The Costs and Benefits of the Terrorism Risk Insurance Act: A First Look

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There is over $15.5 billion worth of construction projects which aren't going forward because they can't get insurance on their projects, can't insure the buildings or the project. And therefore, there's 300,000 people whose jobs aren't going forward. And this is a way for us to work together to put people back to work here in America. It's a really important piece of legislation.

President Bush Remarks Oct 1 2002

Treasury Secretary Paul H. O'Neill called passage of the legislation ``perhaps the single most important thing we can do to boost job creation in the short run."

NYT Nov. 20 2002

Legislation, unlike the regulation which it spawns, is not required to pass a cost benefit test. The recent passage of the Terrorism Insurance Act of 2002, however, has deeply divided commentators[1] on the question of whether it provides necessary Government support for an industry vital to job creation and growth, or is simply a state handout to an industry which is fundamentally sound and which was already successfully coming to grips with new challenges. This division makes it particularly important to examine the consequences of the Act in terms of social accounting This paper begins this process.

Assessing the Costs 1: Direct Costs to Taxpayers

There are two major categories of costs associated with this Act. In the first place there are the direct costs to the taxpayer resulting from the fact that the Act requires the Federal government to pay 90% of all losses in excess of certain thresholds up to a maximum of $100b and to share in insurance company losses for losses below this threshold. In the second place there are the resource reallocation losses associated with the fact that insurance will no longer be priced at true marginal cost. We begin by analyzing the expected costs to the taxpayer.

[1] Divisions are not along traditional party lines. Opponents of the legislation included both the pro market Republican Senator from Texas, Phil Gramm, and the pro regulation Director of Insurance of the Consumer Federation of America J.Robert Hunter.

Expected Taxpayer Costs: In principle calculating the expected costs to the taxpayer of any form of insurance provided by the Federal Government is a standard exercise in the principles of actuarial science. In this case, however, one of the key inputs to this calculation, the probability of loss, is extremely difficult to assess. Indeed this was one of the findings justifying Government intervention in the first place.[2] Shifting risk to the Federal Government makes it no easier to estimate.

Precisely because public money is on the line, however, some efforts have been made to quantify expected losses. In the early stages of the Bill's life, for example, the Congressional Budget Office (CBO) made estimates of expected costs for the version of the Bill then before the House, CBO (2001). At that time it was estimated that HR 3210 would increase expected direct spending by $8.5b over the 2002-2011 period. This version of the Bill required the Government to recoup this sum by various charges, so the cost to the taxpayer would have reduced. In this Bill the Government's role was that of lender of last resort.

No attempt was made by the CBO to estimate the expected costs of the Senate version of the Bill. Here the Government was to act as an insurer of last resort and was not to be repaid for its losses. However, using essentially the same methodology as the CBO had used for the House Bill, Tillinghast -Towers Perrin (T-TP) (2002) estimated that the expected costs to the Government of the then Senate version would be substantially lower, ($2.8b) than (their) estimate of the House Bill ($6.6b) This reduction reflected the fact that payments in the Senate Bill began at a higher threshold and had a higher co-payment by insurers. And even though the House Bill provided for the recouping of these losses, T-TP estimated that since this recoupment would be delayed, the net cost to the Government of the House Bill was higher ($5.3b) over five years than the $2.8b of the Senate Bill's "free" insurance.

Given that the Act as passed differs substantially from both these Bills, these estimates are now moot, but in the process of making the estimates, the CBO did propose a probability density function for losses (also adopted by T-TP) which we will now use.

[2] "Widespread financial market uncertainties have arisen following the terrorist attacks of Sept. 11 2001 including the absence of information from which financial institutions can make statistically valid estimates of the probability and cost of future terrorism events, and therefore the size, funding, and allocation of the risk of loss caused by such acts of terrorism," Terrorism Risk Insurance Act Sect 101a4

Specifically we assume that the annual distribution of terrorism risk losses is log normally distributed with (log) mean of $4.5b and (log) standard deviation of 9.54. This reflects the CBO's view that annual losses would average $4.5b with a 1% chance of reaching $40b[3].

