

Swiss Re



Climate Change related Risk Transfer Solutions

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Capitalising³ on Natural Resources: New Dynamics in Financial Markets
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Agenda

- Swiss Re and climate change related markets
- The changing risk landscape
- Protection against infrastructure losses
- Protection against earnings volatility
- Conclusion



Swiss Re is acting in various climate change related markets

Swiss Re is ...

- ... a financial services firm with 144 years of experience
- ... the world's leading and most diversified reinsurer
- ... a proven expert in risk and capital management
- ... a pioneer and leader in capital market solutions



The "Gherkin", London

Quick Facts (31/12/2007)

- Revenues CHF 42.8 billion
- Net income CHF 4.2 billion
- Total investments: CHF 228 billion
- Market cap CHF 29.8 billion
- 11,000+ employees
- 90 offices in 25 countries
- Headquarters in Zurich, Switzerland

Climate change related markets:

- Property insurance and Insurance Linked Securities (ILS) for natural catastrophes
- Agricultural yield and revenue coverage
- Weather and weather contingent commodity markets
- Trading of emission reduction certificates
- Performance guarantees for emission reduction projects under the Kyoto Protocol

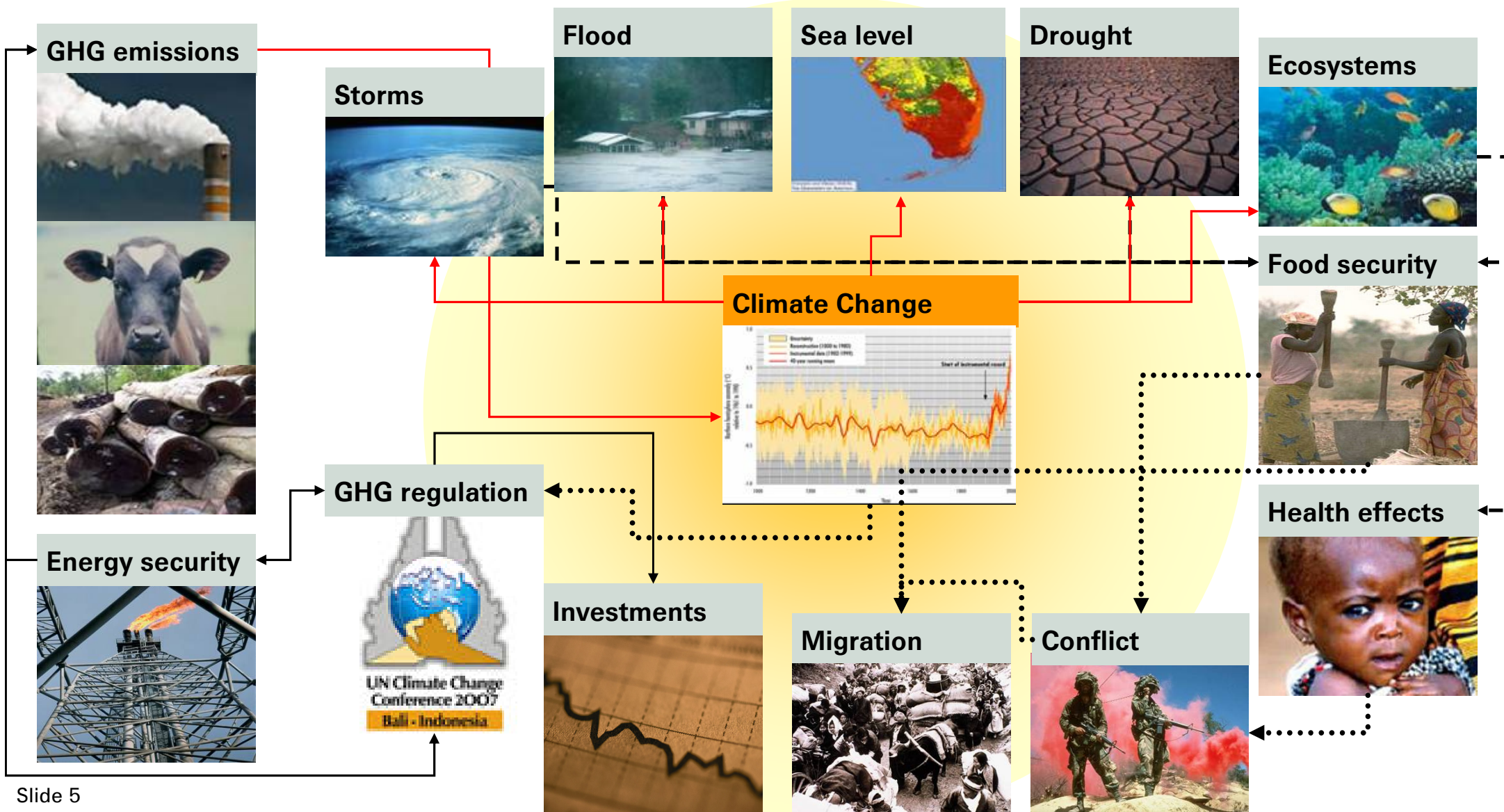


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The climate change risk landscape



