

Terrorism & Enterprise Risk Management

Scenarios & Uncertainty

**Enterprise Risk Management Symposium
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Presentation Outline

- **Terrorism Risk**
 - What do we know 6 ½ after 9/11?
 - Implications for risk managers and ERM
- **Terrorism Scenarios**
 - Limited utility of traditional tools of risk management
- **ERM & The Holistic Approach to Managing Terrorism Risk**
- **The Market for Terrorism Insurance**

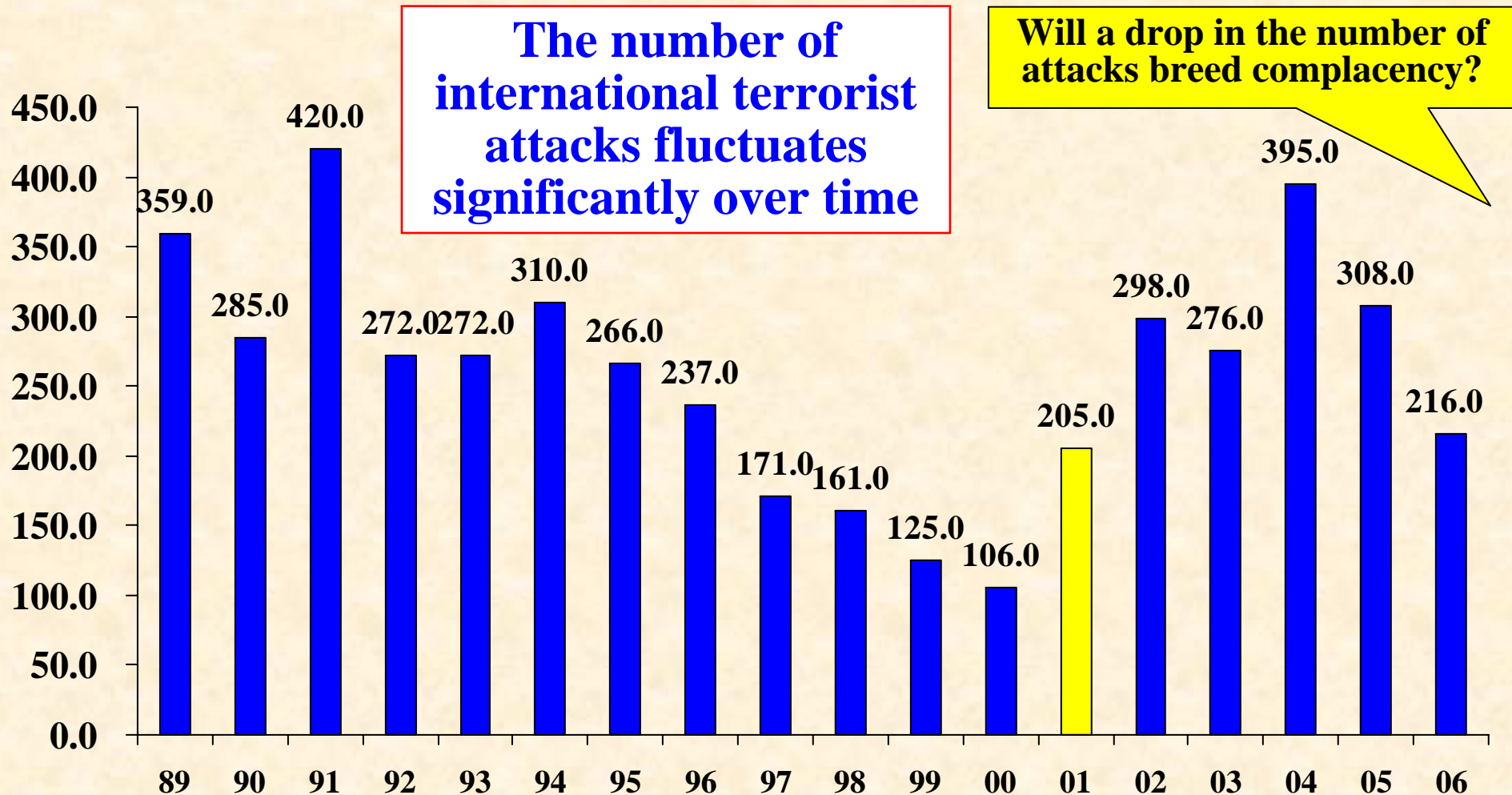
WHAT DO WE KNOW?

*6 1/2 YEARS AFTER 9/11,
IS TERRORISM AN
INSURABLE RISK?*





*International Terrorist Incidents, 1989-2006**



*Approximately half of the attacks from 2004-2006 were in Iraq.

Source: Lloyd's, *Under Attack: Global Business and the Threat of Political Violence*, April 2007.



Our Knowledge About Terrorism is Still Remedial; Insurance Markets Limited

- **Absence of terrorist attacks on American soil since 2001 has helped to restore stability and confidence in the US economy and commercial insurance markets**
- **Ironically, the absence of attacks means that what we have learned since 2001 is mostly academic, circumstantial or indirect—garnered from the experience of other countries (e.g., U.K., Spain)**
 - **Some important experience has been gained in avoiding attacks**
 - **In contrast, we've learned much from the hurricanes of 2004/05**
- **Hundreds of billions of dollars have been spent on national security (effectively tools of risk management available exclusively to government), but this has a limited practical actuarial effect on the price or availability of terrorism-exposed lines of insurance**
- **Conclusion: Terrorism is nearly as uninsurable to day as it was in the wake of 9/11**
- **Stability in the market is due almost exclusively to 2 factors:**
 - **(i) TRIA (ii) Absence of subsequent attacks since 2001**



Implications for Risk Managers & Enterprise Risk Management

- Since 2001 risk managers have been left with three fundamentally difficult or impossible tasks regarding terrorism risk:
 - Identification
 - Quantification
 - Mitigation
- **Identification**: Thousands of vulnerabilities have been identified, but many (and perhaps most) have not
- **Quantification**: Models have been developed that help determine the dollar damage of property and casualty exposures, but how accurate are they (no doubt less so than catastrophe models)?
- **Mitigation**: Corporations and government have spent hundreds of billions to reduce perceived risks, but most are unproven.
- Enterprise Risk Management implies that a holistic approach to such risk be taken, but the practice of ERM in the terrorism context is hampered by huge knowledge gaps



Terrorism Violates Traditional Requirements for Insurability

Requirement	Definition	Violation
Estimable Frequency	<ul style="list-style-type: none">•Insurance requires large number of observations to develop predictive rate-making models (an actuarial concept known as credibility)	<ul style="list-style-type: none">•Very few data points•Terror modeling still in infancy, untested.•US intelligence infrastructure deeply flawed .
Estimable Severity	<ul style="list-style-type: none">•Maximum possible/ probable loss must be at least estimable in order to minimize “risk of ruin” (insurer cannot run an unreasonable risk of insolvency though assumption of the risk)	<ul style="list-style-type: none">•Potential loss is virtually unbounded.•Losses can easily exceed insurer capital resources for paying claims.•Extreme risk in workers compensation and statute forbids exclusions.



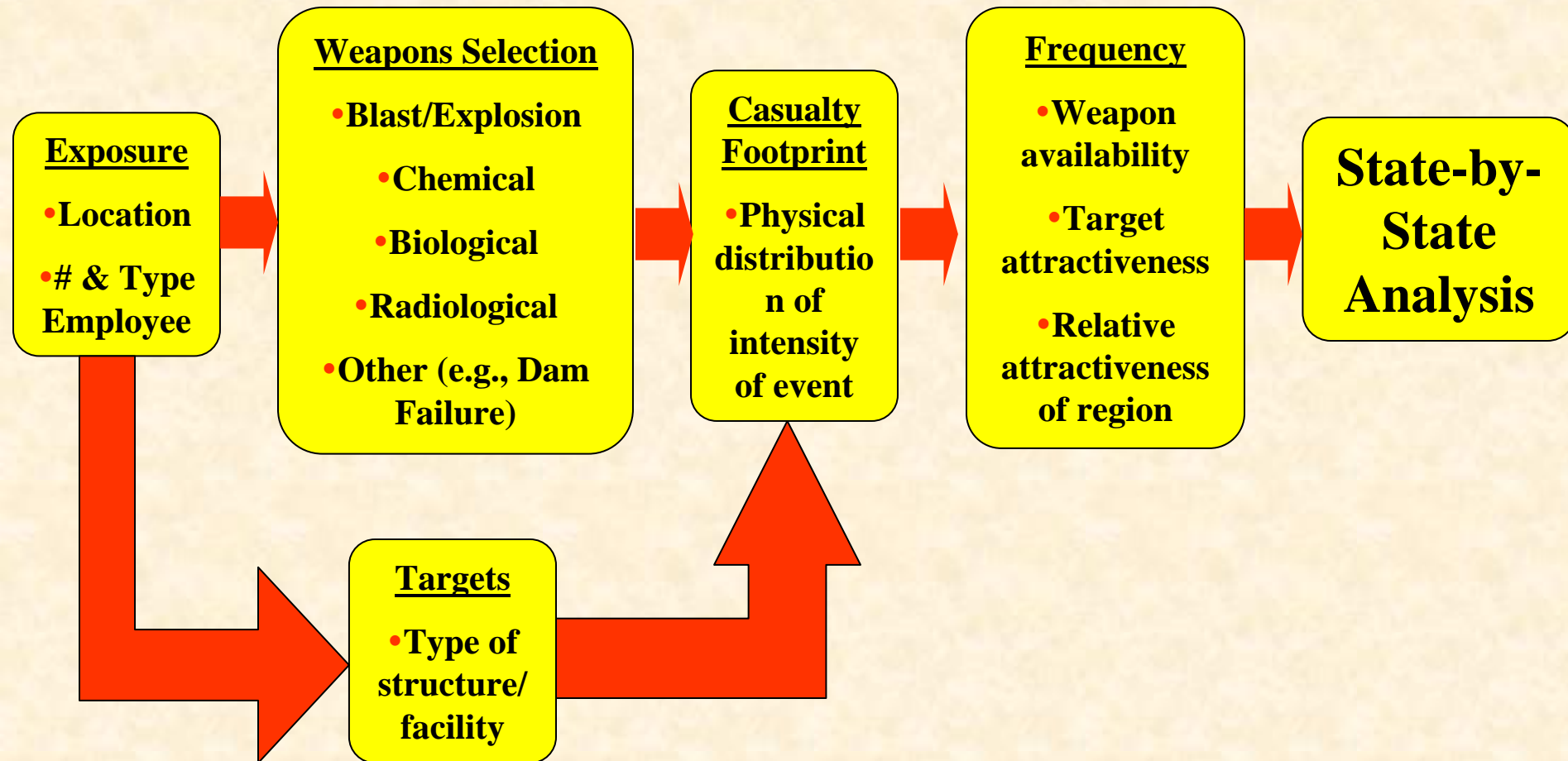
Terrorism Violates Traditional Requirements for Insurability (cont'd)

Requirement	Definition	Violation
Diversifiable Risk	<ul style="list-style-type: none">•Must be able to spread/distribute risk across large number of risks•“Law of Large Numbers” helps makes losses manageable and less volatile	<ul style="list-style-type: none">•Losses likely highly concentrated geographically or by industry (e.g., WTC, power plants)•Take-up rate low outside most at-risk zones/industries leads to <i>adverse selection</i> problem
Random Loss Distribution/Fortuity	<ul style="list-style-type: none">•Probability of loss occurring must be purely random and fortuitous•Events are individually unpredictable in terms of time, location and magnitude	<ul style="list-style-type: none">•Terrorism attacks are planned, coordinated and deliberate acts of destruction•Dynamic target shifting from “hardened targets” to “soft targets”•Terrorist adjust tactics to circumvent new security measures•Actions of US and foreign governments may affect likelihood, nature and timing of attack



Terrorism Scenarios:

Modeling Severity & Frequency





Additional Insurability Concerns

■ **Information Problems:**

➤ Traditional Insurance assumes that emerging issue information is available and shared (Terrorism information sharing is “asymmetric” – Classified data is not shared).