Estimated Costs 1: The Recoupable Portion. The direct costs to the Government fall into two parts. The first part is associated with a possible shortfall in the industry deductible. Specifically, in years 1 (2003) , 2 (2004), and 3 (2005), the industry must itself bear losses equal to the first 7 %, 10% and 15% respectively of gross earned premiums earned. Moreover, from this industry deductible to $10b in the first year, then $12.5b in the second year and $15b in the third year the Government provided backstop insurance will be recouped through a 3% levy on all gross earned premiums. We have used the following methodology to estimate the cost of this portion of the Act.

1. Step one is to estimate the total of gross earned premiums in the relevant years. To do this we started with actual gross premiums in 2001 as provided by the NAIC (2002). This amount, $367b was then increased at an annual rate of 5% (the actual growth rate of the last 10 years) to give gross premiums for the relevant years of $405b (2003), $425b (2004) and $446b (2005) respectively.
2. Step two is to recognize that commercial lines are only a fraction of this total. In 2001 commercial lines were approximately 50% of all P/C premiums and applying this percentage gives premiums of $203b, $213b, and $223b respectively.
3. If the insurance industry was a monopolist we would be done, since the deductible could now be calculated by applying the relevant annual percentages to this sum. However, for any annual loss X, only some fraction Y of all companies would be liable for claims, and only this fraction of premiums would be liable for the deduction. Presumably most small regional companies would not be affected at all. For example, as Table 1 shows, a major share of 9/11 losses was borne by foreign companies not affected by this Act.[4] We believe that at this level of approximation it may not be unreasonable to assume that 50% of all premiums will be subject to the deductible. This leads to deductibles of $7.1b in 2003, $10.6b in 2004, and

[3] It is essential to caution at this point that although these values do not seem unreasonable, they could be very wide of the mark. For example, Standard and Poors, a rating agency whose livelihood depends on accuracy in this assessment recently stated "Claims for the effectiveness of terrorism pricing models now coming to market are widely exaggerated. Bathed in an aura of invincibility by such obfuscatory phrases as fully probabilitistic," they are at best a blunt instrument that could nevertheless lull insurers into a false sense of security"

[4] A further list of individual company losses due to 9/11 may be found at http://www.jltasia.com/risk_intelligence/report/WTC/2002/WTC_loss_25Jan2002.htm

$17.4b in 2005. This in turn implies that the payment to the industry which the government can recoup amount to $1.9b in year 2003 and zero in the next two years.

4. Finally we recognize that the Government can levy a charge of 3% on **all** gross premiums to make up any shortfall. This amounts to a minimum of $6b in each year completely eliminating any government costs on this head. This is summarized in Table 2. We may therefore conclude that the major cost to the Government is the 90% pickup of any losses between the co-payment threshold and the total loss X. We turn now to an estimate of this.

Table 2

Year	Deductible %	Commercial Lines Gross Premium	Industry Deductible $b	Shortfall $b	Assessment $b	Taxpayer Cost
2003	7	203	7.1	1.9	+6	0
2004	10	213	10.6	0	+6	0
2005	15	223	17.4	0	+6	0

Estimate of Government Costs for Recoupable Portion of Scheme in $billion

Estimated Taxpayer Costs 2: The Co-payment: With the distributional assumptions made above, the cost to the taxpayer of the 90% backstop is

$$\int_a^{100} 0.9xf(x)dx$$

where a is the relevant threshold value, (10 in year 1, 12.5 in year 2, and 15 in year 3) and $f(x)$ is the log normal density function with (log) parameters mean=4.5, standard deviation=5.
Under these assumptions the expected costs in $b are

Year	2003	2004	2005
	2.2	1.9	1.6

Whether these costs are to be viewed as large or small depends on the size of the benefits. It must be noted, however, that with domestic industry P/C reserves in the region of $300b, these expected annual losses seem to be well within the range of what the market can bear. The crisis in supply was almost certainly not provoked by the size of expected loss but by the size of potential loss. In the case of the California Earthquake Authority, for example, a cap on the size of maximum potential loss was enough to garner industry support for a scheme which required no public contribution, Jaffee and Russell (2000).Obviously this was not he approach taken here. We return to the question of why supply is withdrawn in a later section.