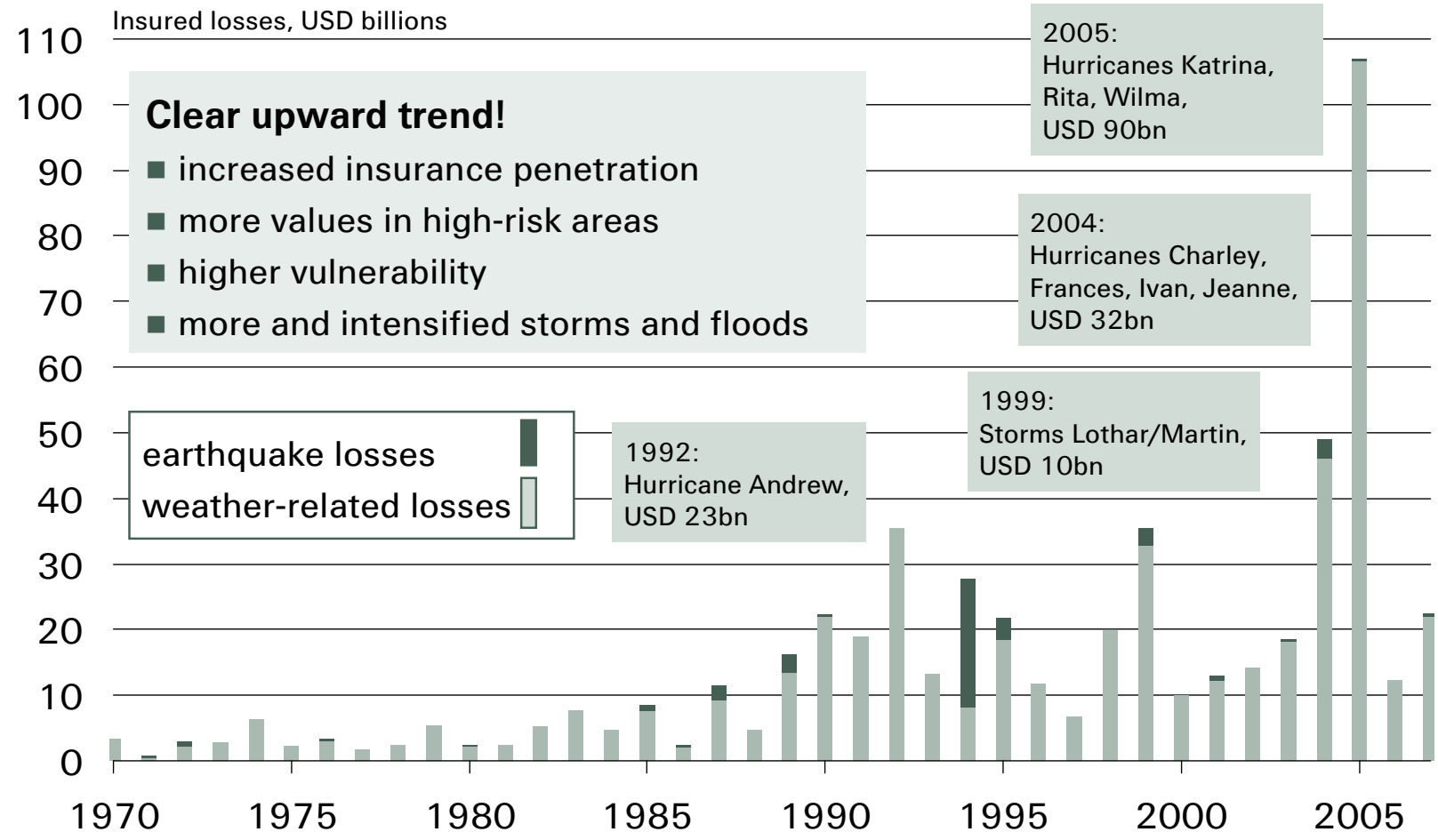


Weather-related natural catastrophe losses are increasing

Ocean Drive, FL, 1926



Ocean Drive, FL, 2000



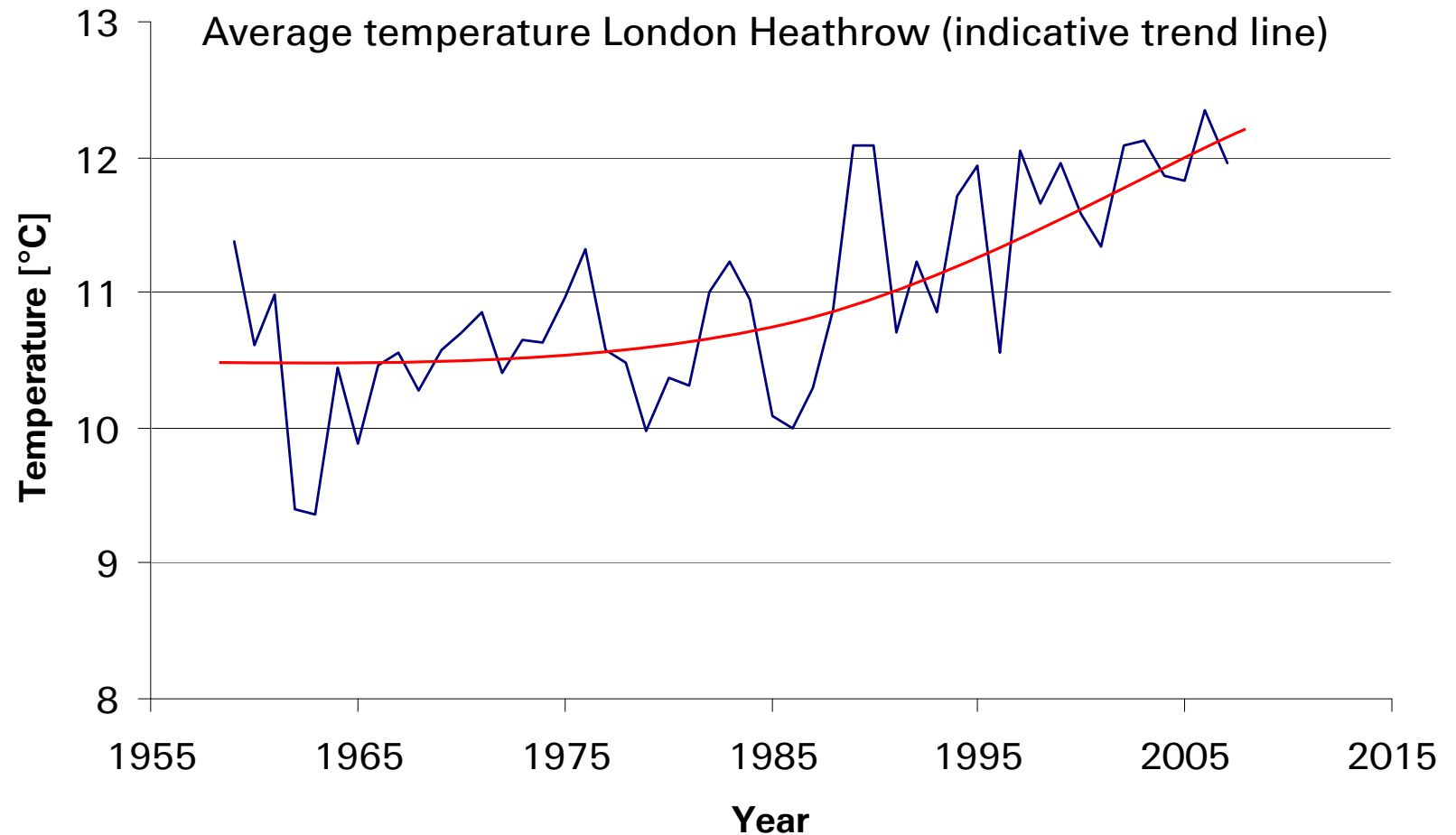
Insured worldwide cat losses > 40m (property/business interruption) at 2007 price levels in USDbn

Source: Swiss Re Economic Research & Consulting



Climate change is a reality with warming trends and ...