■ **Unique Role & Responsibility of Government:**

➤ Insurance is designed for policyholders’ insurable interests (Victims of terrorism are mostly surrogate targets for attacks mainly aimed at government, and the government is in a unique position to influence the likelihood of attack based upon foreign policy.)



Additional Insurability Concerns

■ **Surplus Impairment Risk:**

■ Statutory Accounting requires insurers to set aside reserves for the ultimate liabilities arising from the insurance policies they underwrite. (Insurers are *not allowed to post reserves for losses that have not occurred. Therefore, insurers are not allowed to post reserves specifically related to catastrophe losses* from natural perils or terrorism until they actually occur. *As a result, catastrophe losses deplete insurer's capital & surplus base intended for the security of all policyholders*).

➤ **Pre-Loss Funding:**

➤ Almost all insurance assumes that premiums are paid first, normally at the inception of the policy. (In terrorism programs or pools, private and public sector solutions, such as TRIA, often use a combination of pre-loss and post-loss funding.)

TERRORISM SCENARIOS

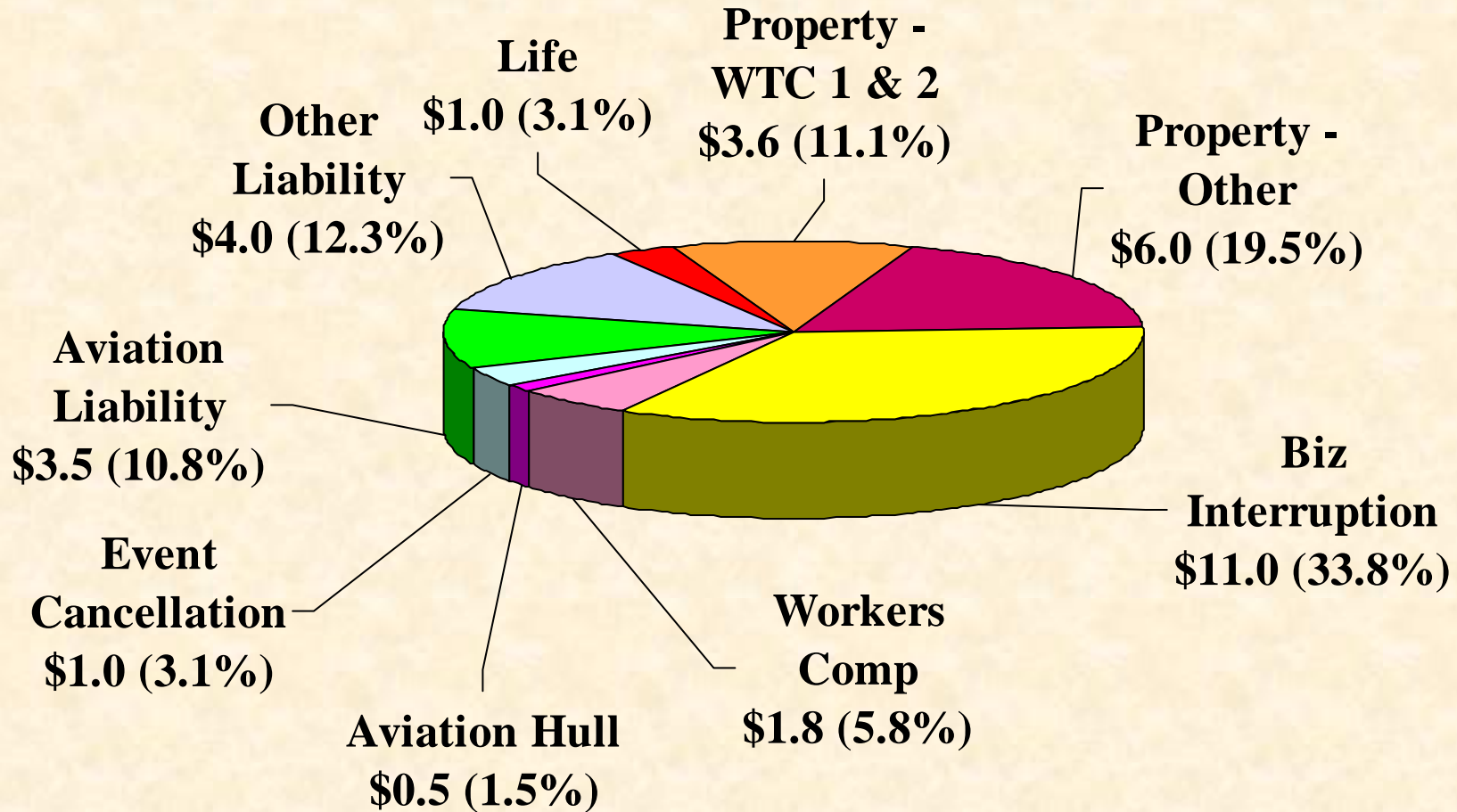
*Traditional Tools of Risk
Management Can Provide Only
Limited Benefits/Insight*





Sept. 11 Industry Loss Estimates

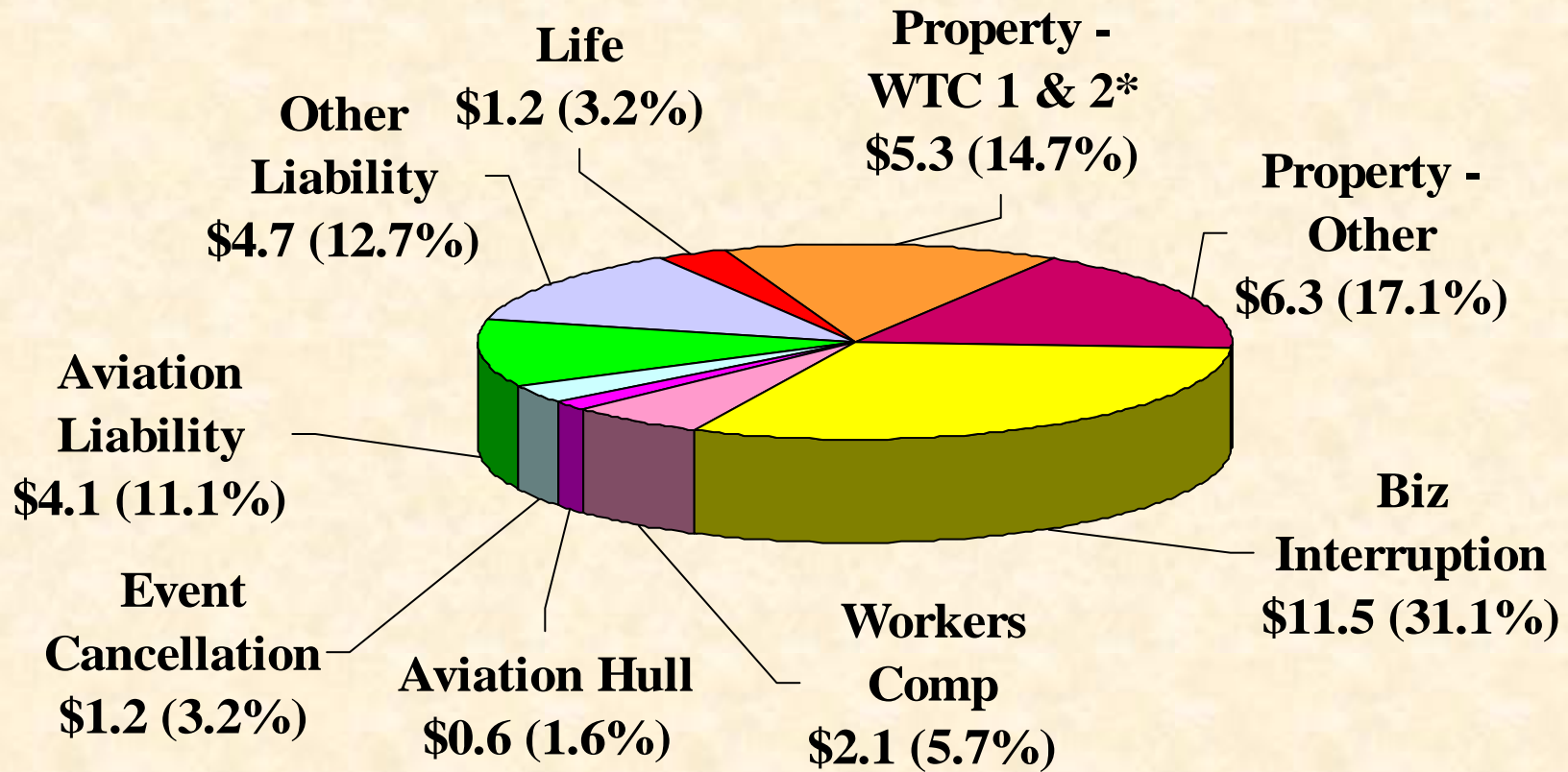
(\$ Billions)



Current Insured Losses Estimate: \$32.5B



Loss Distribution by Type of Insurance from September 11 Terrorist Attack (\$ Billions) (Stated in 2007 Dollars)



Total Insured Losses Estimate: \$36.9B

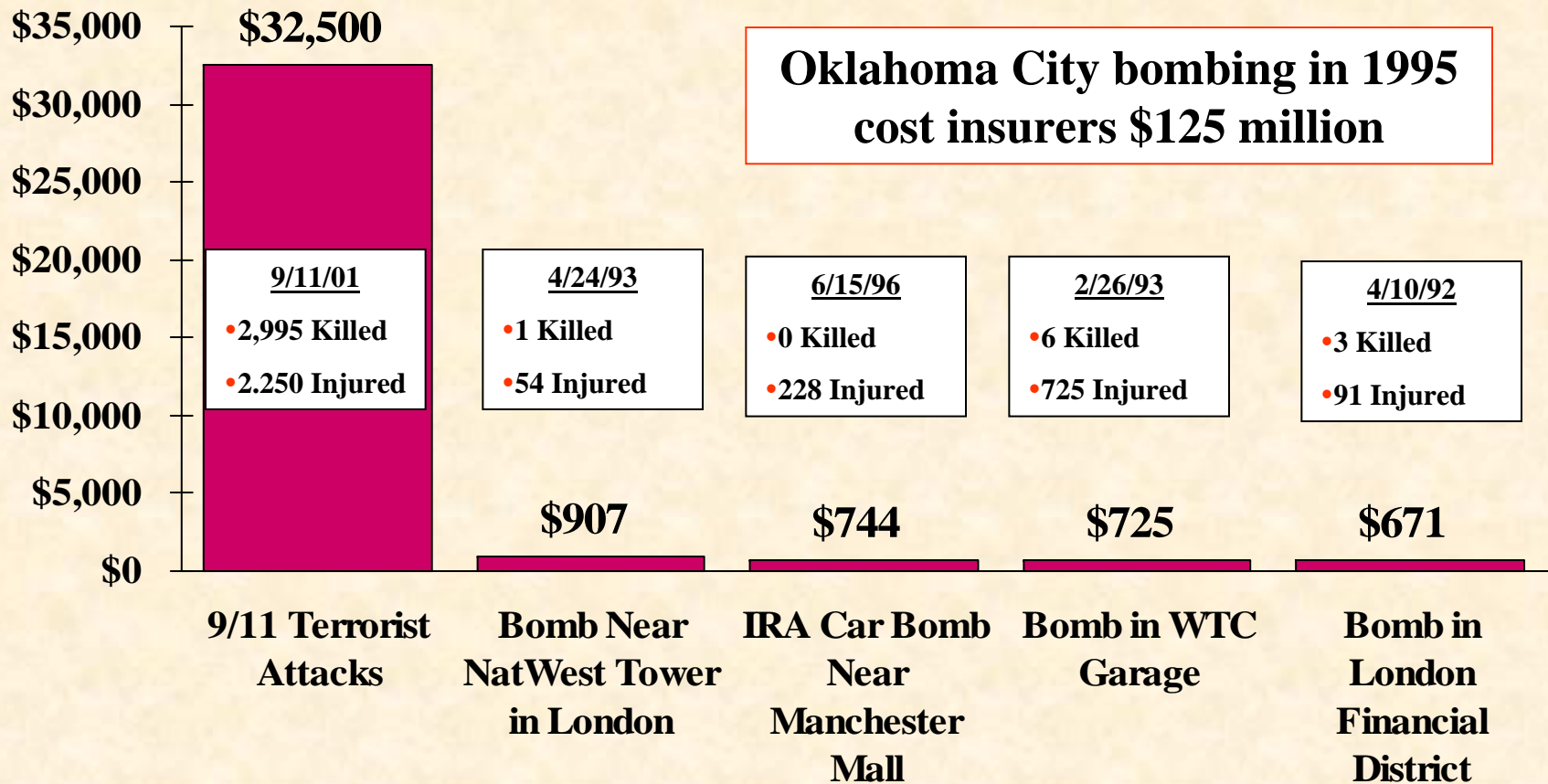
*Final settlement amount on claims on the WTC complex itself of \$4.55 billion as announced on May 23, 2007 by New York State and Port Authority of New York and New Jersey. Figure is adjusted to 2007 price level. Losses stated in 2001 dollars are \$32.5 billion.

