appraising these various models.

III. EFFICIENCY CONSIDERATIONS

(A). Informational Efficiency

i. Comparative advantage in information

Insurance underwriting and pricing requires information from which to calculate expected losses. This information also is important in establishing reserves and setting capital. Establishing a

comparative advantage in information is not easy. Both private insurers and the federal government have some information advantages and both may have some reasons to keep information private. Insurers clearly have access to public information and have the actuarial skills to project losses from raw information. Insurers do, of course, have economic motives for keeping information private, but the competitive process will provide an incentive for gathering and using information.

Through its various agencies, the Federal Government obtains information that enables it to assess the degree and direction of terrorist risk. For security reasons, not all of this information can be released. This places the Federal Government at some advantage compared with private insurers in assessing the degree of risk and in taking the necessary financial steps to fund such risk. Private insurers are (for legitimate security reasons) denied access to certain information that would be necessary to price terrorism risk and to determine the capital necessary to underwrite such exposure. This fact supports the case developed under point 1, that the Federal Government can spread the risk of large terrorist losses more efficiently than private industry.

One can speculate on the domain over which the parties have their comparative advantage. The federal government gains a comparative advantage by its access to intelligence on the organization and activities of particular groups and people. This information may vary in its degrees of specificity. It may range from awareness of the aims of terrorist groups and their changing level of organization, to knowledge of specific threats or plots. How useful this is in terms of insurance contracting depends on its timeliness. For example, awareness of an increasing general threat from intelligence on the increasing organizational activity of groups, could be very useful in underwriting and pricing future risk. Knowledge on specific threats may be too imminent to change insurance contracts, but could be very useful in combating those plots.

An efficient market structure will make use of available information.[12] Better information on loss expectancy will permit sounder pricing and financial planning for insurers. Thus an ideal market

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[12]One of the paradoxes of insurance is that too much information can be a barrier to risk spreading. One must distinguish between new information about the *overall* level of risk and information that changes the *relative* risk of different parties. If insurance is contracted *before* there is new information about relative risk, then it will not only spread the risk of loss but spread the risk of being classified to be high or low risk of loss. See Tabarrock (19..), Doherty and Thistle (1996). For example, suppose the government's intelligence revealed that A was likely to be a target but B was not. If insurance is arranged before that information is know to the A, B or their insurer, they can both insure at a common price. If they wait till information is released before buying insurance, they each face the risk of classification and therefore of a big premium change. For this reason, the failure of the government to release relative information (i.e., on likely targets) could actually enhance the efficiency of insurance markets. However, as information on likely targets hardened, the need to take preventative actions can be weighed against the retention of information for security reasons. The story is often told about Winston Churchill knowing (through breaking Enigma codes) that a massive air raid was planned against the city of Coventry. However, he decided not to warn the population of the impending raid since to do so, might signal to the Germans that their codes had been cracked.

structure would avail itself of the private information on terrorism risk and of market incentives to disseminate this, and other, information in informationally efficient prices.[13]

ii. Information Asymmetry

(B). Moral Hazard

The moral hazard arguments relating to the issue of Federal terrorism insurance are many and, while some federal involvement, other moral hazard issues favor entirely private provision. We think it important not to be doctrinaire on this issue and appeal directly to the underlying economic principles.

i. Moral Hazard in private primary and reinsurance markets

Moral hazard is well known in private insurance markets both at the primary level and in reinsurance. Our main concern is with moral hazard in the reinsurance relationship since this is important of itself and also filters down to the primary market. Suppose that a primary insurer is able to pass on the results of poor underwriting, poor loss control and over-generous claim settlements to its reinsurers without penalty. This primary will have little incentive to control moral hazard. However reinsurance markets do evolve contractual forms and relationships that combat this "passed down" moral hazard. Reinsurance contracts have often have high attachment points and co-payments for primaries and are often experience rated. These encourage the primary to redress moral hazard in the primary contract. Moreover long term contractual relationships[14] between primaries and reinsurers also help to control moral hazard. There is recent evidence to suggest that these devices for controlling moral hazard are commonly used and it would be destructive for any federal scheme to undermine these features.[15] This suggests either that a federal scheme replace private reinsurance, but with similar incentive structure, or that the federal government provide risk bearing capacity to private reinsurers by offerring some hedging capacity to those reinsurers. Thus, these arguments support the securitization model or the retrocession roles for the federal government (and perhaps a direct reinsurance role if appropriate contract incentives, such as coinsurance, are provided)

ii. Government Moral Hazard - Foreign Policy, National Security and Tort Reform

But it must not be thought that all moral hazard problems can be resolved through private markets. A fundamental principle in controlling moral hazard is that the party that is able to

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[13]Of course, there is an issue of revealing security sensitive information in insurance premiums. Use of government information on the overall level of terrorism risk may be less compromising of national security than specific information on sources or targets.