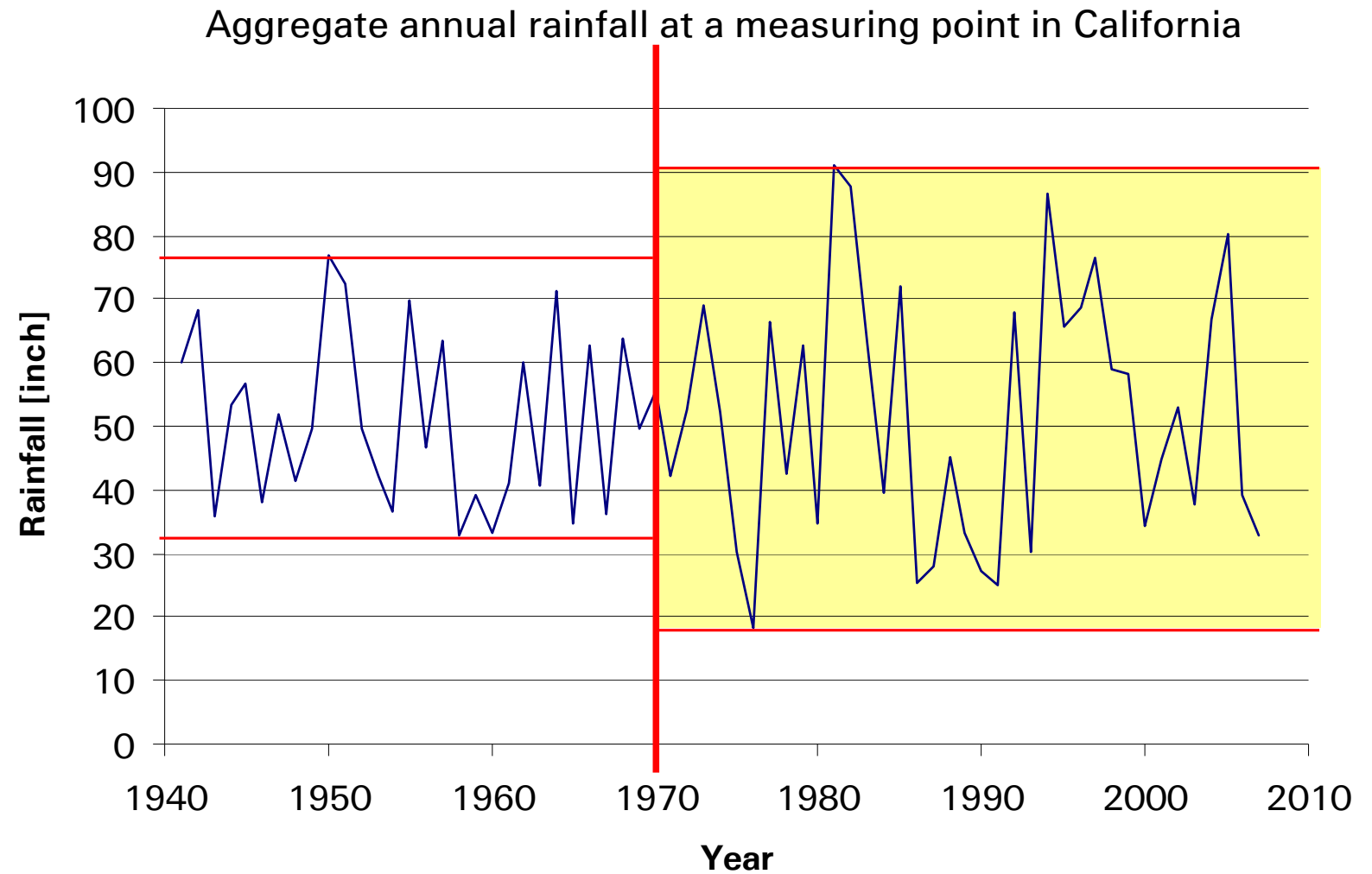
- Average temperatures in many locations are rising