Assessing the Costs 2: The Indirect Costs. It is a standard result in the economics of insurance that resources will be allocated efficiently under uncertainty only when the uncertainty is itself correctly priced. Although the act guarantees the availability of insurance, by subsidizing the price it opens up the possibility of resource misallocation[5].

The extent of this misallocation depends on what equilibrium price emerges. The Act provides for required annual reporting of prices presumably to embarrass potential gougers. In the past insurance prices have been set too low as well as too high, and there is a concern that firms with no experience in this line, but who are now required to sell, it will be overly optimistic and drive the market price below its actuarially fair level[6] What does seem to be clear, however, is that with the taxpayer picking up 90% of losses above the $10b-$15b threshold, and with losses above $100b capped, insurance firms will be essentially indifferent between small losses and large losses. This can be expected to have two harmful effects

a) At the margin, resources will flow into geographical locations and industries which would otherwise be unprofitable if terrorism insurance was priced at full cost. It could be argued that in the case of some large cities such as New York, economies of scale

[5] Many foreign commentators have been surprised by the enthusiasm with which a Republican administration embraced this increase in Government intervention in the free market system. Moss (2002) p. viii cites a French economist as noting that Americans who had long "been teaching the gospel of free markets" had, in the aftermath of the attacks, suddenly seemed "to forget he universal laws of the market."

[6] Thus Standard and Poor's (2002) "Although the legislation does much to ease anxiety among the insurance community, it cannot cure ignorance. By and large insurers do not know how to price terror risk and could use government backing as a crutch taking on exposure irresponsibly. Moreover, if insurers are pricing something they do not understand, they will tend to undercut each other."

in conducting business in a central business district justify this subsidy, but it is a blanket subsidy and there seems to be no general argument in favor of this reallocation.

b) Incentives to mitigate the effects of terrorist attacks, whether by strengthening buildings or by improving surveillance efforts are now weakened.

The size of these effects is very difficult to estimate How many firms, for example, will not take the threat of terrorist attack seriously just because they have subsidized insurance? What is a little hard to understand, however, is why this scheme used a subsidy at all. Why, for example, did the US place so little reliance on market forces when other Government schemes which could have served as a model (for example the U K Pool Re) at least attempt[7] to mimic market solutions, the Government in the case of Pool Re being a lender of last resort against very large losses to an otherwise market priced reinsurance scheme, see Tillinghast and Towers-Perrin (2001). We address the question of the philosophical role of the market in a later section.

Estimating the Benefits: For the buyer of insurance, this act has two main benefits. It ensures that for the next three years terrorism insurance will always be available and it also lowers the price relative to the industry's assessment of actuarially fair value. Standard welfare analysis evaluates this by estimating the area under the representative buyer's demand curve, see Blackmon and Zeckhauser (1988) for an application of this methodology to auto insurance.

In the case of terrorism insurance, there is an additional factor which comes into play. Because lenders of capital refuse to self insure, terrorism insurance is required to obtain debt finance in a number of industries, most notably construction. Thus if terrorism insurance is not available, debt financed construction projects cannot go forward. And if terrorism insurance is only available at very high premiums, builders who seek debt financing are still required to purchase it, making their effective elasticity of demand equal to zero. Since the builder is therefore unable to self insure, again the profit maximizing strategy may be to reject the project.

In this case, the chief benefit of the act according to its supporters is the increased lending to construction (with its attendant increase in employment and output) made possible by the ready