Source: Insurance Information Institute



Top 5 Costliest Terrorist Attacks (by insured property loss)*

\$ Millions, Adjusted to 2001 Price Level



*Includes property, business interruption and aviation hull losses.
Source: Swiss Re; Insurance Information Institute.



Insured Loss Estimates: Large NBCR Attack (\$ Billions)

Type of Coverage	New York	Washington	San Francisco	Des Moines
Group Life	\$82.0	\$22.5	\$21.5	\$3.4
General Liability	14.4	2.9	3.2	0.4
Workers Comp	483.7	126.7	87.5	31.4
Residential Prop.	38.7	12.7	22.6	2.6
Commercial Prop.	158.3	31.5	35.5	4.1
Auto	1.0	0.6	0.8	0.4
Total	\$778.1	\$196.8	\$171.2	\$42.3



*Models of Property and WC losses (Insured and Uninsured)**

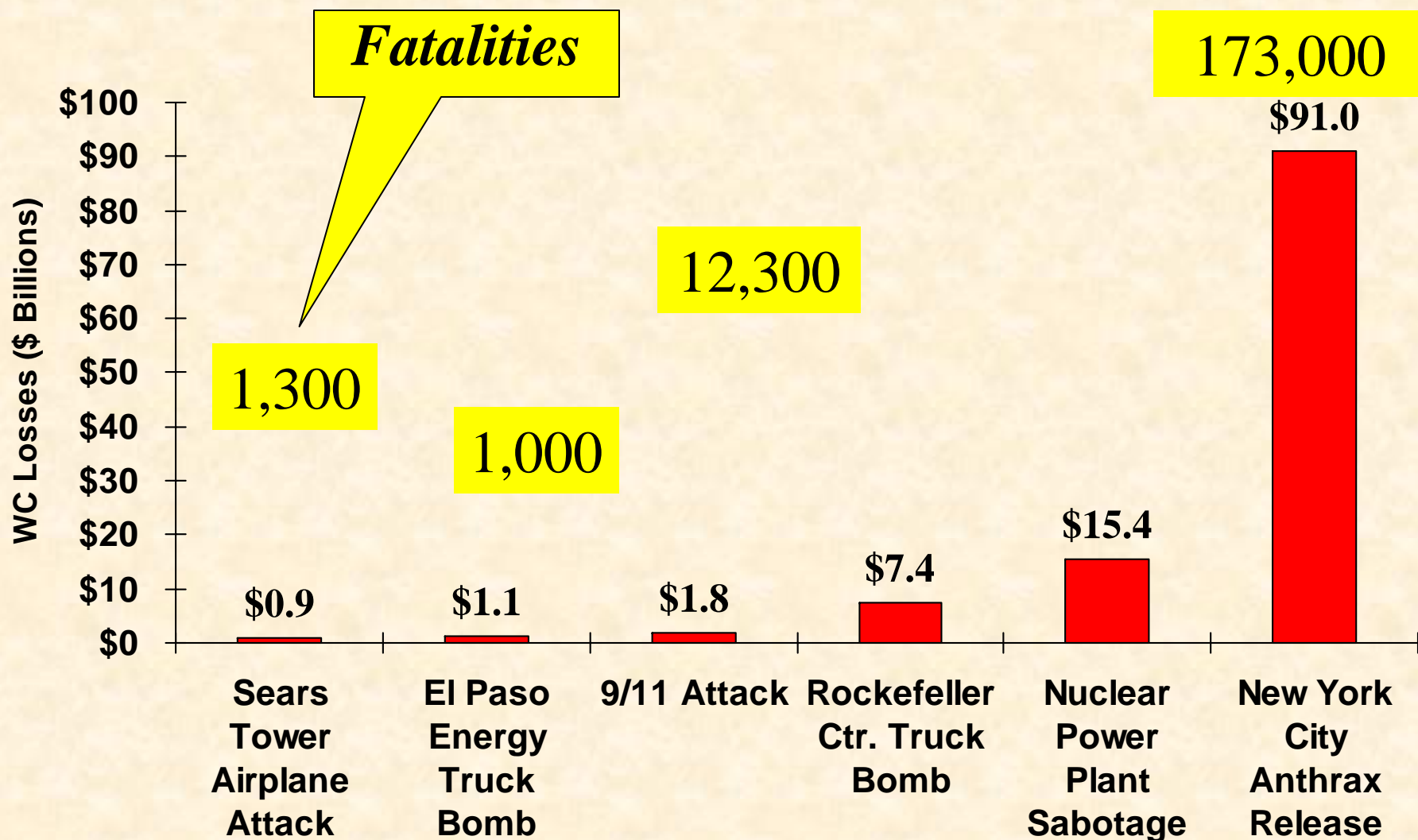
	Losses (\$ billions)			
Attack Scenario	WC	Property	Total	Simulated Range
Conventional				
10-Ton Truck Bomb	\$11	\$11	\$22	\$7-\$66
1-Ton Truck Bomb	2	5	7	2-21
NBCR				
5-kiloton Nuclear Bomb	320	310	630	210-1,900
Outdoor Anthrax	160	240	400	130-1,200
Radiological Attack	0.5	62	63	20-190
Indoor Sarin Attack	5	1	6	2-18

*Based on Risk Management Solutions (RMS) models.

Source: RAND, *Trade-Offs Among Alternative Government Interventions in the Market for Terrorism Insurance*