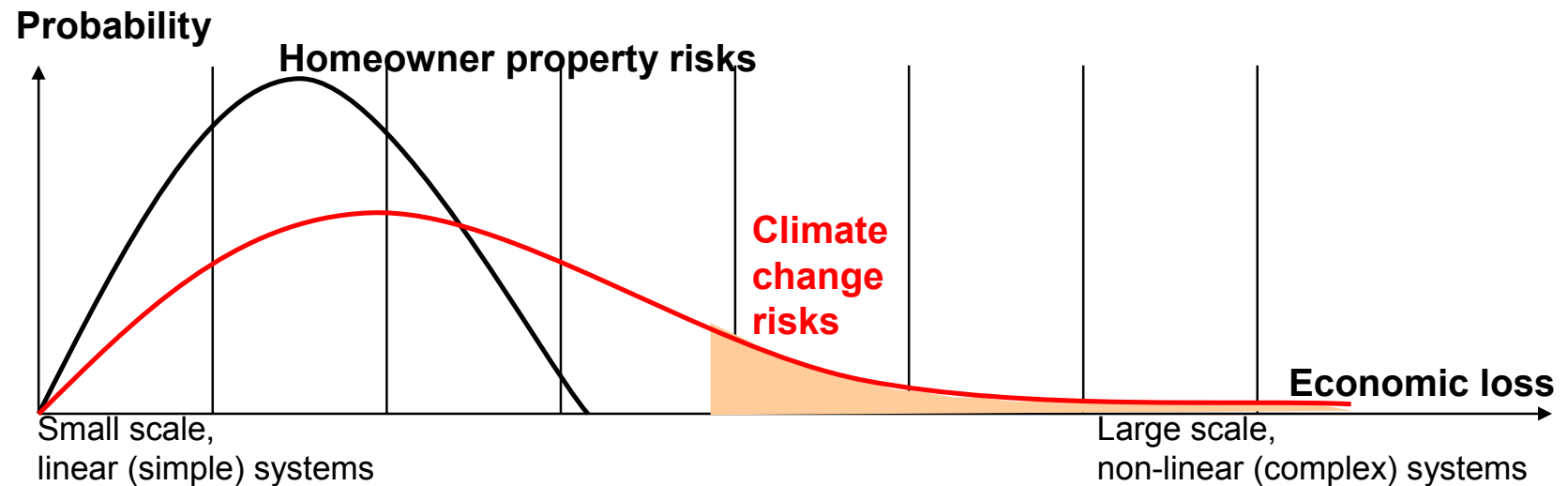


...increasingly volatile rainfall

- The bandwidth of rainfall extremes is widening



Investments into climate sensitive infrastructure and businesses require thorough risk management



Homeowner property risks

- well defined risks with known level of uncertainty
- lognormal distribution
- require standard risk management such as property insurance

Climate change risks

- partially unknown risks with high level of uncertainty
- heavily skewed distribution with potential for extreme economic losses
- require risk management based on modern instruments such as ILS or weather derivatives