[14]Which might be stretched thin in the current round of contract renewals following 9/11/01.

[15]Doherty and Smetters, 2001.

control the likelihood or size of potential loss, be on risk. Given that the federal government determines foreign (domestic) policy, and that such policy can influence the degree of external (internal) terrorist activity then the government can exert influence over future terrorist activity.[16] For example, foreign policy in support of Israel and the Saudi Kingdom is often cited as breeding disaffection amongst Palestinians and the poor and disenfranchised. Moreover, the federal government is responsible for intelligence and national security and can thereby influence the extent to which terrorists can realize their ambitions. The moral hazard argument is that, if the cost of terrorist activities is borne in part from tax revenues, this will influence the formulation of foreign policy and the investment national investment in security, since politicians will take more "heat". Thus, the additional worry of having to raise taxes will exert some marginal influence on politicians and policy formulation.

Another area in which government moral hazard is potentially very important, relates to tort reform. While the current estimates of the amount of property and related insurance claims, are in the range of $40 billion, the amount of potential liability claims is open ended. These will be partly reduced by the Federal Compensation Fund and, in theory, by the self enforced moratorium by the plaintiff's bar on pursuit of business. On the other hand, there are already signs of a liability explosion. Frequent newspaper reports reveal that law firms are preparing for such actions.[17] At issue, is whether politicians will let the liability system run its course, or whether they will seek some tort reform, either for terrorist acts or more general reform.

The usual counter argument to moral hazard is that principled people will do the "right thing". If the "right thing" were brightly defined and widely endorsed, then this argument might carry conviction. Consider tort reform. From the plaintiff's bar support of the rights of the injured common man, to the reformists accusations of the greed, capriciousness and inefficiencies, of the tort system, all parties seem to firmly believe they defend integrity and common sense. But a fair and efficient liability system involves a balance of interests and a structure to encourage economically efficient behavior. Like all balances, it can be swayed in one direction or another. In this regard it is useful to note that the legislators are overwhelmingly represented by a single profession, lawyers, and that two of the most vigorous lobbyists on this issue are the plaintiff's bar and insurance companies both of whom secure substantial business from a vigorous and expansive tort system. Thus, one might suppose that legislators might take a more balanced approach to law reform if they are accountable directly to taxpayers; i.e., if the federal government is directly at risk for such losses.

The arguments in this section strongly favor some degree of federal risk bearing, though they do

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[16]For a popular analysis of the influence of Foreign policy on the seeds of terrorism see "Why Do they Hate Us So Much", Newsweek, October ****

[17]Lawyers' math in Sept. 11 deaths shows varying values for life. William Glaberson. The New York Times. 2001/11/11. Page B1. Moreover, "...at a recent conference at Georgetown University on the future of mass injury litigation, lawyers were surprisingly unanimous in predicting that recent events would profoundly affect the attitude of judges, juries and lawyers", Aon, World Trade Center Bulletin, Issue 8, 14th November, 2001.

not speak to the form of such risk bearing, whether as a reinsurer or as a counter-party to an insurance securitization. These arguments favor the role of the government as a true risk bearer rather than the more limited finite reinsurance model (though the latter might provide some weaker incentives for cost control as the government has to temporarily fund the loss).

iii. Government Moral Hazard - Bureaucratic Inefficiency and Disincentives

We will not go into depth in this section. But we will merely note that bureaucratic structures are difficult to monitor and is difficult to set in place a set of economic incentives that promote effective decision making. Thus, we will take as an assumption that is a federal risk bearing facility can be established with minimal bureaucratic structure, this will be seen as a virtue. With this view, a facility that provides standardized contracts and avails itself effectively of existing private market incentives and resources, is preferred to one that duplicates market resources and requires intensive oversight. In this respect, the retrocession, securitization and loan models are the preferred approaches. Each of these models, makes full use of private market capabilities to underwrite, price and settle claims, and each addresses private market moral hazard. The former two, retrocession and securitization, require only a modest institutional structure since contracts are standardized. And the loan facility has the advantage that lending requires less screening than underwriting.