Estimated Workers Comp Insured Losses & Deaths for Terrorist Events

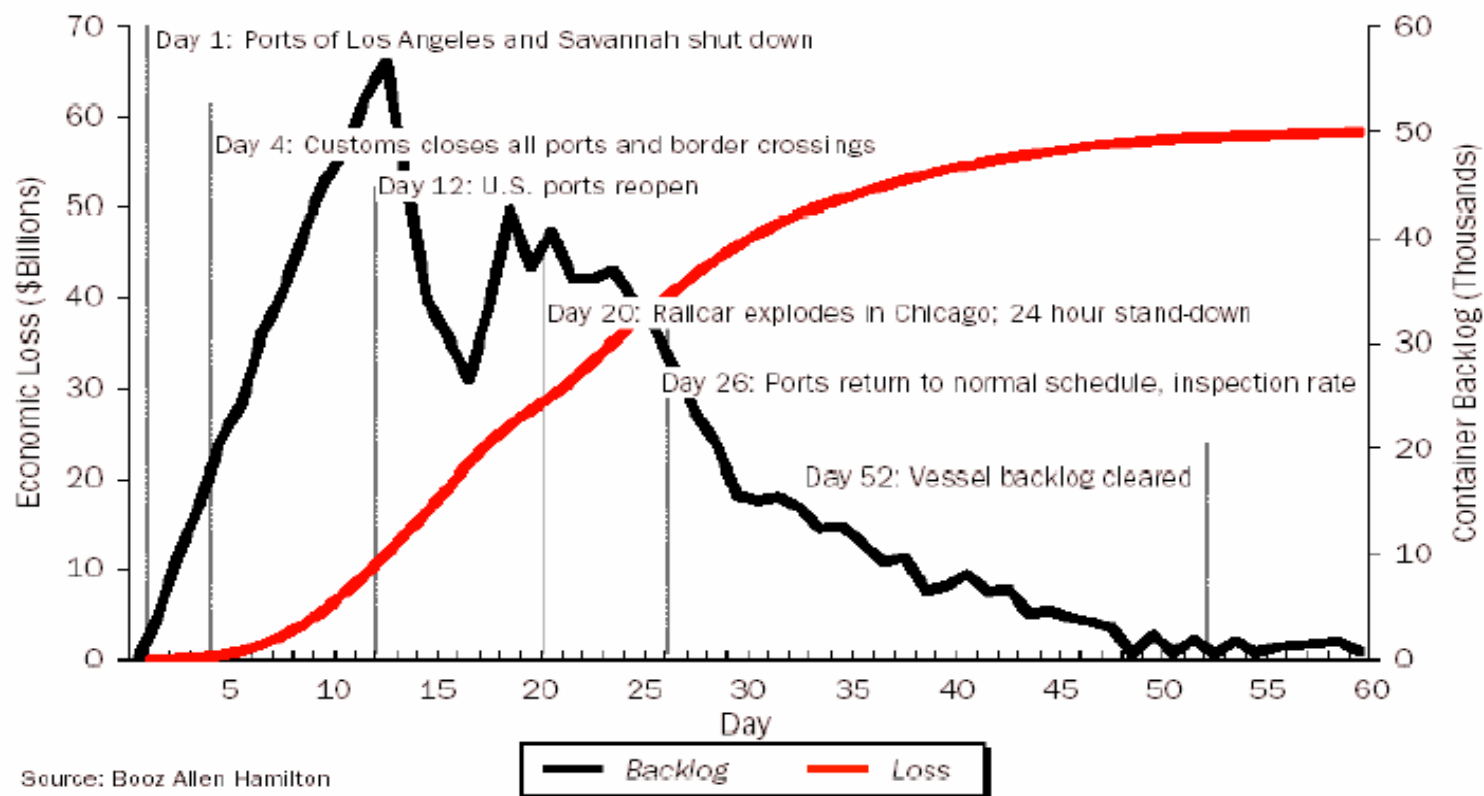


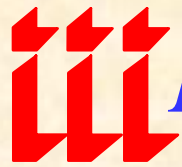


Port Security War Game Estimates \$58B Impact from Simulated Terrorist Attack

PORT SECURITY WAR GAME—ECONOMIC IMPACT

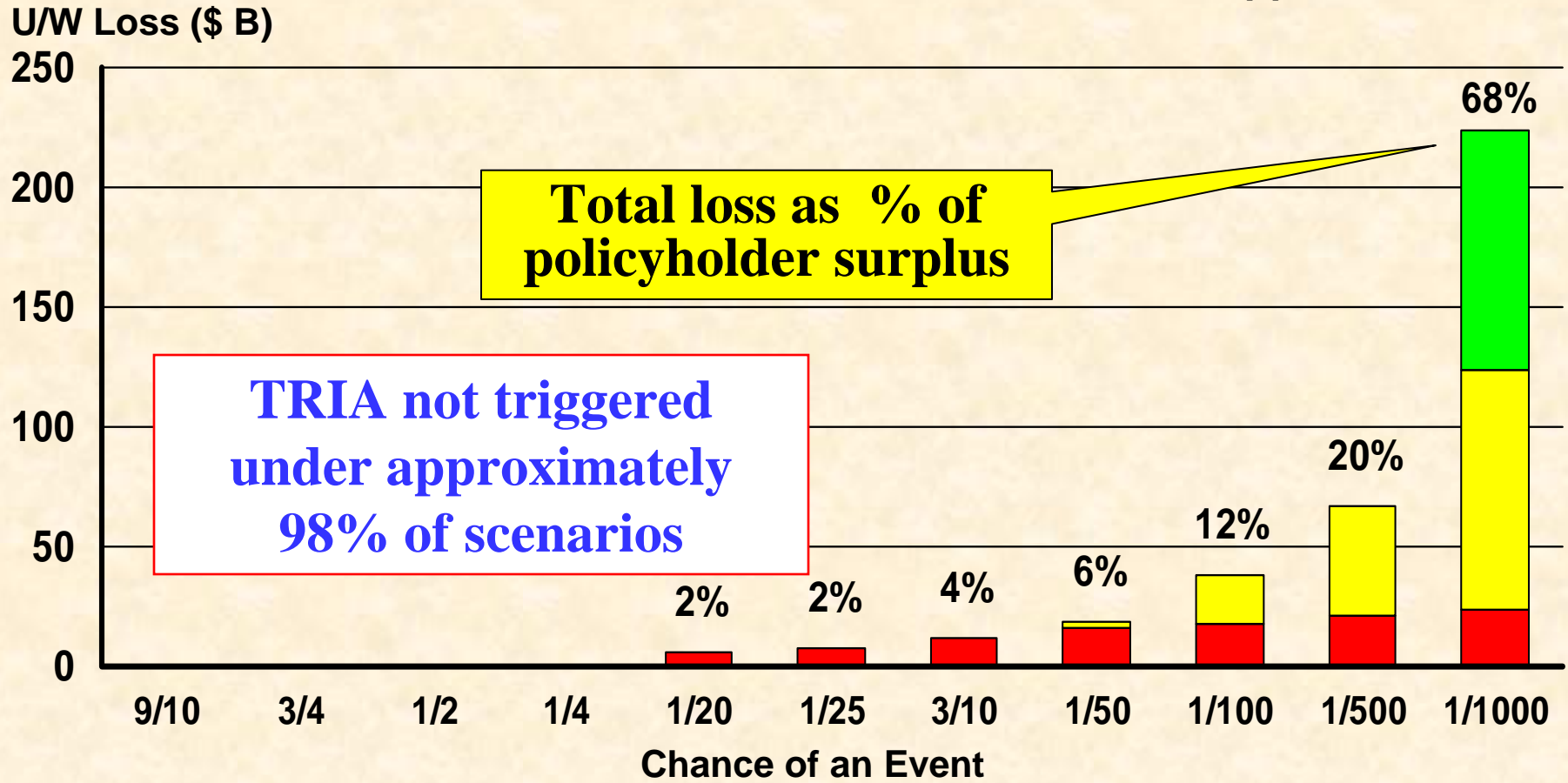
Exhibit 4





*Under Most Scenarios TRIA Is Dormant But Vital When Triggered**

P&C U/W Loss With and Without TRIA Support



■ Industry Loss with TRIA ■ Federal Contribution ■ Excess of TRIA Limit

*Under the Terrorism Risk Insurance Extension Act (expired 12/31/07)

Source: EQECAT, NCCI

ERM & THE HOLISTIC APPROACH TO MANAGING TERRORISM RISK

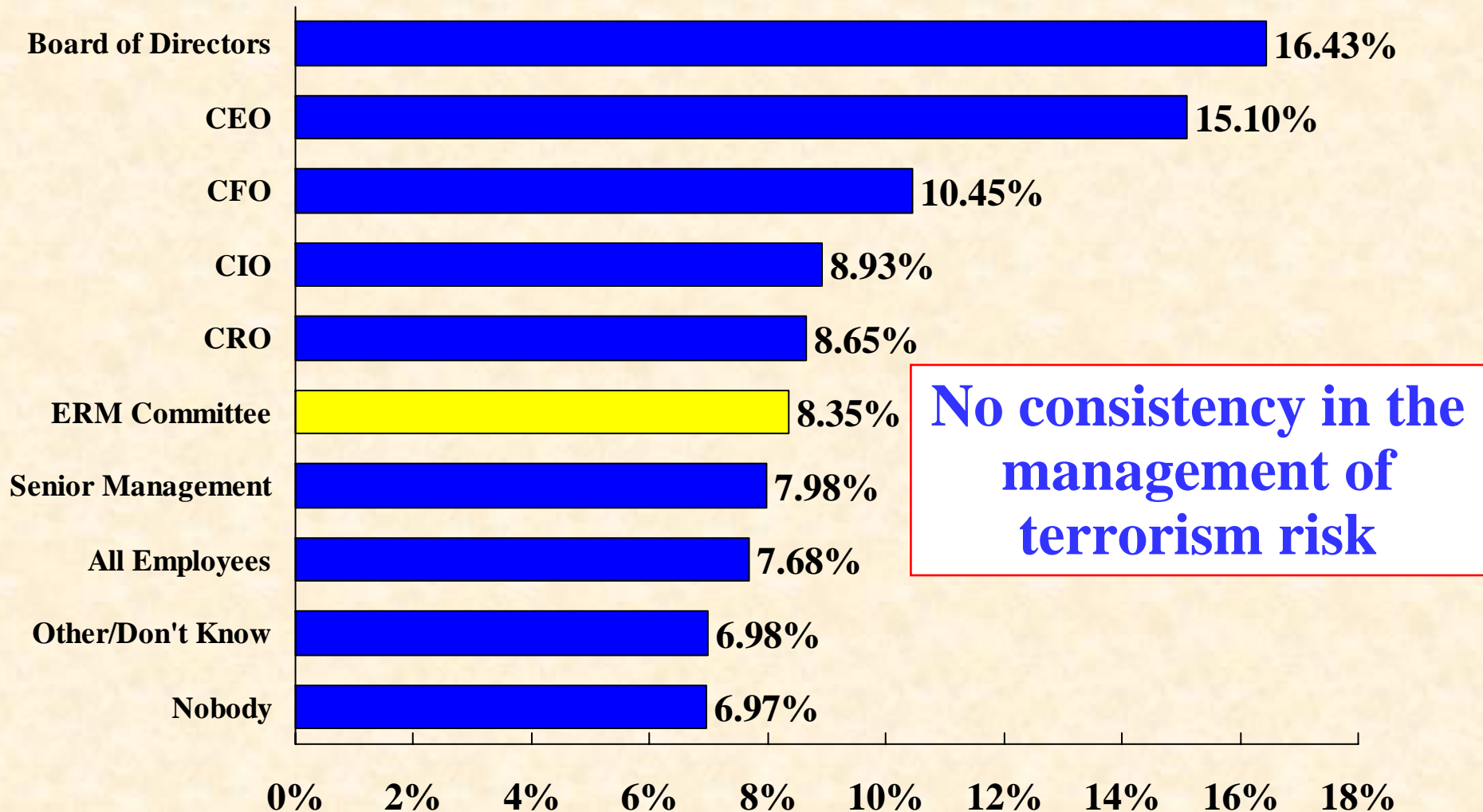


*Preparing for
the Unknown*





*Whose Responsible for Monitoring & Managing Terrorism and Political Risk**

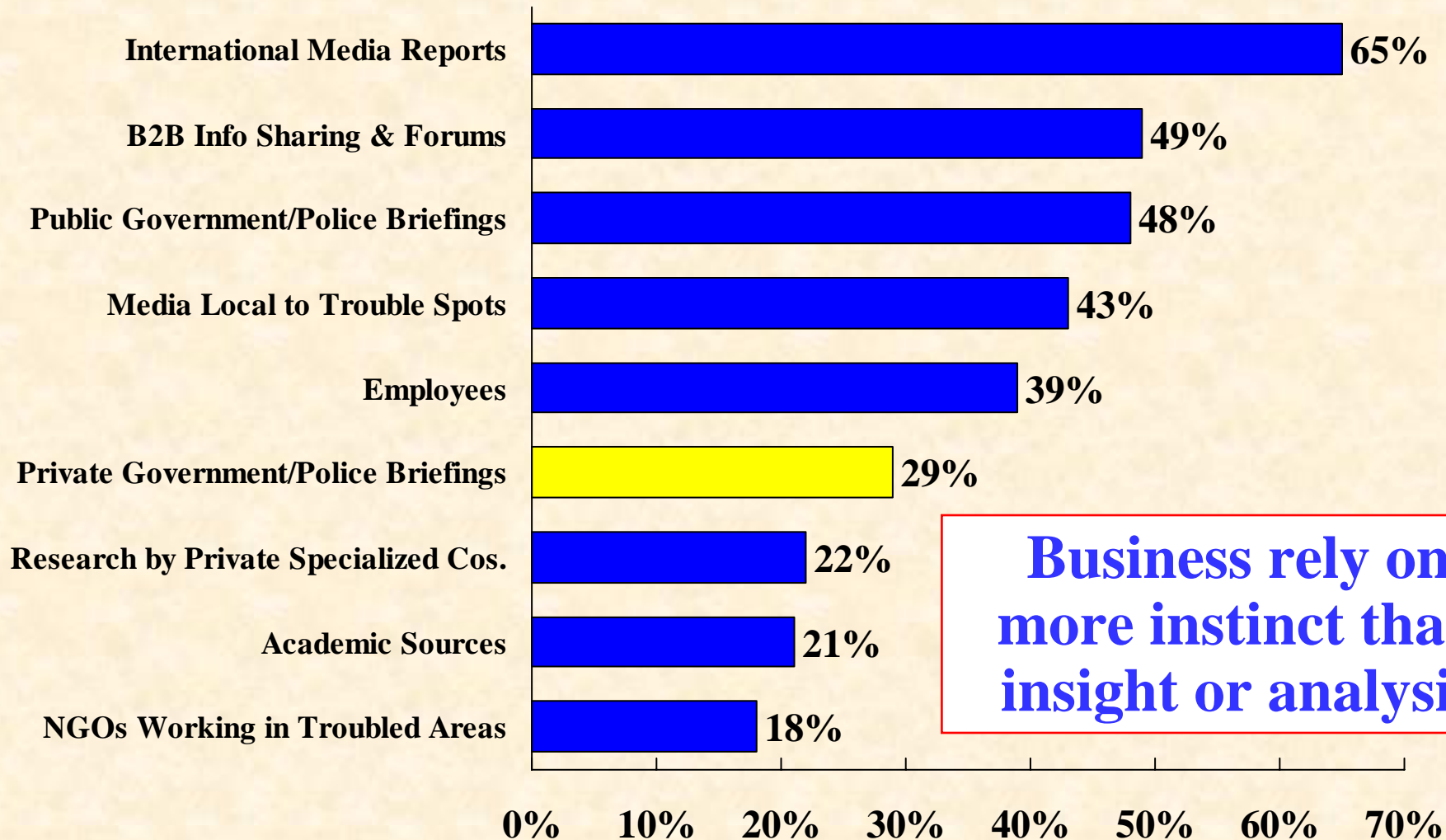


*Respondents to survey could indicate more than one response.

