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# Catastrophe Bonds: Current Status and Future Possibilities

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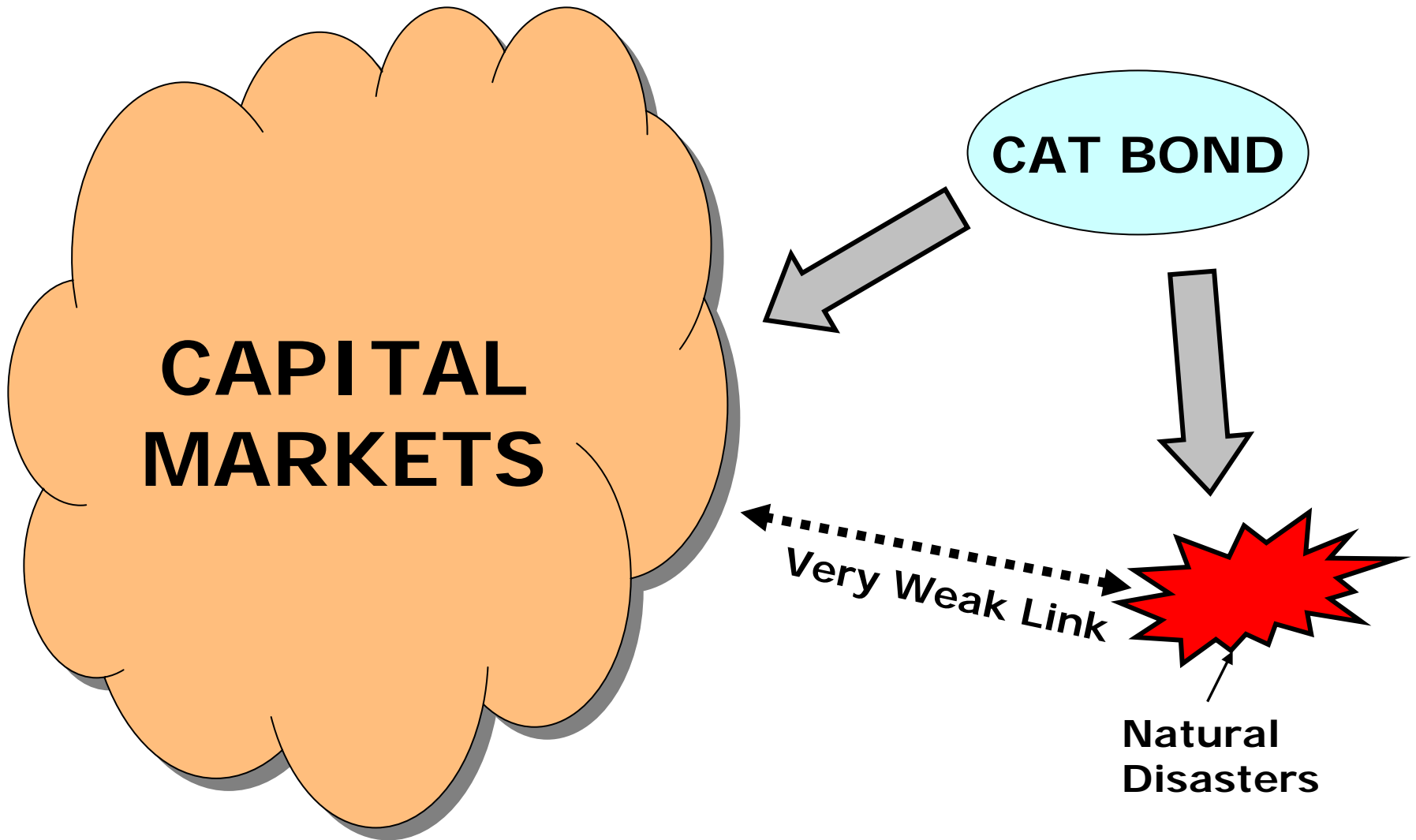
**December, 2006**

**R.W. Pressprich & Co.**  
INCORPORATED

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*An Independent View*

# Background



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# Facts

- Many non-financial risks that can have a significant effect on the economy of a region/country or large company currently go un-insured (or worse “un-acknowledged”)
- The insurance industry does not have enough capital to absorb these events
- Emerging markets are the most likely to suffer devastating consequences as a result of these events