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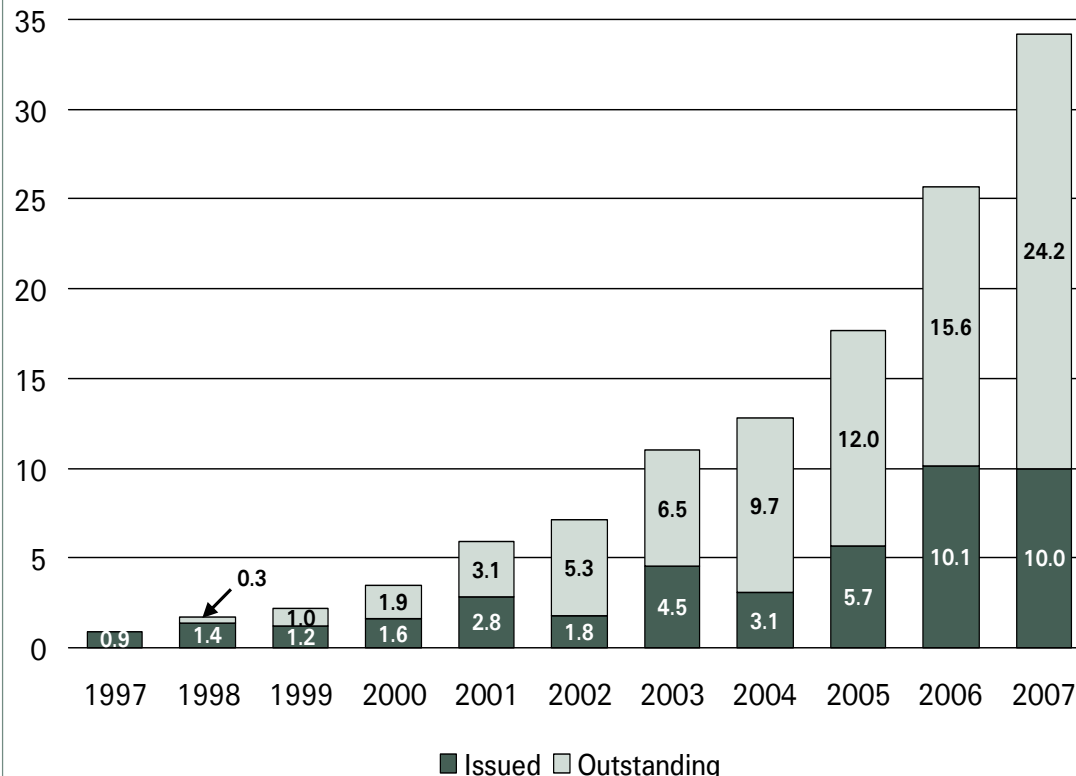
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Insurance Linked Securities: peak risk exposure as attractive asset class for capital markets

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Notional value of ILS outstanding as of Dec 2007 (USD billion)



Source: Swiss Re Capital Markets

- Peak risks, such as losses related to tropical cyclones, grow much faster than the insurance industry's risk taking capacity
- Insurance linked securities (ILS) are instruments that transfer these risks to capital market investors
 - enormous size of capital market
 - uncorrelated nature of investment
- Today, nearly USD 35 bn of capacity is provided by capital markets, with strong growth in recent years (CAGR 46% over 1997-2007)
- Investors are banks, asset managers, hedge funds and dedicated ILS funds



UK flood risk securitization as example for creativity of financial markets

Features

- First ILS structure transferring flood and Canadian Earthquake risks to the capital markets
- Highly innovative index definition measuring the damage potential related to floods in Great Britain
- Water depth at a number of reference points and the time between official flood warning and “all clear” announcements used as input for index calculation
- Coverage for portfolio of industrial/commercial risks with high value concentration at a limited number of locations

Involved parties

- Swiss Re structured and placed the securitization on behalf of one of its direct insurance clients
- Risk Management Solutions (RMS) serves as independent risk modeller and index calculation agent
- Governmental agencies serve as independent input data provider

Background information

- The transaction attracted considerable investor demand from a wide variety of investors and was over-subscribed
- Input data for calculation of flood index is manually measured; solution limited to small number of measurement points (eg portfolio of a limited number of high value commercial property risks)
- Further developments needed to expand solution to portfolio of residential risks