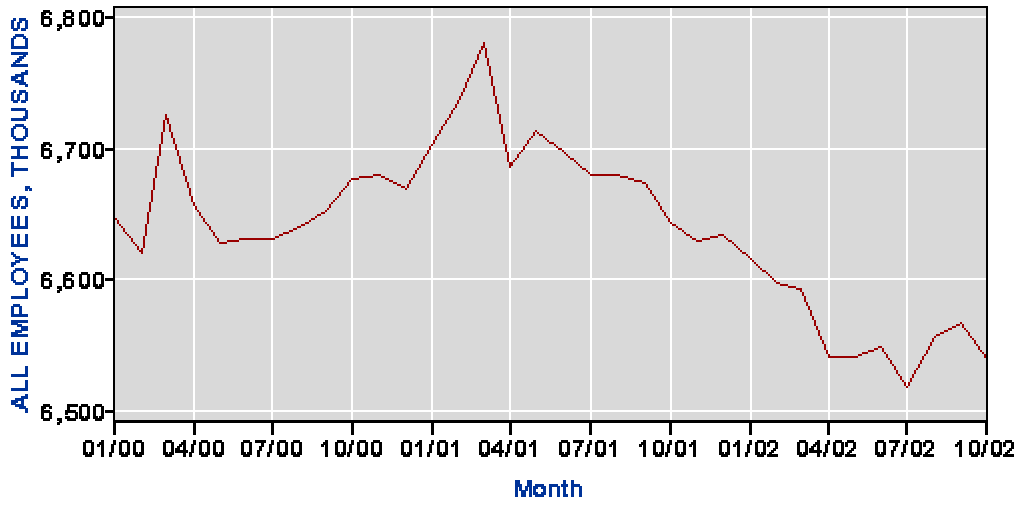
[7] This is not to say that Pool Re's rather crude pricing system could not itself be refined, see Bice (1994).But at least the UK system makes an attempt to use market signals.

availability of terrorism insurance at a subsidized price[8]. The increase in lending to be made possible by the Act has been widely estimated to be $15b leading to an increase in jobs for 300,000 workers.[9] To shed light on this claim it is interesting to examine the behavior of employment in the construction industry in the period around Sept 11 2001. This data is presented in Table 3.

Data extracted on: November 30, 2002 (8:18:44 PM)

National Employment, Hours, and Earnings

Series Id: EES20000001 (n)
Seasonally Adjusted
Industry: Construction
Data Type: ALL EMPLOYEES, THOUSANDS
SIC Code: 15-17



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	6648	6621	6726	6657	6628	6631	6631	6640	6653	6676	6680	6669	
2001	6702	6738	6781	6686	6714	6697	6680	6679	6674	6643	6629	6634	
2002	6615	6597	6593	6541	6541	6549	6519	6556	6567(p)	6540(p)			

n : NAICS 2002 replaces SIC beginning June 2003. See http://www.bls.gov/ces/cesnaics.htm for details.
p : preliminary

Table 3

[8] Symbolic of this benefit was the presence of a number of construction workers in hardhats at the signing of the Act.

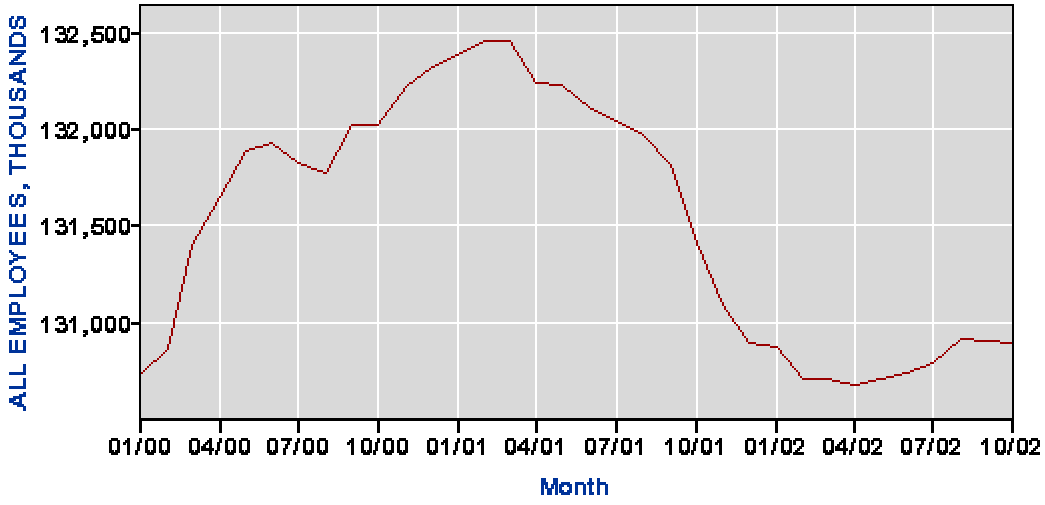
[9] Again it is worth emphasizing that claims for benefits of this size are not partisan. This figure was also used by Senators Schumer and Clinton in their call for support of the legislation SCHUMER, CLINTON: LACK OF TERRORISM INSURANCE COVERAGE COSTING BILLIONS Press release Sept. 30 2002.The source is a survey by the Real Estate Roundtable. The amount increased by $5b in the weeks before the vote.