C. Capture by Interest Groups - The Thin End of the Comprehensive Government Reinsurance Wedge.

The final criterion we will offer is whether the instrument used to involve the federal government provides an opportunistic target for other interest groups seeking to extract rent. Insurance in particular has been seen as a social good though which income might be distributed. Of course, the purpose of insurance is to distribute income from those who do not have a loss to those that do. But beyond this, regulatory pressures are often used to force insurers to provide coverage at rates that are not sustainable and to subsidize one group of policyholders at the expense of another. For example, state regulators have sometimes forced rates for catastrophe insurance or workers compensation insurance to such low levels that no insurers will offer to do business. Commonly regulators will choose to subsidize high risk premium by increasing premiums for low risk insureds. Examples are subsidized automobile premiums for inner city drivers, subsidized windstorm premiums for those who live on barrier islands, and subsidized health insurance for those with poor existing health.[18] Sometimes these subsidies reflect widely held social values, but sometimes they simply reflect the lobbying power of well organized interest groups. But in all cases, these subsidies interfere with the effective working of the insurance market and often reduce the number who are insured. For example, however worthy is the argument in favor of uniform health insurance premiums, this practice has certainly contributed to the legion of uninsured.

The existence of a federal insurance facility does provide a target for those interest groups seeks

[18]Nor are such subsidies confined to state intervention as evidenced by the national flood insurance program.

to escape the real costs of their risks (as reflected in premiums) by persuading their political representatives to engineer subsidies. An obvious risk is that of grafting of federal natural catastrophe reinsurance on to a catastrophic terrorism facility. The case for such a natural catastrophe scheme is not the same as that for federal terrorism coverage[19] and should be subject to independent debate. These arguments favor a low profile facility, possible administered from an existing structure. We suspect a securitization of retrocession scheme operated perhaps by the Treasury, would be favored on these ground. However, a fully fledged government terrorism reinsurance structure could become the seed for an extended federal reinsurance presence.

This concerns also speak to the permanence of the government's role is providing terrorism coverage. Specifically, a temporary facility is more difficult target for opportunism than a permanent structure. While acknowledging this, we feel there are wider considerations and we will discuss permanence separately.

IV. PROPOSED PROGRAM STRUCTURE

In the following table we summarize the performance of the alternative generic designs against the risk sharing and efficiency criteria. We believe that a securitization design is the most convincing. It can be a low cost, standardized instrument, based on an indexed payout and thereby encountering minimal moral hazard. Let us call these federal XORL contracts since each will pay some proportion of amount by which the aggregate industry losses exceed some multiple of extant industry surplus (XORL denotes "excess of relative loss" [20]). When the industry is well capitalized, the deductible will be high. However, since any loss will deplete surplus, the attachment for a second loss will be much lower. And, as the industry re-capitalizes after a loss, the deductible will automatically creep back up.

Federal XORL contracts should be sold at a price no less than the best available estimate of the expected losses and expenses likely to arise under the contacts. We realize that estimation of expected losses is not simple since there is will not be credible statistical data for high end losses. However, a combination of actuarial techniques, scenario analysis and security intelligence does provide a basis a basis for making best estimates. We recommend that the

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[19]For example, the federal moral hazard arguments developed above are different for catastrophe risk. To be sure, there are some parallels. For example, the government can influence natural catastrophe losses by is selection of land use policy, flood control, setting of building codes. But for the most part, these policies displace market controls and many economists would argue that the government's intervention should be minimal. The same market arguments cannot be made in terms of foreign policy. But the most important difference is that, unlike terrorism losses, natural catastrophe losses are unlikely to exhibit strong serial correlation. This suggests that the degree of social risk is potentially much higher.

