

Using Capital Market Securities as Operational Risk Mitigants

**Goldman
Sachs**

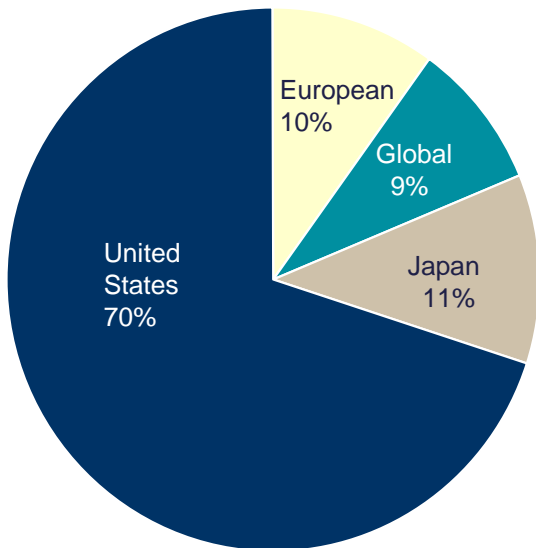
**David Wildermuth
Operational Risk Conference
November 16, 2001**

Agenda

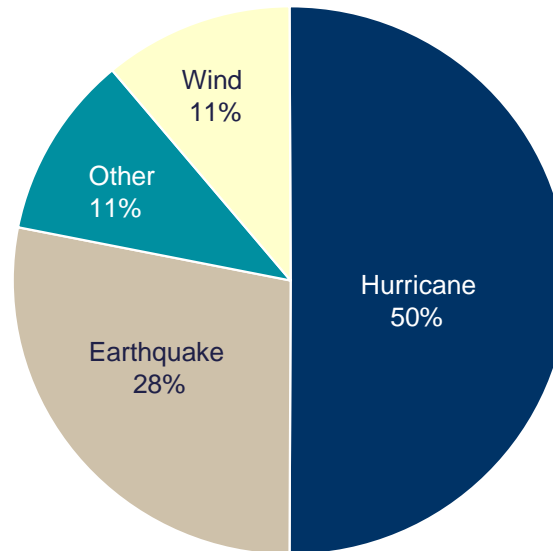
- **Catastrophe Risk Market Overview**
 - Overview
 - Evolution
 - Structural considerations
 - Advantages & disadvantages for issuers
 - Key success factors
- **Operational Risk**
 - Comparison to key success factors
 - Issues to consider
 - Potential capital allocation considerations
 - Relation to GS Operational Risk Approach