As can be seen, from August 2001 to Sept. 2002 the total job loss in this industry was 112,000, a far cry from the 300,000 apparently found by the surveying realtors. Moreover, post hoc not being propter hoc, it must be pointed out that these job losses took place in an economy undergoing a recession. In Table 4 we plot general payroll numbers for the same period.

Data extracted on: November 30, 2002 (8:28:57 PM)

National Employment, Hours, and Earnings

Series Id: EES00000001 (n)
Seasonally Adjusted
Industry: Total nonfarm
Data Type: ALL EMPLOYEES, THOUSANDS
SIC Code: N/A



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
2000	130728	130859	131397	131645	131887	131925	131827	131777	132023	132018	13221
2001	132382	132457	132461	132243	132229	132108	132045	131966	131819	131414	13108
2002	130871	130706	130701	130680	130702	130736	130790	130913	130900(p)	130895(p)	

n : NAICS 2002 replaces SIC beginning June 2003. See http://www.bls.gov/ces/cesnaics.htm for detail

Table 4

If the decline in employment had been at the national rate (.07%), 47,000 construction workers would have lost their jobs anyway due to general macroeconomic conditions. This suggests that an estimate of the jobs lost due to the lack of insurance is around 65,000. Obviously more

sophisticated analysis can be made of the construction employment/GDP elasticity but it is clear that numbers such as 300,000 for construction jobs lost are simply too high.

Should the taxpayer spend $6b to generate 65000 jobs, i.e. $92,000 per job created? Since most State job creation schemes budget $10,000 per job created, there would seem to need to be substantially more benefits i.e. in the neighborhood of $5 b if the legislation is to pass the cost benefit test.

Other benefits: Construction is not the only industry likely to benefit from readily available subsidized terrorism insurance. Other vulnerable industries include transportation, sports franchising, tourism, and indeed any undertaking likely to be a terrorist target. At this time, however, there seems to be no hard evidence of reduction in activity in other sectors due to difficulties in the terrorism insurance market. Many NFL franchises (including the New York Giants, Dallas Cowboys, Chicago Bears, Washington Redskins and Baltimore Ravens are reported to have no terrorism insurance, but this has had no noticeable impact. In particular, The Washington Redskins made no change in ticket prices for the 2002 season. Clearly it will be a challenge to find $5b in additional benefits of the Act.

Is Cost Benefit Analysis the Correct Social Accounting Tool 1: Behavioral Issues.

The application of cost benefit calculus as a criterion for social action requires a number of preconditions. Foremost among these is the requirement that prices reflect social opportunity costs and that firms and individuals react rationally to the signals which these prices provide.

Recently, drawing on the growing literature on behavioral economics, some proposals have been made for a "new" welfare economics based on the recognition that producers and consumers are not always maximizing profits and utility; see Camerer et al (2002). This literature seems particularly applicable to this Act. The Act, by providing support for only three years, is deliberately designed to be a temporary crutch to the private market. The argument must be that private markets work, but, after an extreme event they may need time to get back on their feet. It is very difficult to square this view with any a belief that firms are continuously profit maximizing in a well functioning capital market. If it is not profit maximizing to write terrorism insurance now, why should it be profit maximizing to write it later?

The crisis in the terrorism insurance market after 9/11, however, is known to be typical of the response of insurance markets to other extreme events. Whether it be an earthquake, a hurricane, or a terrorist attack, the first response of markets is to shut down, then a few brave souls begin to write contracts at high prices, and as profits roll in, others enter and the price falls, see Jaffee and Russell (forthcoming)

At this time we lack a theory for this type of behavior, but even in the absence of theory, it is clear that the Government has a role here quite different from in role in a world of continuous profit maximization. By providing "Maalox for Markets" the Government can speed up the process of transition, restoring markets to a normal state faster than they would without this calmative. It is a very difficult task to measure this benefit because at this time we have no way to quantify the shortening of the transition period to normalcy. Nevertheless this does appear to be a very important Government role.