[20]This is a variation of the industry term XOL which is the "excess of loss". But with standard XOL the attachment point is fixed. Where the XOL resembles an call option with a fixed striking price, the XORL is a call option with a striking price indexed to industry surplus. There is an analogy to indexed stock option executive compensation plans.

treasury retain an actuarial firm to undertake this task but also seek input on changing terrorist exposure from appropriate federal intelligence and law enforcement agencies. One format for sale of these contracts would be an auction with a reserve price set relative to the expected value of loss. This structure would permit the government to stimulate the market by selling at the reserve prices and providing reinsurance capacity in times of emergency, but would also allow the government to sell well in excess of expected losses, and thereby encourage the re-emergence of private reinsurance capacity, as markets ease. Many existing cat bonds are set with risk loadings of some multiple of expected losses – they have tended to range between about twice and seven times the expected loss (Cummins, Lalonde, and Phillips 2001).[21]

Federal coverage should start after a reasonably large deductible, say 6% of current premiums. Contracts could be written at denominations of 1/10,000 of the amount by which industry losses exceeded the deductible and the government could sell as many as demanded by reinsurers. The government should explore ways in which it could encourage the development of private markets for catastrophic risk without providing Federal financial backing. For example, it should

- investigate the possibility of lowering regulatory barriers that may exist to securitizing insurance risk and taking control of this aspect of insurance regulation to simplify the regulatory system. The government should

- explore serving as a facilitator of securitization by providing data that could be used by private firms in developing better loss indices to serve as the basis for the trading and settlement of CAT risk securities, on both natural and man-made (e.g., terrorism) catastrophes.

- address the issue of tax deductibility of reserves for both natural and man-made (e.g., terrorism) catastrophes.

- reconsider the structure of liability rules in the light of its status as residual bearer of the costs of liability settlements.

PERMANENT OR TRANSITORY DESIGN

The arguments being offered for a temporary federal structure are as follows

- The crisis in the private market is temporary. Capital is already flowing back into the industry and soon the private market will have sufficient capacity and willingness to be able to offer coverage up to high levels. Moreover, the actual level, or perceived level, of terrorist risk will decline over time as the counter-terrorism war bears fruit. Thus the demand for terrorism coverage will decline.

[21]The possibility of securitizing a proportion of the coverage should be explored to facilitate price discovery.

! The government must make a quick decision to address the immediate crisis. This will not permit thorough research and a rushed plan is likely to be far from optimal for the long haul.

! A permanent facility is more likely to provide a platform from which other federal reinsurance programs can be grafted in order to provide subsidized insurance for successful interest groups.

! A permanent facility is likely to discourage the development of private market alternatives such as securitization. It is not known at this time whether this type of risk is ultimately securitizable, but it would be desirable to design any Federal program such that private market "crowding out" would be encouraged. If the Federal coverage is not priced or is under-priced, there would be little or no motive for the development of private market alternatives.

! Having a sunset provision forces Congress to reconsider the program at the sunset date and either reenact the program or allow it to expire. Absent a sunset date, it would require some affirmative action in order to trigger a review of the program, making it less likely that the program would be reviewed or cancelled if the need for it had dimished or if it were functioning inefficiently.

The counter-arguments to these three points are as follows

! Even if we get over this crisis, another large loss would simply put us back in the same position of justifying a temporary facility until private market capacity is restored. The proposed plan anticipates that we only need coverage for very large losses, or second loss coverage, and sets federal coverage relative to changing market capacity

! While agreeing that a hurried decision is unlikely to be close to optimal, we can provide for a facility which establishes roughly the correct structure with provisional parameters (e.g. relative deductibles) but with provision for periodic executive or agency re-authorization. The most likely problems are in estimating the prices and setting the deductibles and these can be re-parameterized according to a specified procedure.

! The structure proposed here is minimal; it is not a self standing agency and is merely an added function of an existing department, e.g., Treasury. Moreover, the level of sales of government XORL instruments will tend to decline as private markets re-emerge. Thus, there is very little structure on which to build. Finally appropriate drafting of legislation can limit the extent to which such a facility can expand.

	Federal Reinsurer risk taking	Securitization	Federal Retrocession	Federal Reinsurer loan-finite	No Federal Role
risk sharing	✔	✔	✔	✔**	
information efficiency	✔	✔	✔		
moral hazard - primary/reinsurer	✔ *	✔	✔	✔	✔
moral hazard - government tort reform/security/etc	✔	✔	✔		
bureaucratic inefficiency and moral hazard		✔			✔
Capture by interest groups		✔			✔

* with appropriate contractual features
** permits insurer to spread risk over time

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David - can we speculate on numbers here. Note the current loss, Not covered by this scheme is say $40 - $50 billion. Current P-L industry capacity is say $**** billion. If we say that the industry can just cope with this loss of this relative size, we could set the relative deductible at this level. We can talk though this..

Neil: FYI, 10% of year-end 2000 surplus would be 32 billion. 10% of 2000 losses (all lines) would be 16.6 billion.