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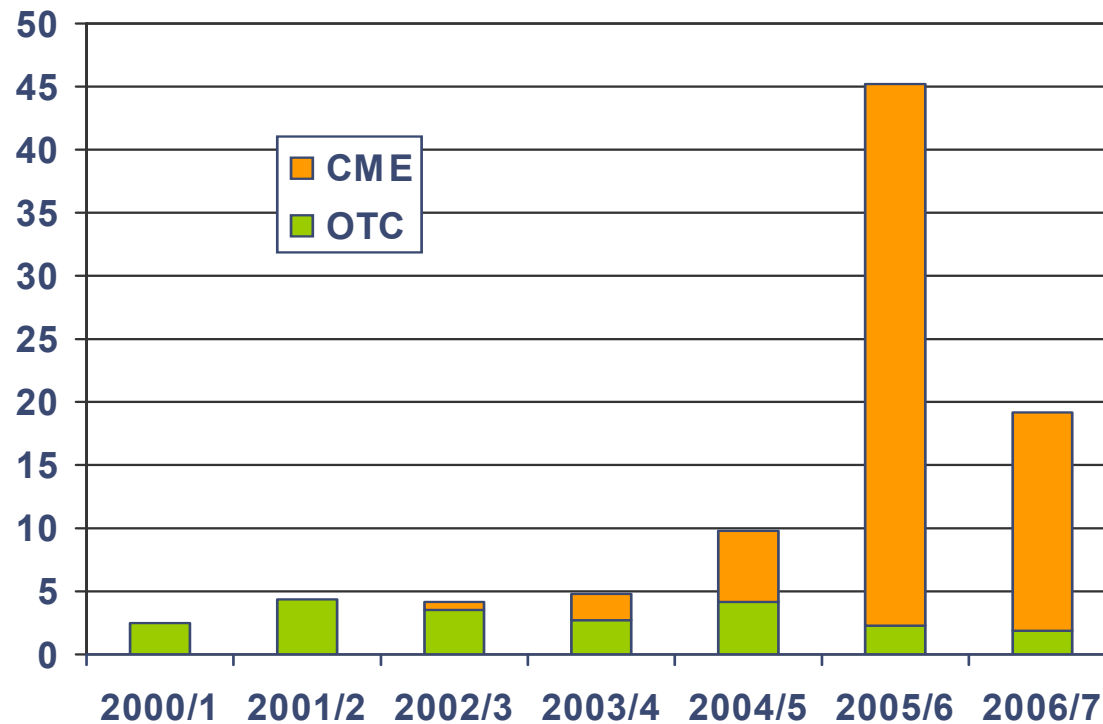
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Weather markets: Protection for profits of weather related businesses

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Notional value of weather risk transfer market (USD billion)



* Chicago Mercantile Exchange, ** Over-The-Counter

Source: PwC 2007 Market survey

- Weather derivatives and parametric weather insurance structures are based on seasonal climate variations (eg average summer temperature, number of critical days, etc.)
- Market has grown to an aggregated notional value of USD 19 bn in 2007; thereof about 90% is related to CME* trading the rest to bespoke OTC** structures
- Market players include banks, reinsurers and hedge funds
- Buyers include all industry sectors
- Increasing interest from the public sector (eg WB, IFC)