Source: Lloyd's, *Under Attack: Global Business and the Threat of Political Violence*, April 2007.



*Information Sources Used by Companies to Gather Data on Political Violence**



*Respondents to survey could indicate more than one response.

Source: Lloyd's, *Under Attack: Global Business and the Threat of Political Violence*, April 2007.



“Traditional” Losses Arising from Terror Attack Scenarios

Risk	Concern
Property	<ul style="list-style-type: none">• Cost to repair, rebuild, replace
Casualty	<ul style="list-style-type: none">• Death/injury of workers• Death/injury customers & other 3rd parties
Liability	<ul style="list-style-type: none">• Claims of negligence (direct & 3rd party)
Business Interruption	<ul style="list-style-type: none">• Loss of income/extra expense may exceed insurance and company resources

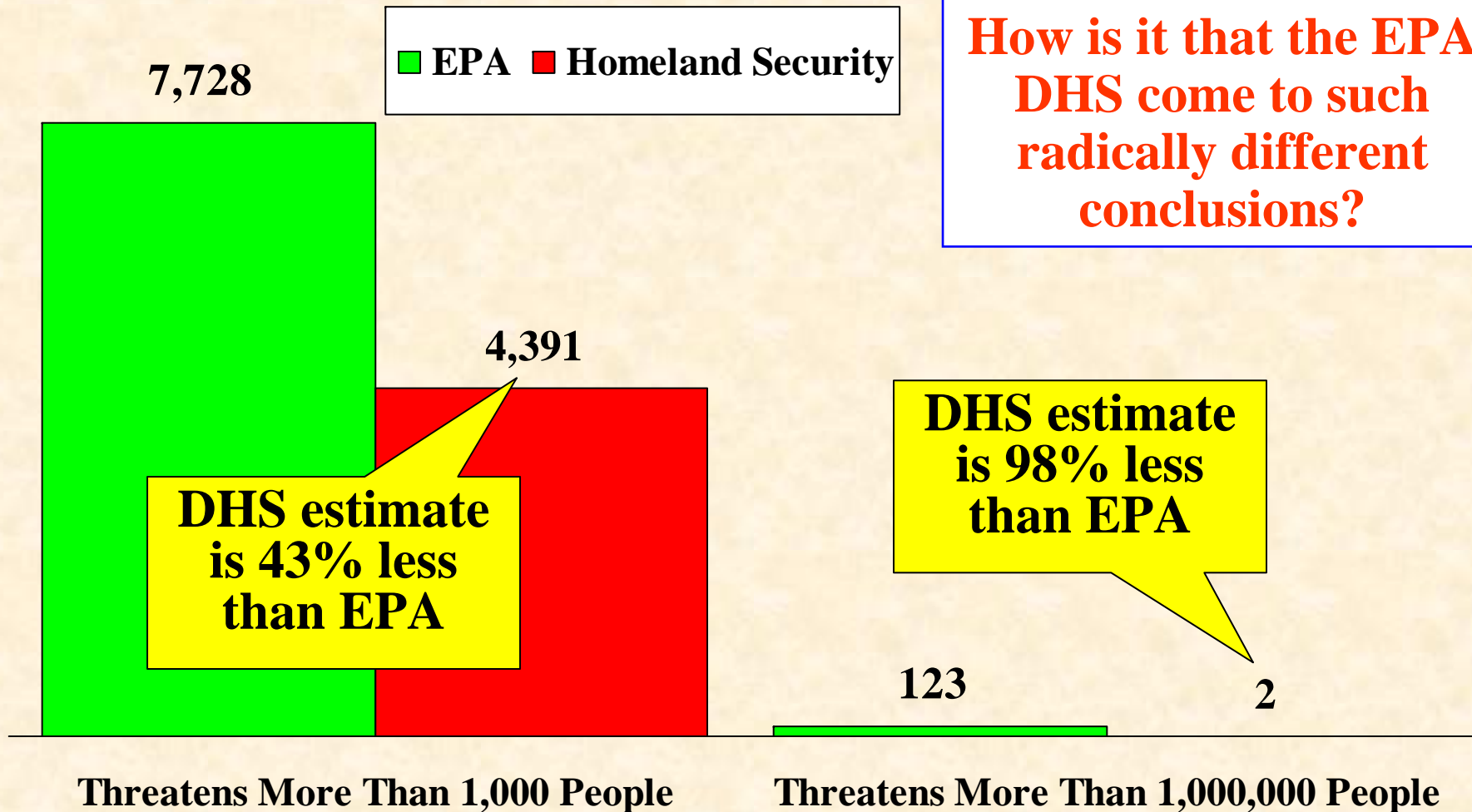


“Less Traditional” Losses Arising from Terror Attack Scenarios

Risk	Concern
Contingent Business Inter.	<ul style="list-style-type: none">• Upstream damage/dislocations interfere with ability to operate
D&O	<ul style="list-style-type: none">• Shareholders could allege management/directors did not take prudent steps to prevent attack or manage its effects
Latent Liability	<ul style="list-style-type: none">• Claims of disability/disease/death well after the event (e.g., first responders post 9/11)
Political Risk	<ul style="list-style-type: none">• Global political landscape and economic opportunities could shift• US government policy influences risk



Number of Chemical Plants that Could Threaten Nearby People



Risks of Doing Business Internationally: Top 10 Country Rankings (2003-2006)

Ranking	Country	Business Partner Score*
1.	Afghanistan	10.0
2.	Equatorial Guinea	10.0
3.	Tajikistan	10.0
4.	Syria	10.0
5.	Iraq	8.0
6.	Serbia	7.7
7.	Colombia	7.0
8.	Angola	7.0
9.	Venezuela	7.0
10.	Vietnam	7.0

Business partner risk is the risk of entering into a transaction, project or other form of relationship with a business partner.

•Business Partner Score is a mean score, out of a maximum of 10, derived from three components: ventures halted or modified, transparency and integrity.

•Source: Aon 2007 Political and Economic Risk Map; The Risk Advisory Group

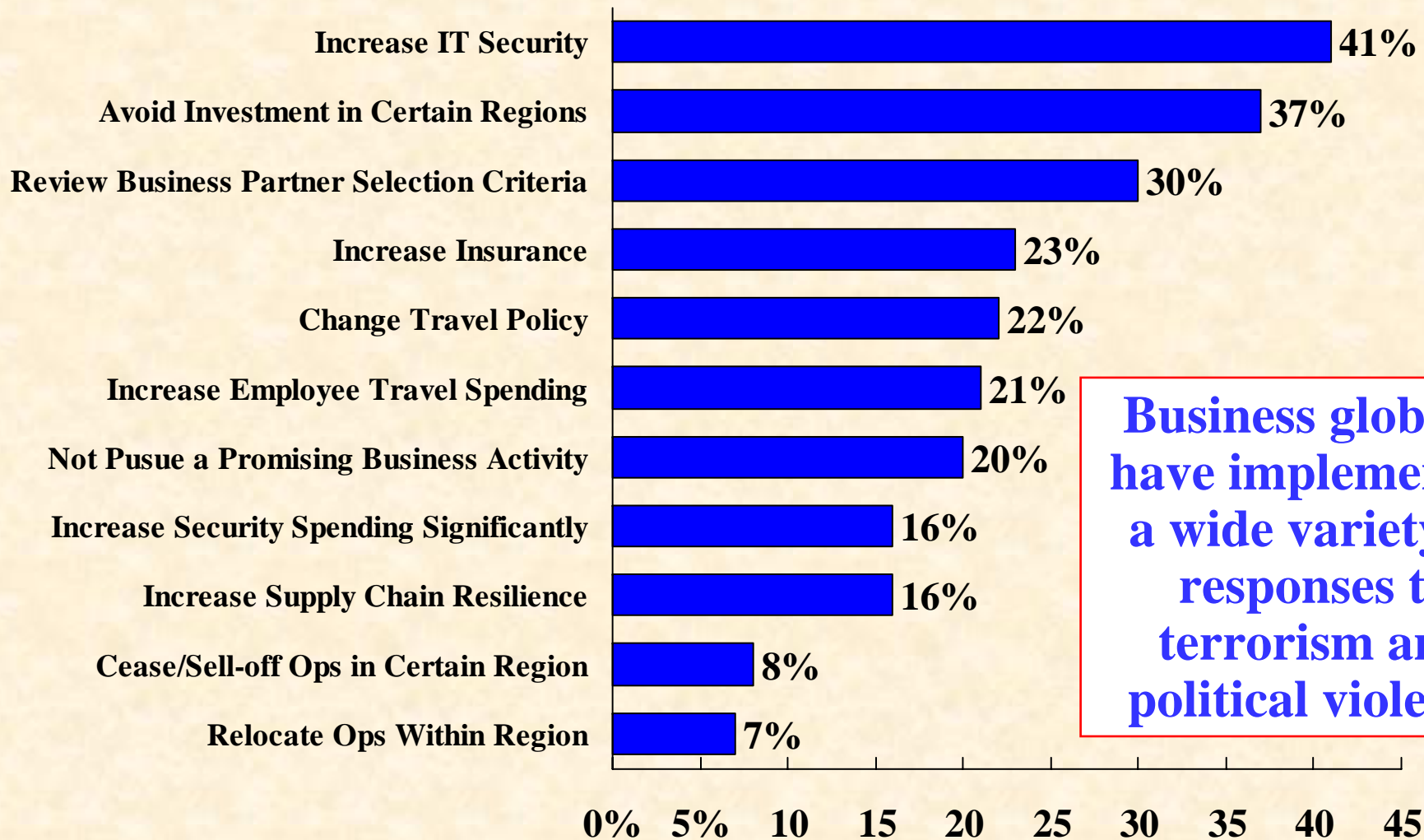


“Non-Traditional” Losses Arising from Terror Attack Scenarios

Risk	Concern
IT Risk	<ul style="list-style-type: none">• Infiltration, disruption or disruption• Could involve your IT, or up/downstream
Investment Risk	<ul style="list-style-type: none">• Terrorist attack will likely negatively influence investment opportunities, possibly for extended period
Reputational Risk	<ul style="list-style-type: none">• Perception of vulnerability; Botched recovery; treatment of stakeholders issues
Regulatory Risk	<ul style="list-style-type: none">• Regulator/Govt. reaction could impair business prospects, raise costs
Economic Risk	<ul style="list-style-type: none">• State of the economy pre/post-attack influences performance



*Risk Management Reactions to Political Violence and Terrorism**



**Business globally
have implemented
a wide variety of
responses to
terrorism and
political violence**

*Respondents to survey could indicate more than one response

Source: Lloyd's, *Under Attack: Global Business and the Threat of Political Violence*, April 2007.