Is Cost Benefit Analysis the Correct Social Accounting Tool 2: Philosophical Issues. Suppose we were to determine that within reasonable bounds the costs of this Act in fact exceed the benefits. Should one then conclude that its passage was a mistake? One possible way to answer this question would be to look at it from the point of view of a potential new resident of the United States. Realizing that the taxes exceed the gain, this potential citizen would choose to live elsewhere, so the cost/ benefit rule maximizes the number of citizens when citizenship is an economic choice.

But can a country (or region) achieve social cohesiveness when citizenship is a fluid state based on economic calculation? This framing of the problem makes it clear that one important feature of terrorism risk is that it affects people because they live (or work) in a certain place. To preserve the cohesiveness of the group in this case it may be necessary to forego the individuality of market solutions and simply make terrorism risk a collective responsibility. This is the approach taken in Israeli where no attempt is made to use the market, the costs of state provided terrorism being paid out of general taxation.

It was also the approach taken by the US during World War 2 to deal with the act of war exclusions standard in property casualty insurance contracts. This non-market approach was heavily criticized by Hirshleifer (1988) when it was proposed that it be reapplied during the Korean War. His arguments were precisely the cost/benefit arguments provided earlier. The

question is whether they are appropriate when nationhood itself is the target or whether they are trumped by arguments of fairness and cohesiveness as in the Israeli case.

Conclusion: In this paper we have attempted to provide a framework for a cost benefit analysis of the recently passed Terrorism Risk Insurance Act. Even if it is not appropriate to determine the fate of such a proposal on the simple criterion of benefits being greater than costs, it would still seem desirable to know what the likely costs are. This paper has attempted to estimate at least some of these costs, admittedly under probability assumptions which may turn out to be far from the mark.

In the matter of benefits, almost all of the benefits are associated with the fact that the Act resuscitates the private market in terrorism insurance by requiring companies to offer this line at a subsidized cost. Since the Act expires in three years, the benefits must be measured against what would have happened to the industry during transition if no federal backstop had been provided. At this time, no quantitative information seems to be available on industry recovery, perhaps because in almost all cases the Government in any case steps in.

Finally, even if it is concluded that the industry would have recovered quickly and that therefore the costs of the Act exceed the private benefits, there remains the question of whether or not the cost benefit test is appropriate. Paradoxical as it may be, when the basic notion of the free market itself is threatened, state intervention may be a necessary response.

Table 1 - Insurers count cost of US terrorism

Global insurers estimated losses in relation to US terrorist attacks

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COMPANIES	LOSSES (Estimated)	COUNTRY
Lloyd's of London	$1.9bn	UK
Berkshire Hathaway	$2.2bn	US
Munich Re	$1.9bn	Germany
Swiss Re	$1.74bn	Switzerland
Allianz	$975m	Germany
Zurich Financial	$700m-$900m	Switzerland
AIG	$820m	US
XL Capital	$700m	US
St Paul	$700m	US
Employers Re	$600m	US
Axa	$550m	France
Travelers (Citigroup)	$500m	US
Partner Re	$350m-$450m	Bermuda
Ace	$400m	Bermuda
Hannover Re	$365m	Germany
CNA Financial	$200m-$350m	US
MetLife	$300m	US
Scor	$150m-$250m	France
Royal & Sun Alliance	$290m	UK
Fairfax Financial	$100m-$200m	Canada
Cox	$179m	UK
One Beacon	Up to $175m	US
Brit Insurance	$119m	UK
Chubb	$100m	US
Amlin	$87m	UK
Everest Re	$75m	Barbados
Wellington Underwriting	$74m	UK
Markel	Up to $75m	US
CGNU	$51m	UK
Hiscox	$29m up to $43m	UK
Cigna	$25m	US
Goshawk	$12m	UK

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