# Example of a Potential Disaster: Chile

- GDP: US\$ 89 billion
- Exports: US\$ 38 billion
- Copper: 45% of exports

19% of Chile's GDP

Chile is located in a very active seismic zone

## Recent Seismic Events

2005, Magnitude=7.9

1985, Magnitude=7.7, Damages= 1.2 US\$ Billion

1960, Magnitude=9.5

1939, Magnitude=7.8

1922, Magnitude=8.5

1906, Magnitude=8.5



**Bottom Line: A major quake close to a copper mine can have a substantial effect on the Chilean economy**

# Estimates for Recent US Disasters (in 2005 US\$)

<b>Disaster</b>	<b>Damage Estimate (US\$ Billion)</b>	<b>Affected Population (Millions)</b>
Hurricanes Katrina and Rita (2005)	\$55 - 125	4.5
Northridge Earthquake (1994)	\$44	1.5
Hurricane Andrew (1992)	\$45	2.1
Loma Prieta Earthquake (1989)	\$9.5	1

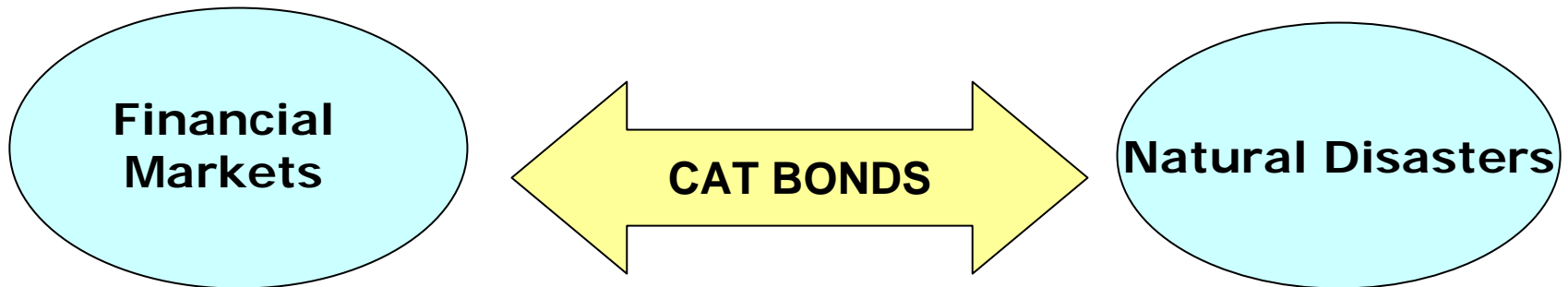
# Size of Relevant Market Segments

<b>Capital Market</b>	<b>Size in US\$</b>
<b>Credit Derivatives (notional)</b>	<b>\$ 8 trillion</b>
<b>US Corporate Bonds</b>	<b>\$ 4.7 trillion</b>
<b>US Treasury Debt</b>	<b>\$ 4 trillion</b>
<b>US Municipal Bonds</b>	<b>\$ 2 trillion</b>
<b>CDO Market (Global)</b>	<b>\$ 1 trillion</b>
<b>CAT Bond Market (Global)</b>	<b>\$ 0.012 trillion</b>

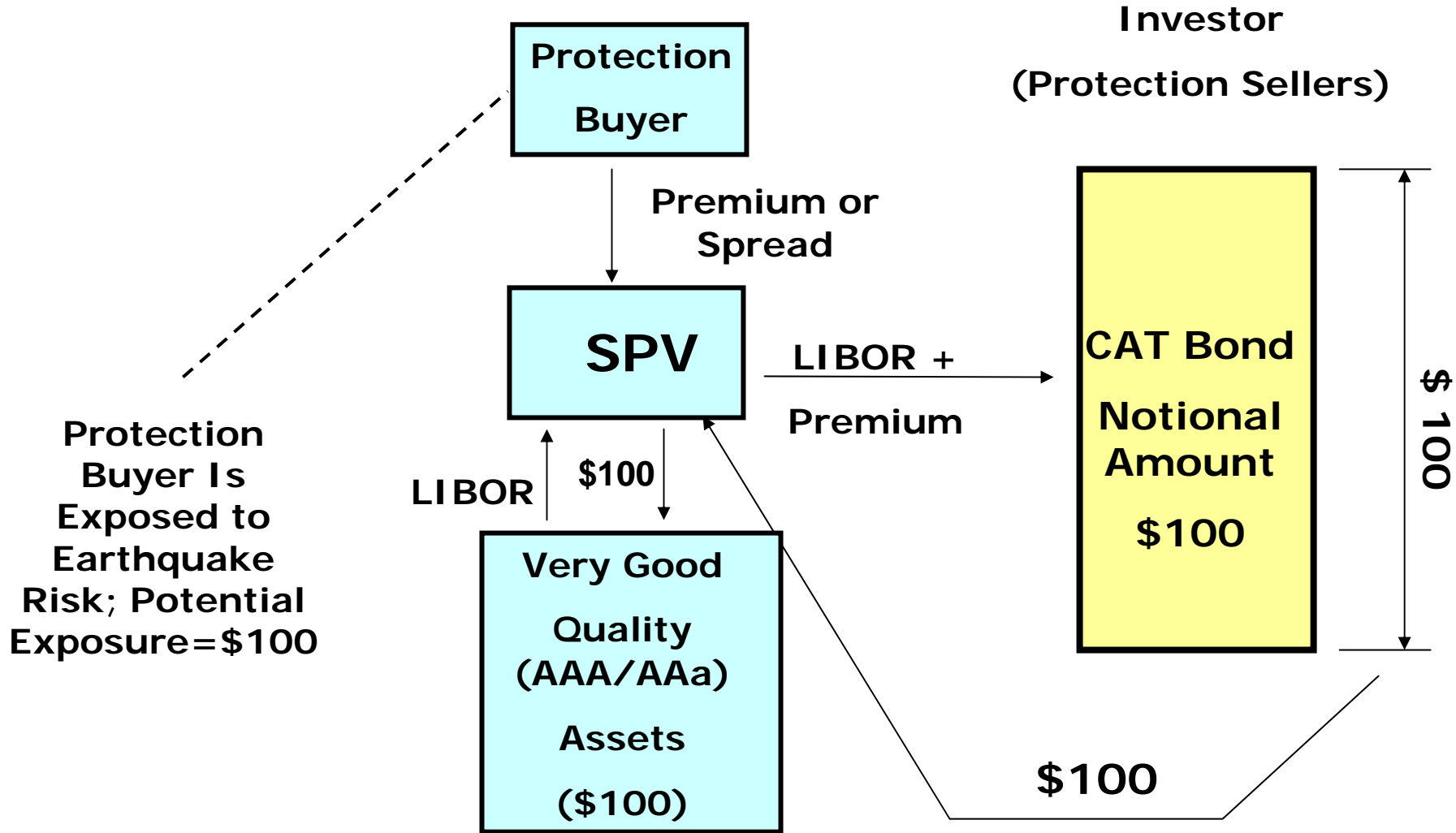
Sources: The Bond Market Association, 2006; British Bankers Association, 2006