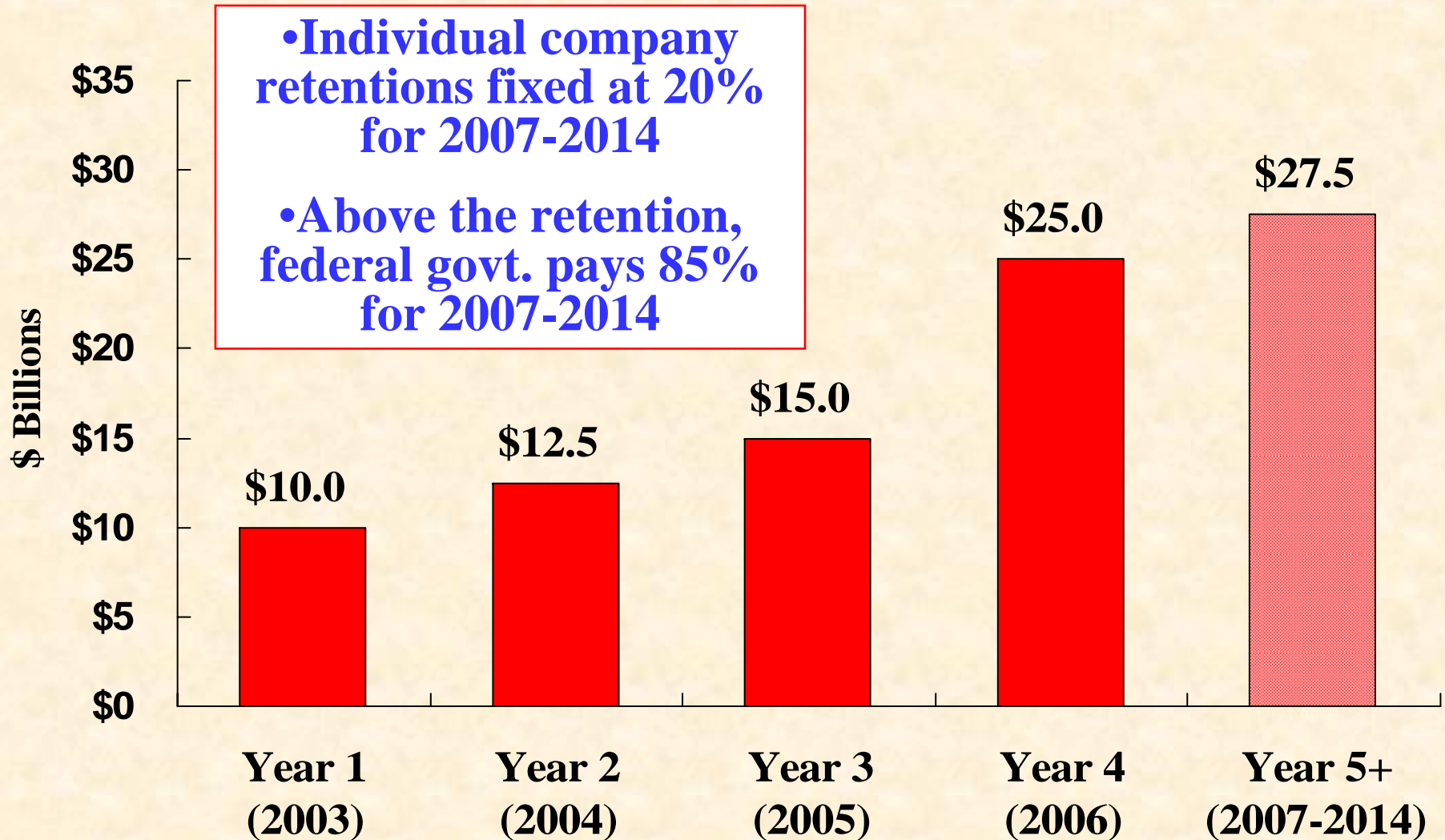
THE MARKET FOR TERRORISM INSURANCE

*TRIA Remains a
Runaway Success*





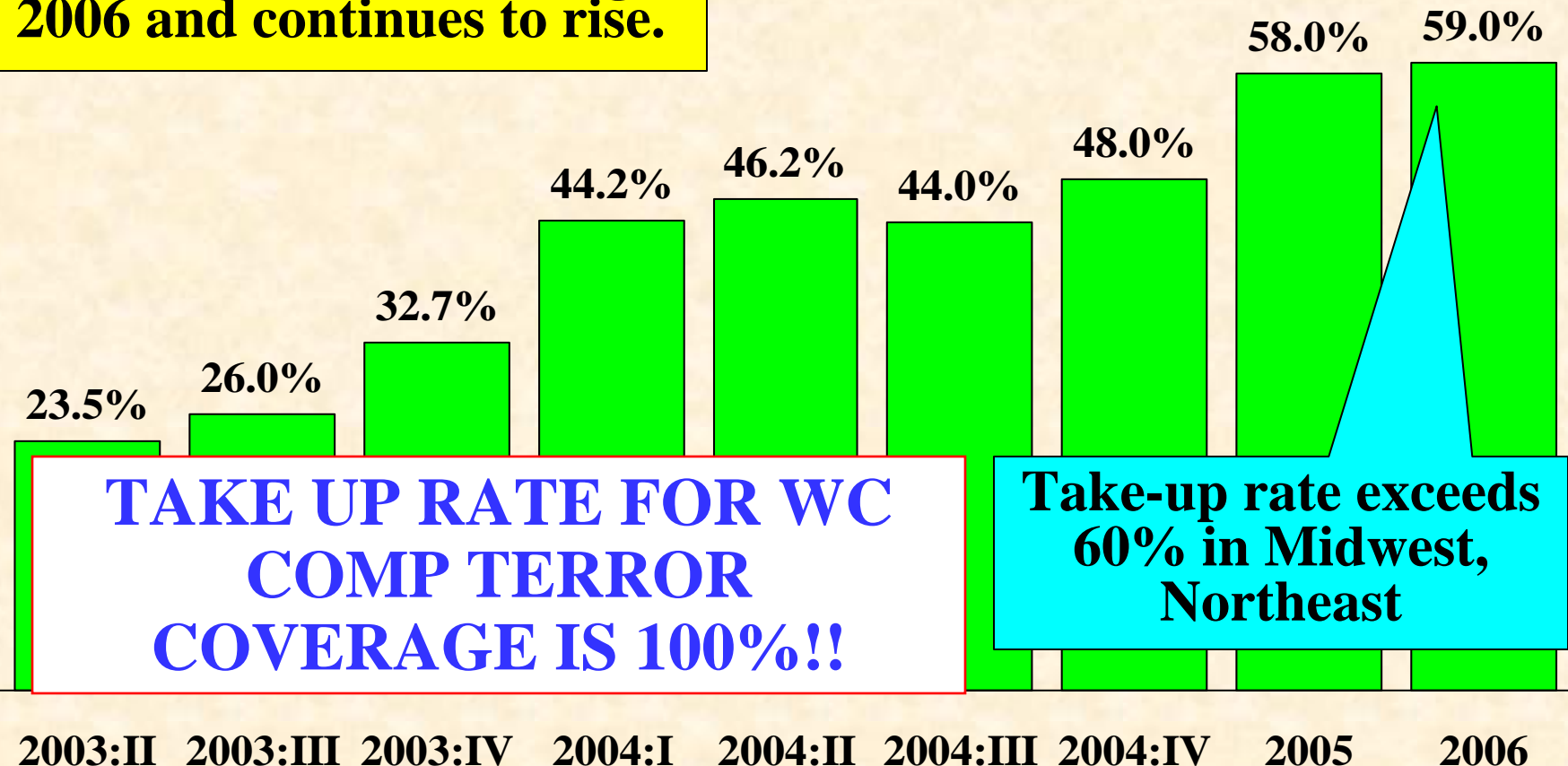
Insurance Industry Retention Under TRIA (\$ Billions)





Terrorism Coverage Take-Up Rate Rising

Terrorism take-up rate for non-WC risk rose through 2006 and continues to rise.