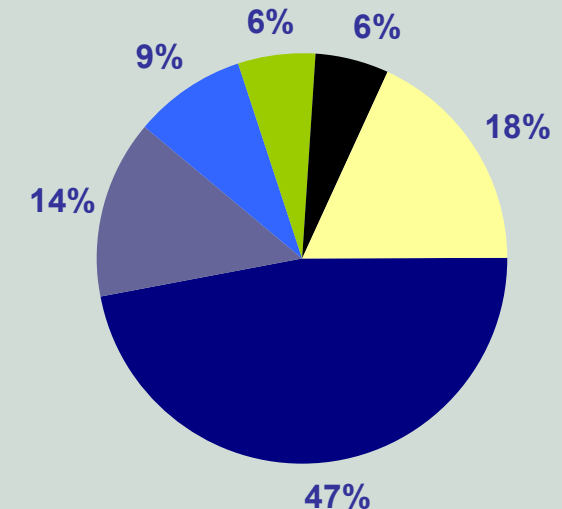
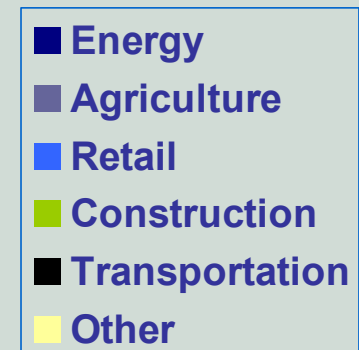
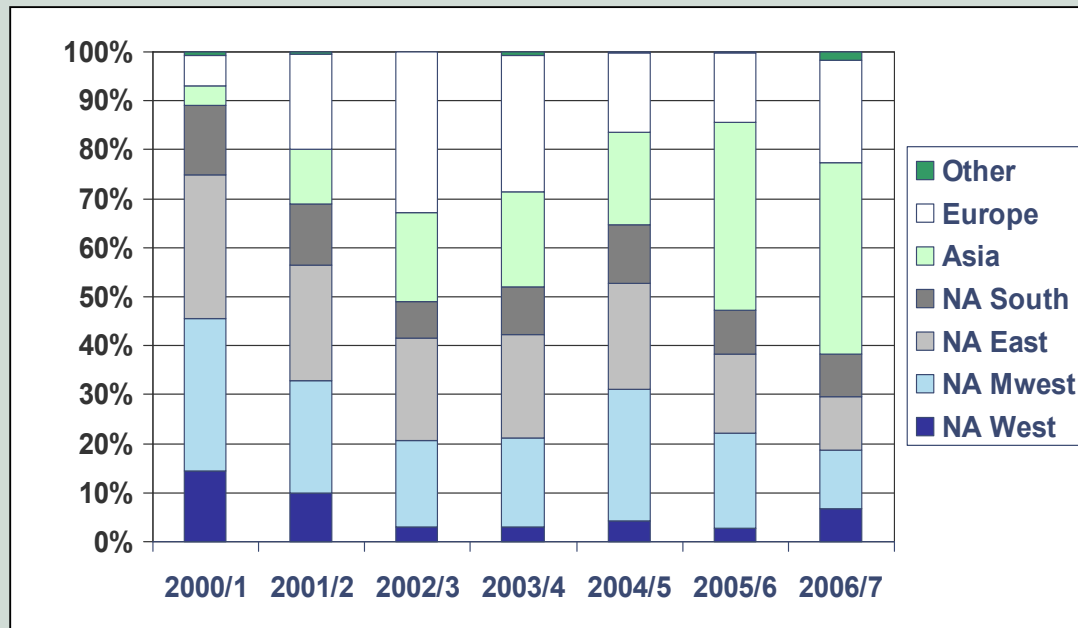
From US energy industry solutions to worldwide applications for various industry sectors

Number of OTC contracts by region:

- 2000/01: 90% of business in the US;
- 2006/07: about 1/3 in US, 1/3 in Asia, 1/3 in Europe

Number of contracts by industry sector:

- 2000/01: 90%+ related to retail energy demand
- 2006/07 (pie chart): 47% energy, 14% agriculture



Source: PwC 2007 Market survey



Weather insurance for Indian farmers as example for capacity building and market development through incentives

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Solution features

- First weather reinsurance in 2004 with ICICI Lombard and Basix (microfinance institution) for castor and groundnuts in Mehbubnagar, Andhra Pradesh against deficit rainfall covering 1500 farmers
- Since then more than 60 reinsurance contracts closed with various insurance partners providing coverage for more than 560,000 retail policies
- Parametric weather insurance is an alternative to indemnity based crop insurance and fosters innovation such as bundled products (eg insurance combined with purchase of quality seeds)
- Additional solutions include products for corporates in the agricultural sector covering risks related to marketing campaigns (discount programs), commercial farms (eg tea, sugar), salt production and contract farming (insurance as part of the services offered to farmers entering off take contracts)

Background information

- The World Bank's commodity risk management group provided Basix and ICICI Lombard with the technical assistance for the first weather insurance scheme
- Since then indexes have been tailored for a broad range of crops
- Indexes are based on rainfall (about 80% of contracts), temperature (14%) and combinations thereof
- In 2008 the Indian Ministry of Agriculture subsidizes weather insurance in 15 states with USD 12.5 million; scheme is compulsory for asset poor farmers profiting from government loans
- Distribution and administration is through the government owned agricultural direct insurer and two private insurance companies



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Climate change and political decision making lead to increased demand for risk transfer and new market developments

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- **Climate change is increasingly impacting the risks and returns related to investments in many industry sectors**
- **The financial sector developed various markets and instruments to cope with the financial consequences of such risks**
- **Climate change will likely accelerate growth in these markets and trigger further demand for innovative risk transfer solutions**
- **Political decision making is likely to result in the development of new markets. However, governments need to ensure stable market regulation to attract investors and risk takers into these markets and provide incentives to foster initial market development.**
- **In developing economies education and capacity building is needed to efficiently and effectively develop climate change related markets**