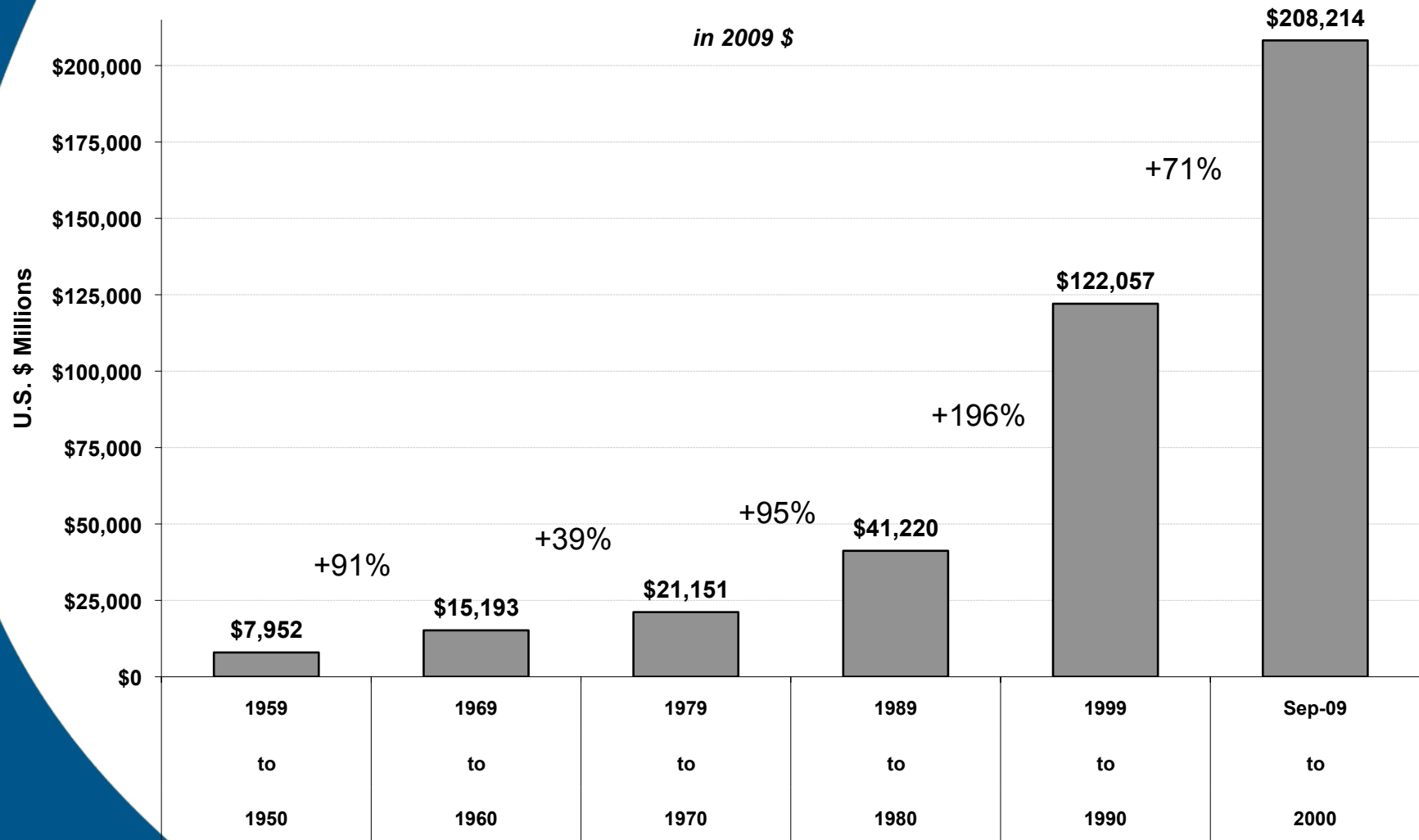


# Catastrophe Losses by Decade



Source: Property Claims Service/ISO; Insurance Information Institute



## Two Quotes

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**“We’d be out of our minds if we wrote weather insurance on the opinion global warming would have no effect at all.”**

**-Warren Buffett, 2006 Berkshire Hathaway Annual Shareholder meeting**

**“The essence of risk management lies in maximizing the areas where we have some control over the outcome, while minimizing the areas where we have absolutely no control over the outcome, and the linkage between cause and effect is hidden from us.”**

**- Peter L. Bernstein “Against The Gods: The Remarkable Story of Risk”**



## Minimizing the Impacts of Climate Uncertainty

### Things we can influence / control

**Exposure data quality**  
**Levels of exposure to extreme catastrophe events**  
**Underwriting**  
**Rates – “uncertainty-adjusted pricing”**  
**Claims adjusting practices**  
**Expenses**  
**Investment mix**  
**Reinsurance**  
**Credit exposure**  
**Leverage / Capital Adequacy**  
**Reserve adequacy – margin of safety**