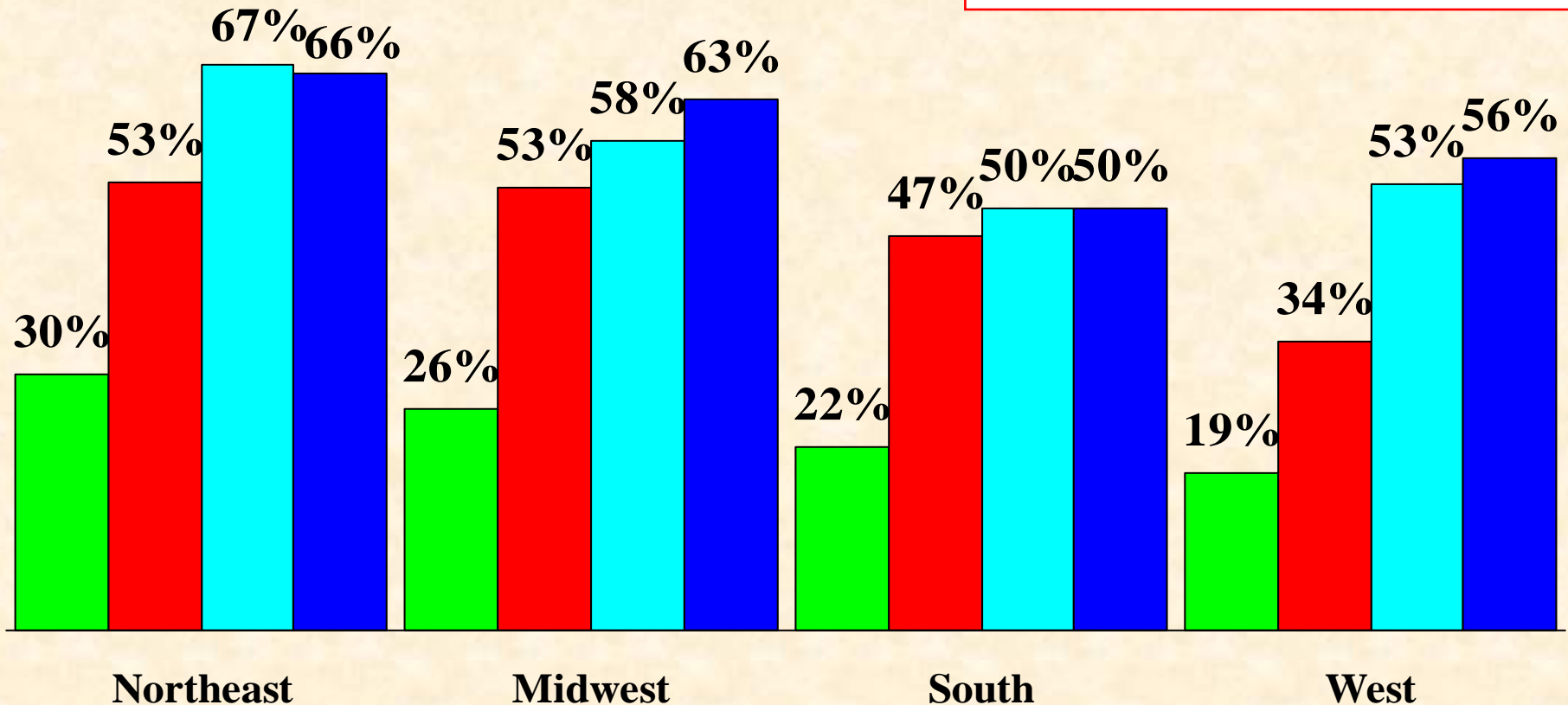




Terrorism Coverage: Take-Up Rates by Region

■ 2003 ■ 2004 ■ 2005 ■ 2006

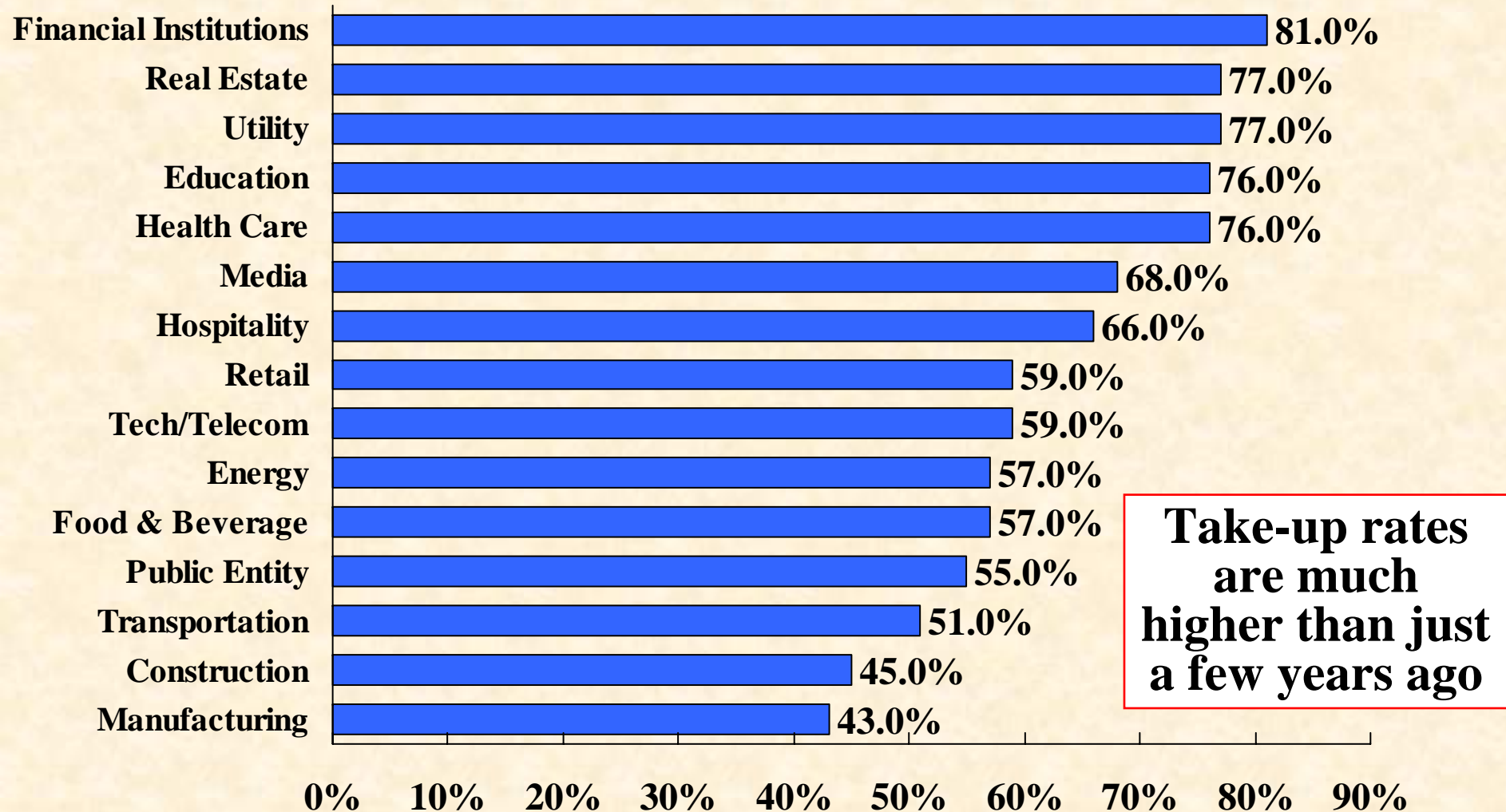
**Terrorism take-up rates
are highest in the
Northeast and Midwest**





Terrorism Coverage:

Take-Up Rates by Industry, 2006



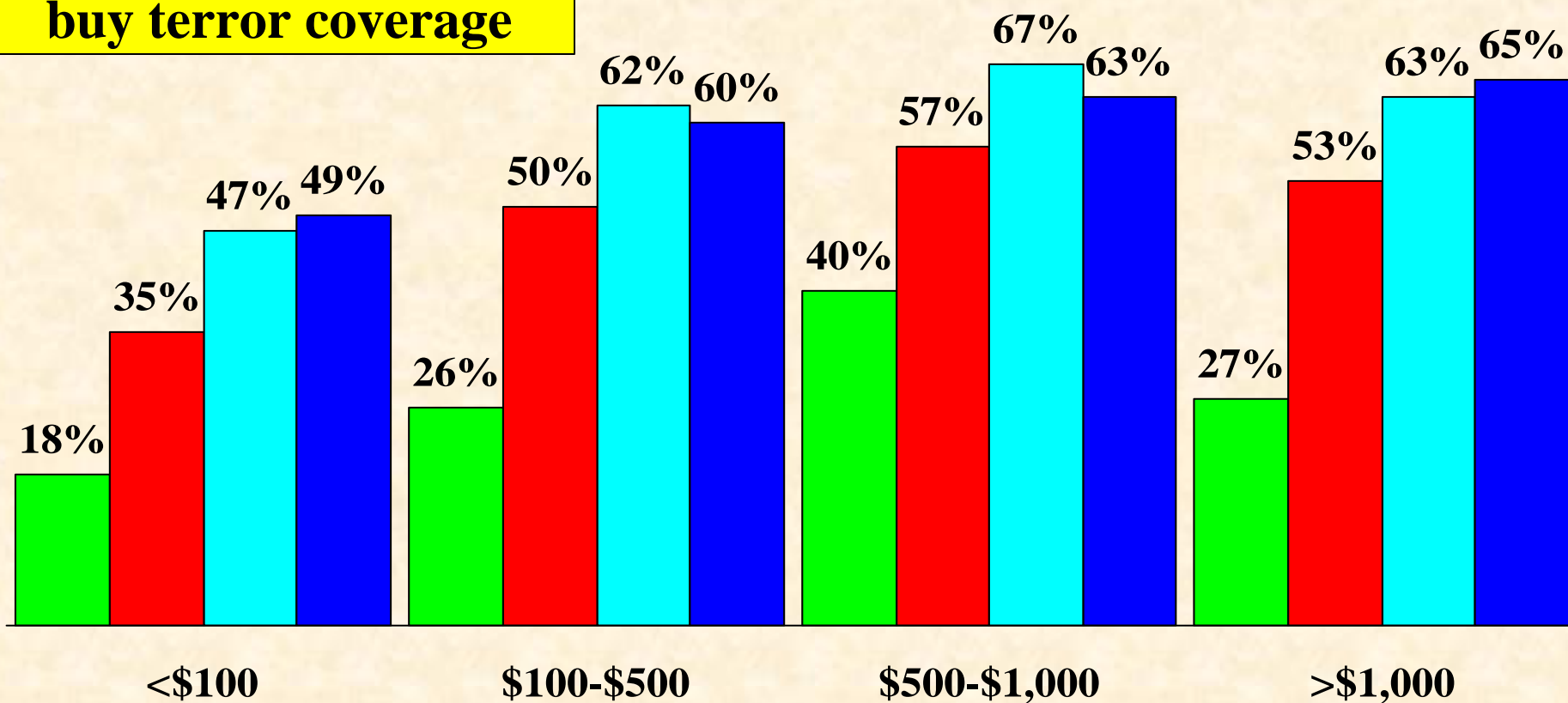


*Terrorism Coverage Take-Up Rates by Total Insured Value (TIV)**

**Some 60% of firms
with TIV between \$500
million and \$1 billion
buy terror coverage**

\$ Millions

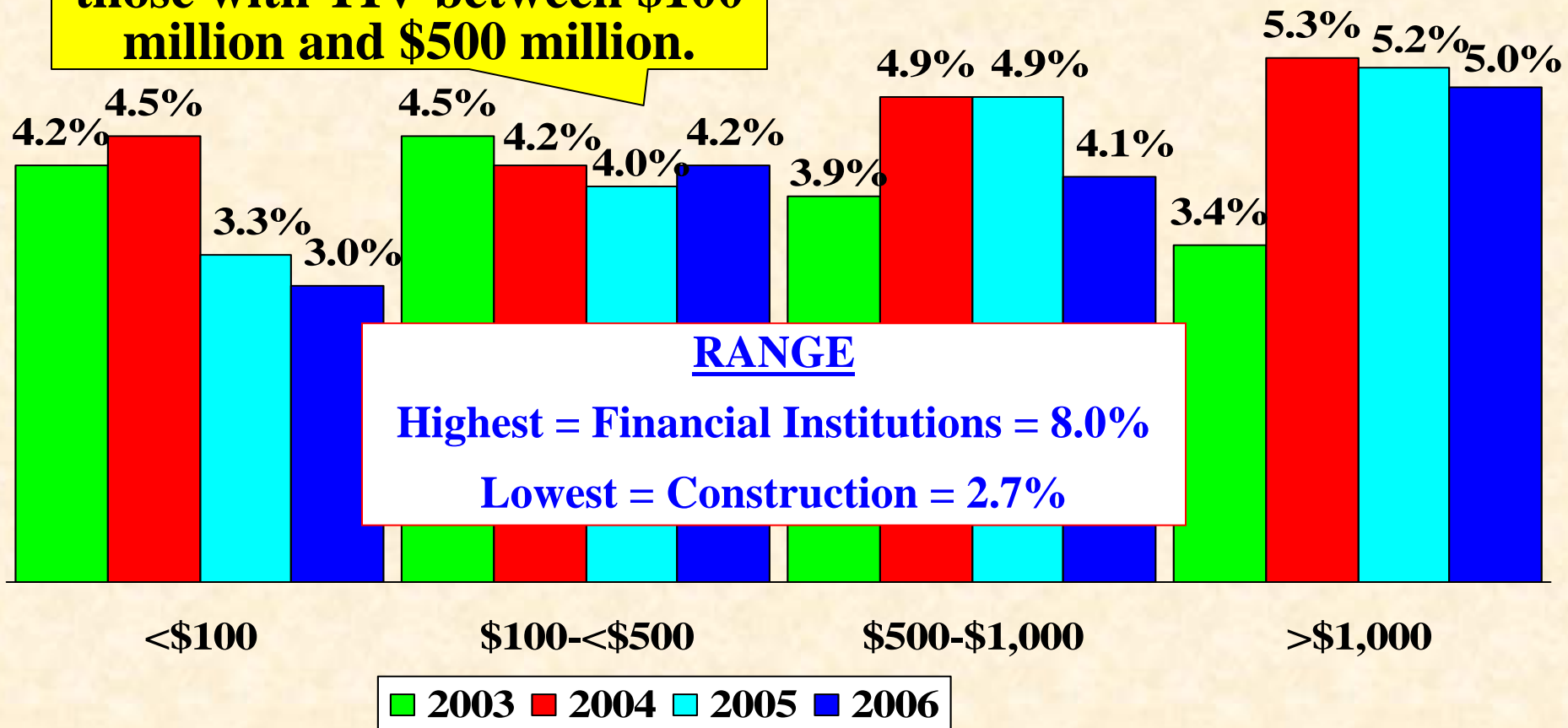
■ 2003 ■ 2004 ■ 2005 ■ 2006

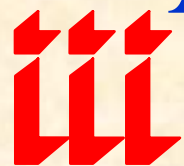


*Does not include firms that buy coverage through package policies.
Source: 2006 Marsh Marketwatch Report.; Insurance Information Institute