The Catastrophe Risk Capital Market

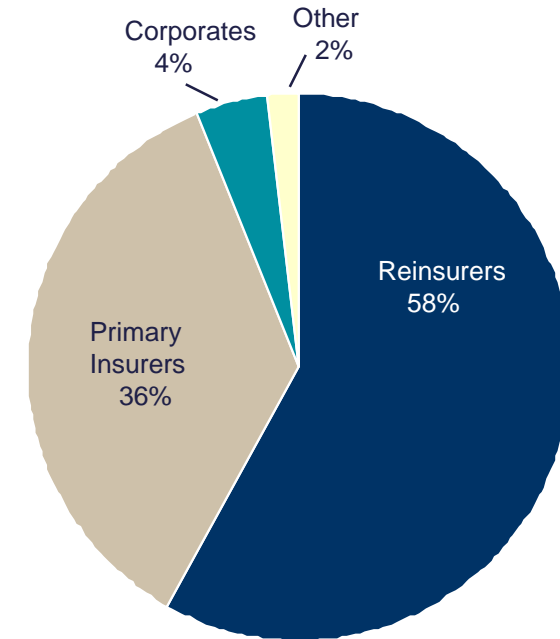
By Geography



By Type of Risk



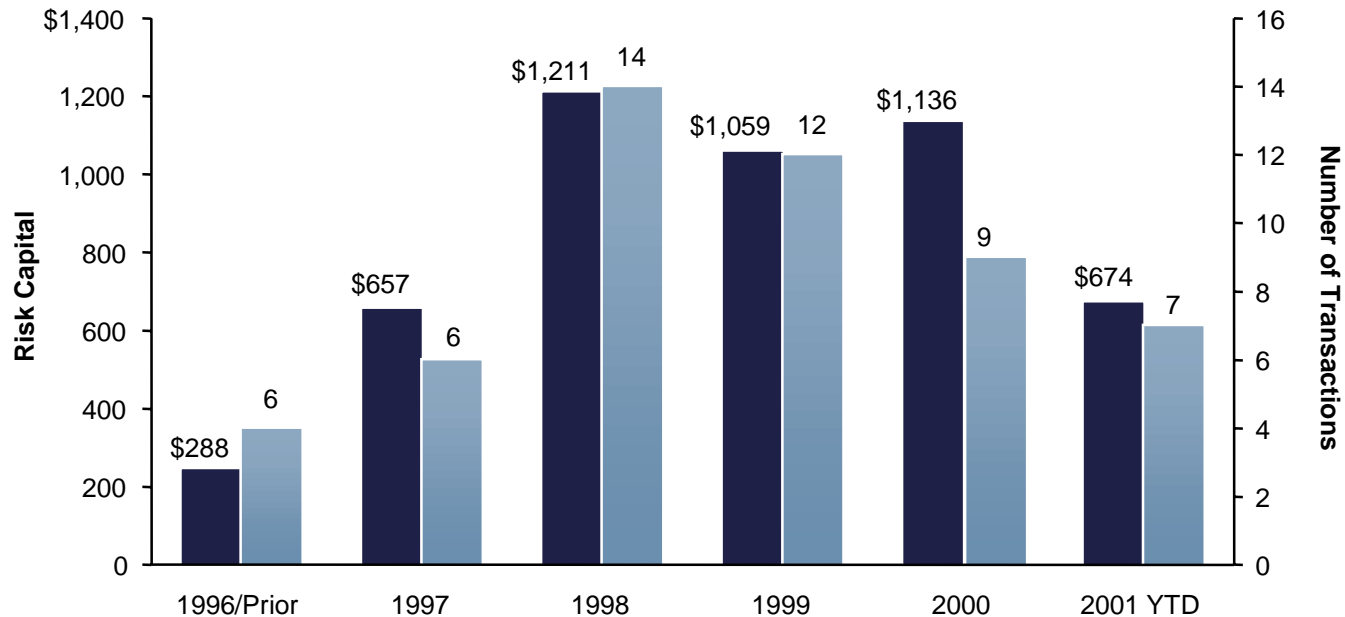
By Issuer



Source: GS Estimates

Evolution of the Catastrophe Bond Market

Property Catastrophe Risk Securitization Activity



Source: GS Estimates

Breakdown by Investors

Mutual Funds & Investment Advisors

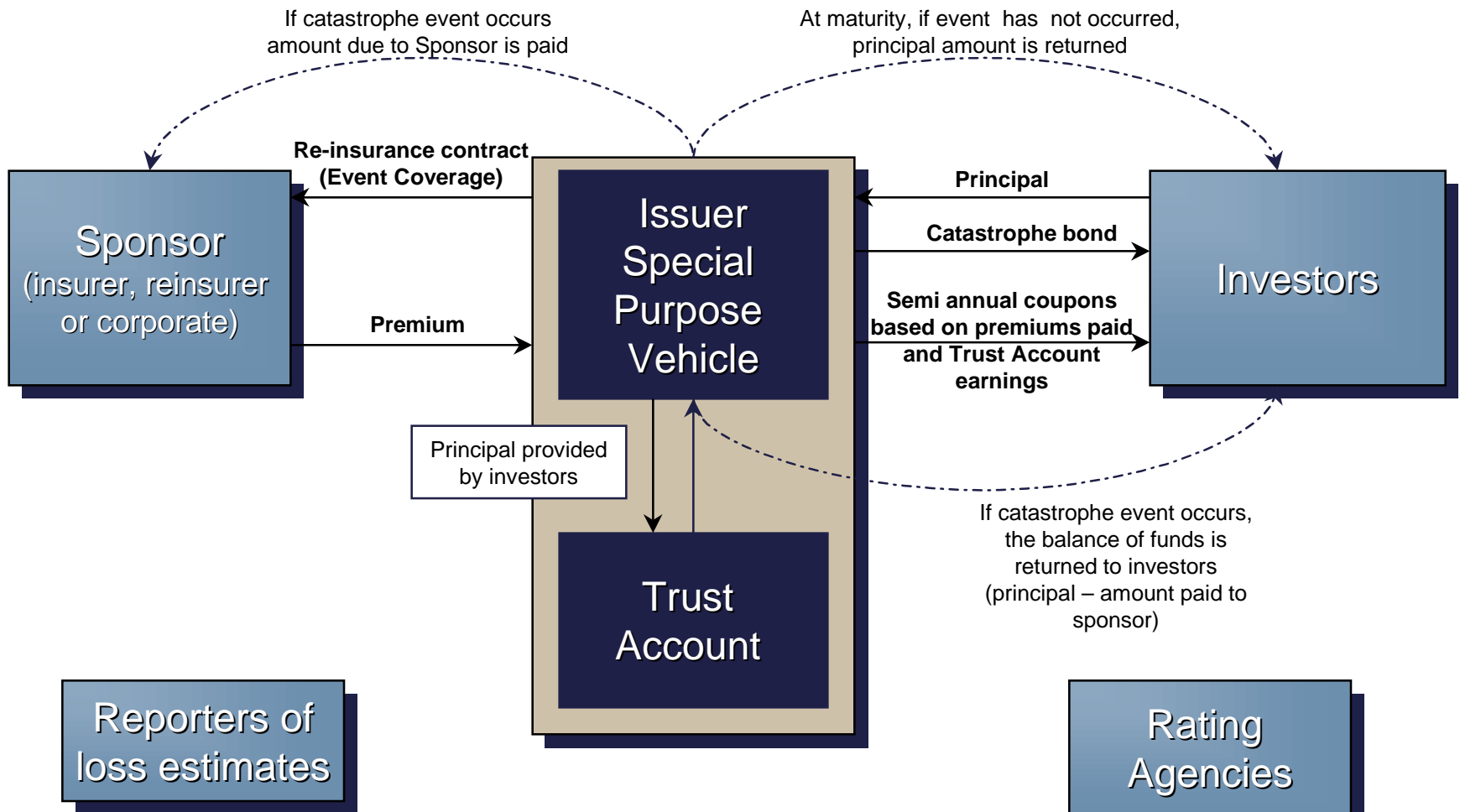
Hedge Funds

Reinsurers / Intermediaries

Life Insurers

Typical Investors

A Simplified Catastrophe Bond Structure



Measurement & Calibration Considerations

- **Based on sponsor's specific losses**
 - Disadvantages: Sponsor has to disclose proprietary information related to catastrophe claim. Investors are more exposed to adverse selection and moral hazard.
 - Advantages: Absence of basis risk to sponsor.
- **Based on an independent catastrophe index**
 - Disadvantages: Sponsor may be exposed to basis risk.
 - Advantages: No proprietary information disclosure. Greater objectivity & transparency to investors with reduced adverse selection and moral hazard risk.

“Corporate” Risk Securitization: Example

- In 1998 Toyota* entered into a relationship with Gramercy Place Insurance Ltd as the special purpose vehicle for this transaction.
- Securitized a portion of Toyota’s auto lease residual risk for 1999, 2000, and 2001 to protect against high losses on vehicles returned to Toyota at the end of full-term leases.
- A deductible totaling up to the first 9% of residual value will be paid by Toyota on resulting losses. Losses that exceed the deductible are split 90% / 10% between investors and Toyota, respectively.
- Notes issued in classes rated Aa2 / AA and Ba2/BB
- Residual values have deviated historically and may be impacted by underwriting practices as well as Toyota’s remodeling and/or repricing of certain popular models.