# Linking the Two Markets

- Natural disasters, although “big” by conventional standards, are quite negligible in the context of capital markets
- The financial markets should be the natural “bearer” of these risks
- **CAT Bonds: the natural link between the two “markets”**



# CAT Bond Mechanics: Example



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**At Time  $t = 0$ , Investors Buy CAT Bond At Par**

**The Proceeds (\$100) Are Used To Buy Highly Rated (Very Safe) Assets That Yield LIBOR**

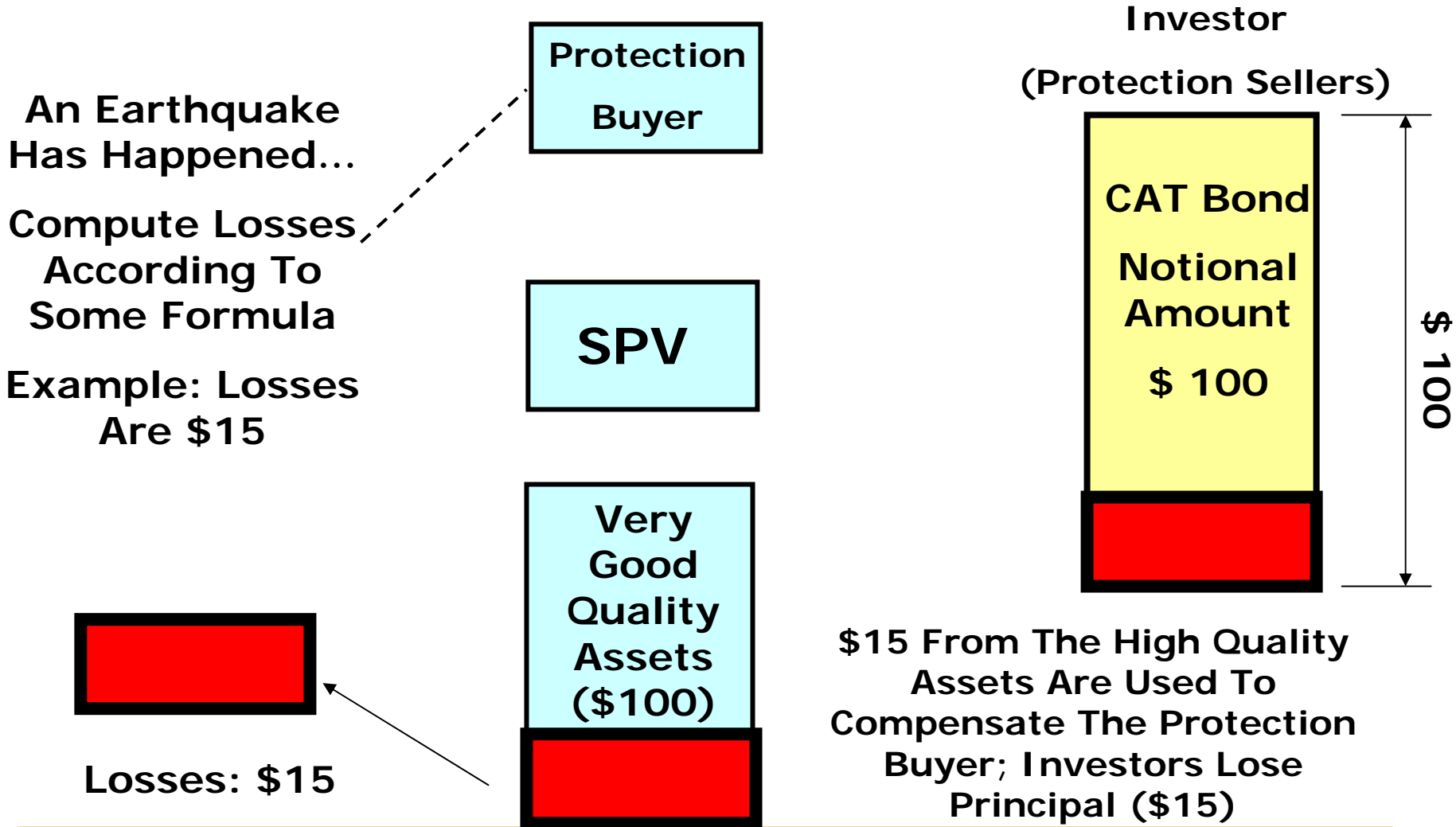
**At Maturity, Say 3 Years, There Are Two Possible Scenarios:**