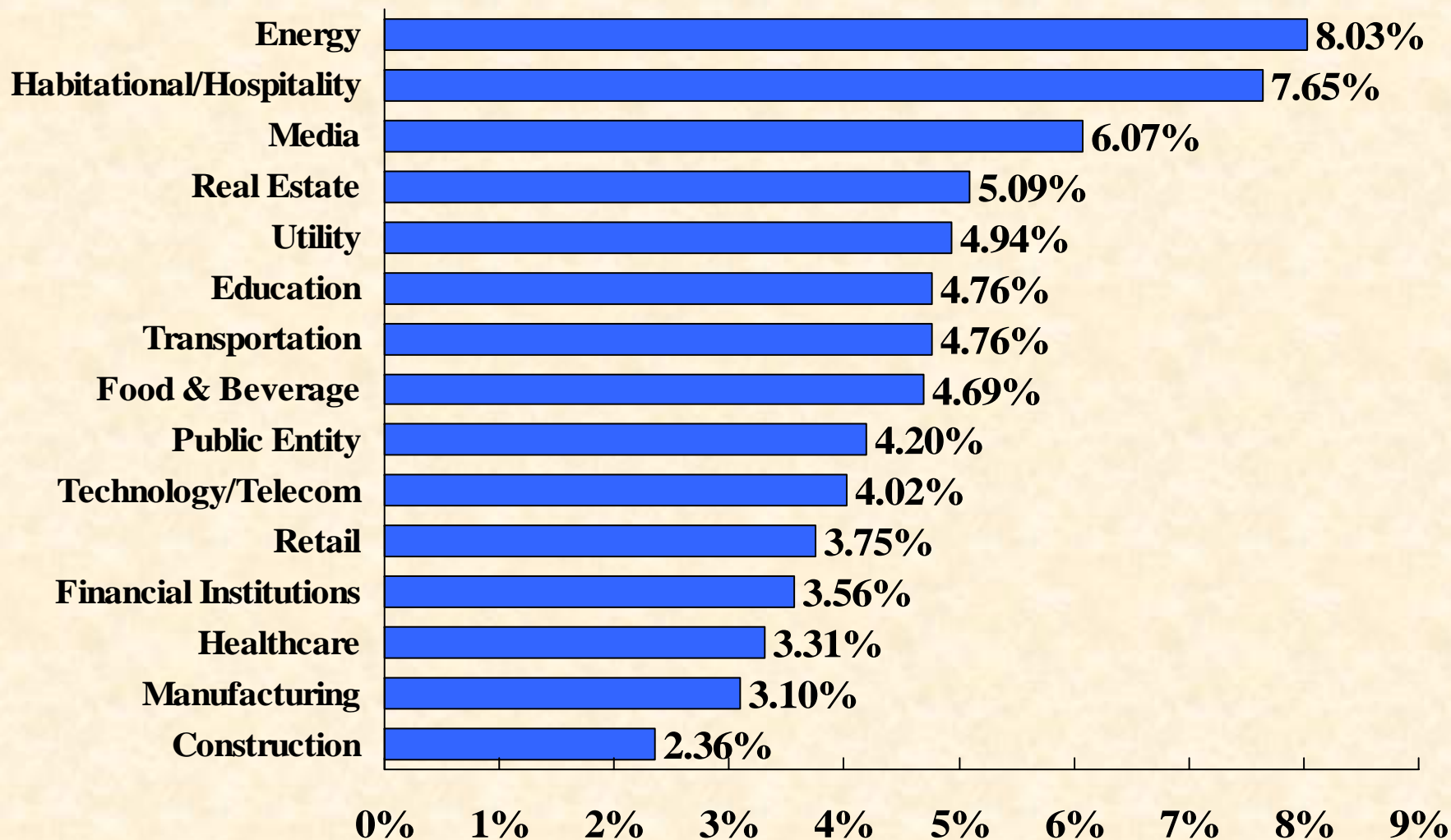
*Terrorism Premium as a Percentage of Property Premium by TIV**

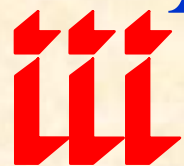
2006 saw modest reductions for all companies, except those with TIV between \$100 million and \$500 million.



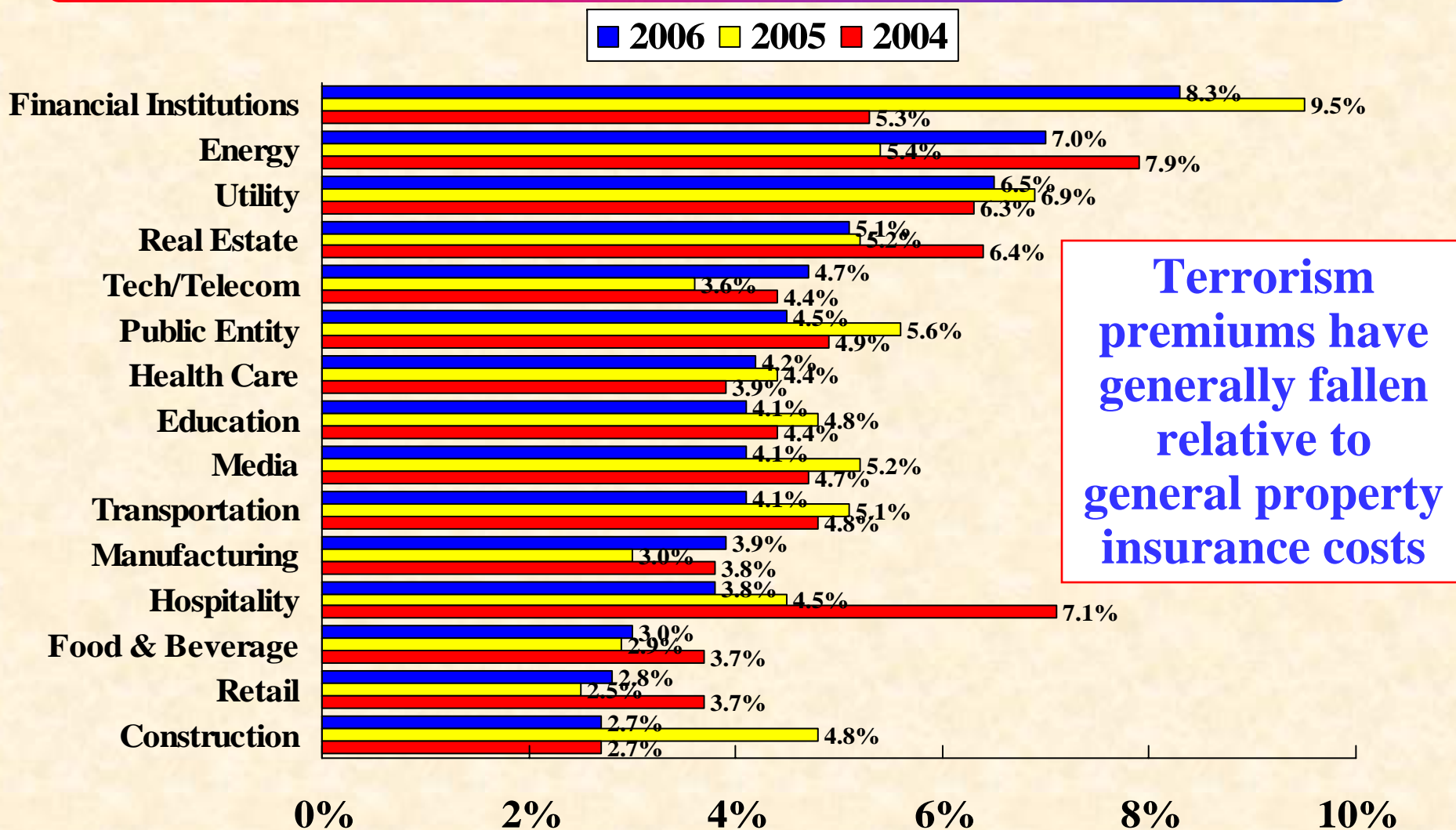


Terrorism Premium as Percentage of Property Premium, by Industry





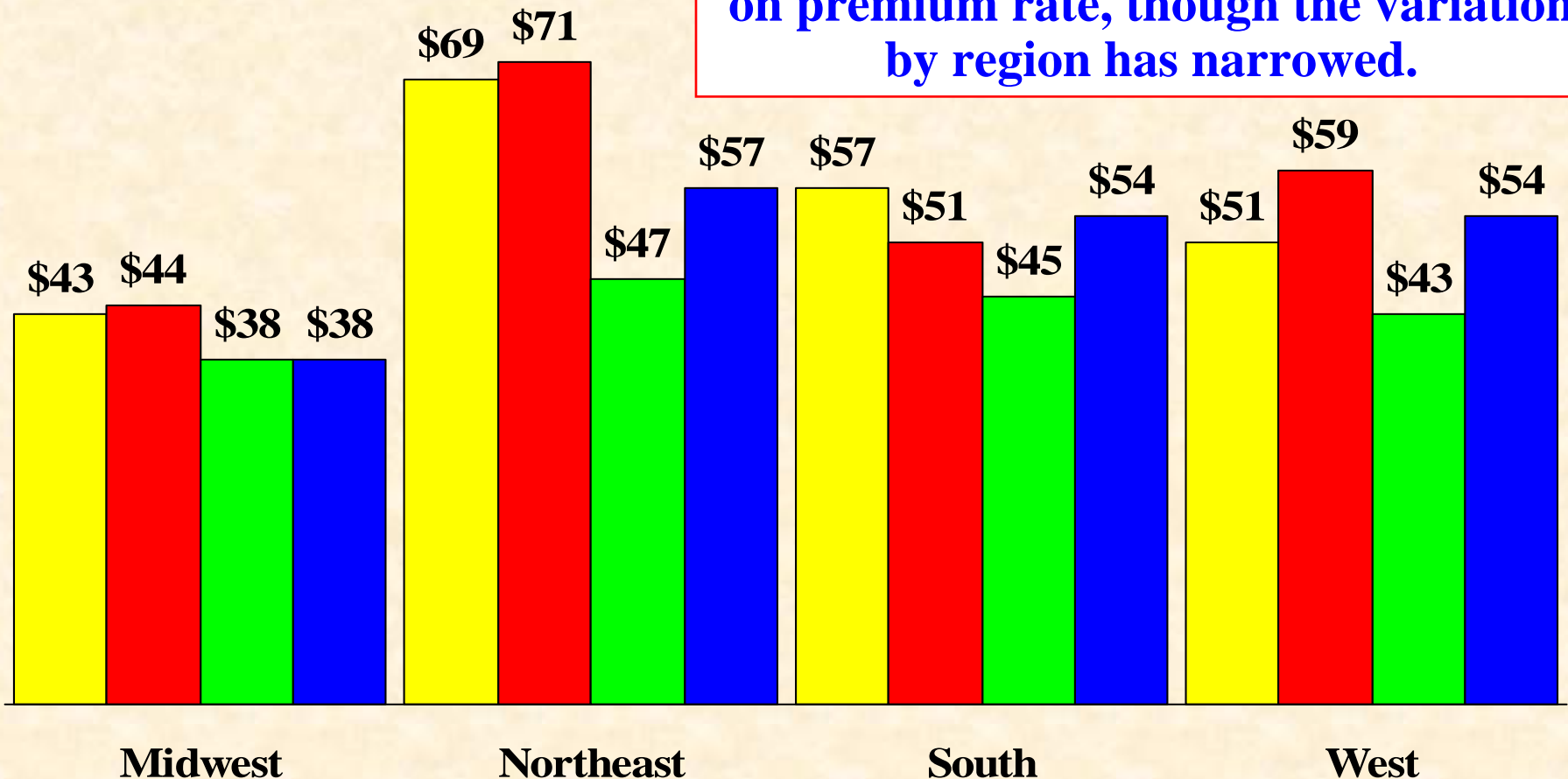
Terrorism Premium as Percentage of Property Premium, By Industry





Terrorism Pricing: Median Rates by Region (per \$1 Million TIV)

Terrorism insurance continues to be most expensive in the Northeast based on premium rate, though the variation by region has narrowed.





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