*Toyota Motor Credit Corporation in all cases

Source: Research from Moody’s Investors Service and Standard & Poor’s

Catastrophe Risk Bonds: Summary

- **Advantages for issuers**

- Stable source of non-fluctuating insurance
- Minimal credit risk, since principal to cover catastrophe losses is invested in a trust account of highly rated investments
- Structuring of vehicle can provide prompt payout
- Multi-year transactions
- May have advantageous pricing

- **Disadvantages for issuers**

- Heavy reliance on catastrophe modeling
- Potential for basis risk
- May require additional disclosure

Key Success Factors

In general, the success of these securities depends on the extent to which they facilitate a mutually beneficial transfer of risk, allowing issuers to tap into new sources of liquidity and investors to diversify their portfolios.

Specific success factors

- Clear and objective definition of catastrophe event, loss and risk
- Issuer motivation to transfer a portion of risk
- Demand from potential investors
- Accurate modeling and quantification of risk
 - Loss history
 - A loss probability model that can calculate a reliable estimate of expected losses (frequency, severity) and likelihood of different loss outcomes
- Mechanism to mitigate moral hazard and adverse selection risk
- Generally accepted reporter of loss estimates
- Rating agencies acceptance of criteria and methodology

Comparison with Operational Risk

Historical Success Factors

1. Clear and objective definition of catastrophe event, loss and risk
2. Issuers motivation to transfer a portion of risk
3. Demand from potential investors
4. Accurate modeling and quantification of catastrophe risk
 - Sufficient loss history
 - A catastrophe loss probability model
5. Mechanism to mitigate moral hazard and adverse selection risk
6. Generally accepted reporter of loss estimates
7. Rating agencies acceptance of criteria and methodology

Operational Risk – “Current State”

- ➔ Lack of standardized & agreed definitions
- ➔ Uncertain. Final regulatory capital treatment and potential inclusion of ‘floor’ will likely have a meaningful impact.
- ➔ Uncertain diversification benefits
- ➔ Does not exist
Does not exist. Requires causality linkage.
- ➔ Substantive Risk
- ➔ Does not exist
- ➔ Does not exist. Necessary development of loss history & probability model.

Issues to Consider

- Development of some necessary attributes is a matter of time, while for others, it is uncertain whether they will be developed.
 - Definitional standardization and loss histories are not enough
 - Models need to be developed and based on proven causality and incorporate objective assessments of specific control environments at present and at time of historical losses
- Moral hazard and adverse selection risk is a substantial consideration
- If develops, more likely to evolve first for individual loss types, or subsets of loss types (narrow definitions)
- If develops, more likely to develop in the reinsurance and insurance markets prior to the direct market

Potential Capital Allocation Considerations

- Flexibility of BIS approach to allow for capital impact, as appropriate, from the risk securitization capital markets
- Flexibility of BIS approach to allow for capital impact for individual loss types
- Flexibility of approach to incorporate risk sharing techniques (first loss, co-payments, other techniques) and other types of potential mitigants to moral hazard risk
- Potential limiting impact of proposed capital ‘floor’ on demand and development of these advanced techniques

Relation with GS Operational Risk Approach

Our Operational Risk Approach is aligned with many of the identified primary areas which require further development:

1. Create and accumulate quantitative metrics and qualitative indicators reflecting the state of the control environment.

2. Focus on unexpected operational losses above thresholds which reflect ordinary costs of conducting business.

3. Focus on unexpected operational losses above thresholds which reflect ordinary costs of conducting business.

4. Establish methodology which scales unexpected operational losses depending on the control environment in place, not solely 'size' indicators.

5. Over time, develop robust operational risk model which is forward-looking, causality-based, and reflects the risks inherent in the specific control environment. This is crucial both to the modeling and to ensuring proper incentives for control improvements.