**(i) If No Event Has Occurred, The Highly Rated Assets Are Liquidated And The Investors Receive Par (\$100)**

**(ii) If An Event Has Occurred (An Earthquake Whose Epicenter Is Within The Prescribed Region And The Prescribed Time Frame); Losses Are Computed According To Formula**

- If The Magnitude Is Higher Than 8.0, Investors Lose All Principal**
- If The Magnitude Is Lower Than 5.0, Investors Receive Par (All Principal)**
- If The Magnitude is Between 5 and 8, Investors Lose Some Principal, According To Some Agreed Upon Formula**

# CAT Bond Mechanics: After The "Event"



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# CAT Bonds

- In fairness, the CAT Bond Market has been around since 1994
- However, its development has been a bit slow:
  - Size: About US\$ 12 Billion
  - Limited to U.S., Europe and Japan (No Emerging Market participants)
  - Issuers: Mostly (Re)-Insurance companies
  - Investors: a few hedge funds
  - Little liquidity, no secondary market
  - Rating agency methodologies: still under development
  - Pricing models: no widely accepted method

# Examples of Recent Transactions

Transaction	Sponsor	Lead Manager	Risk/Peril	Size (US\$ million)	Issuance Date	Term (years)	Date of Maturity
Champlain A	Montpellier	Goldman Sachs	US and Japan Quake	\$75	Dec-05	3	Jan-09
Aiolos Limited	Munich Re	BNPP	US Hurricane/ European Wind; Calif. & Japan Quake	\$129	Nov-05	3.5	Apr-09
Vita Capital II Class C	Swiss Re	Swiss Re	Extreme Mortality	\$200	Apr-05	5	Jan-10
Cascadia Limited	FM Global	Goldman Sachs	Pacific Northwest Quake	\$300	Jun-05	3	Jun-08
Foundation Re Ltd. Class A	Hartford	Goldman Sachs	US Hurricane	\$180	Nov-04	4	Nov-08

Source, Goldman Sachs & Co.

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# Advantages of CAT Bonds

- From the point of view of the “insured” party:
  - More efficient than getting insurance
  - No litigation risk
  - “Tailor-made” to their needs (little basis risk)
- From the point of view of the investor:
  - Higher spreads (for the same rating)
  - Uncorrelated to other financial markets/ variables

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# OBJECTIVE/CHALLENGE

- Extend the CAT Bond technology to Emerging Market countries (that is, the countries whose economies are the most vulnerable in the event of a natural disaster)
- This will minimize their dependence on international relief agencies such as the IMF, World Bank, or United Nations
- Large companies/organizations can also benefit from this financial engineering technology. For example:
  - (i) Oriental Land (Tokyo Disney), US\$200 Million
  - (ii) Golden Goal (FIFA, 2006 World Cup), €400 Million

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# One Final Example...

- In May 2006 Mexico issued a 3-year CAT bond
  - Notional Amount = US\$ 160 million
  - Coupon = LIBOR + 230
  - Triggering Event = Earthquake, magnitude 7.5 or higher (Richter scale), epicenter within a prescribed area (Pacific coast)