- These items are all part of ERM discipline
- Even more important in the context of climate uncertainty
- Climate-weather connection is very difficult to predict
  - No consensus from modeling firms in the near future
  - We can't just say “more bad stuff happens”



# Catastrophe Reinsurance

## Reinsurers drive better practices

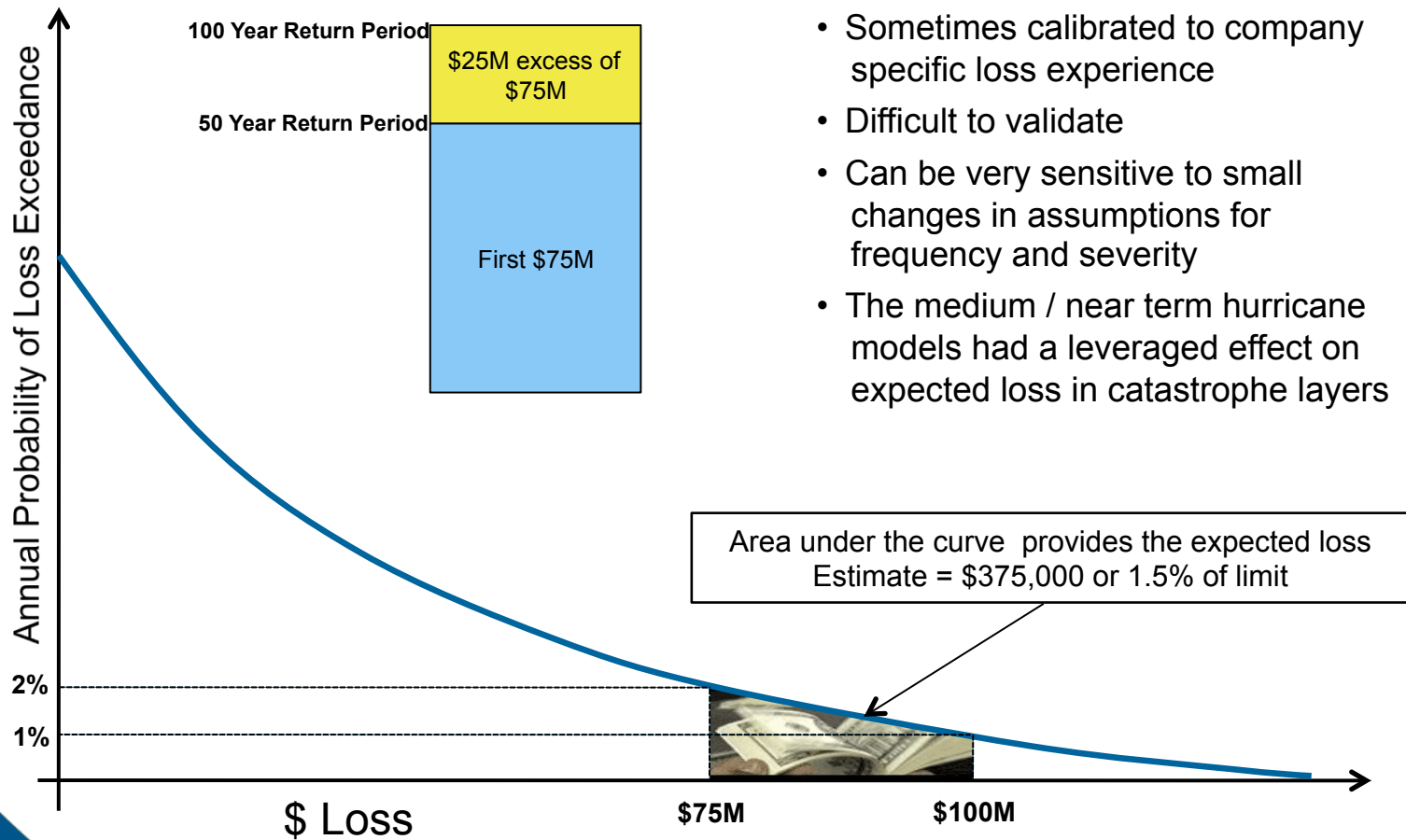
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- Ernst & Young LLP's Catastrophe Exposure Data Quality Survey
  - 83% of reinsurers have basic data quality checks
  - ITVs, completeness and secondary characteristics are the biggest issues
  - 90% of reinsurers apply surcharges to compensate for data quality deficiencies with 70% applying surcharges of up to 25%
  - 58% said they directly modify catastrophe model results versus 42% modifying the inputs prior to running the model
  - 92% would provide benefits if they felt that the company exhibited strong data management controls:
    - 70% of these would be more flexible in authorizations
    - 75% would provide credits up to 15%
- Strong claims handling also important
- Proactive management of accumulations



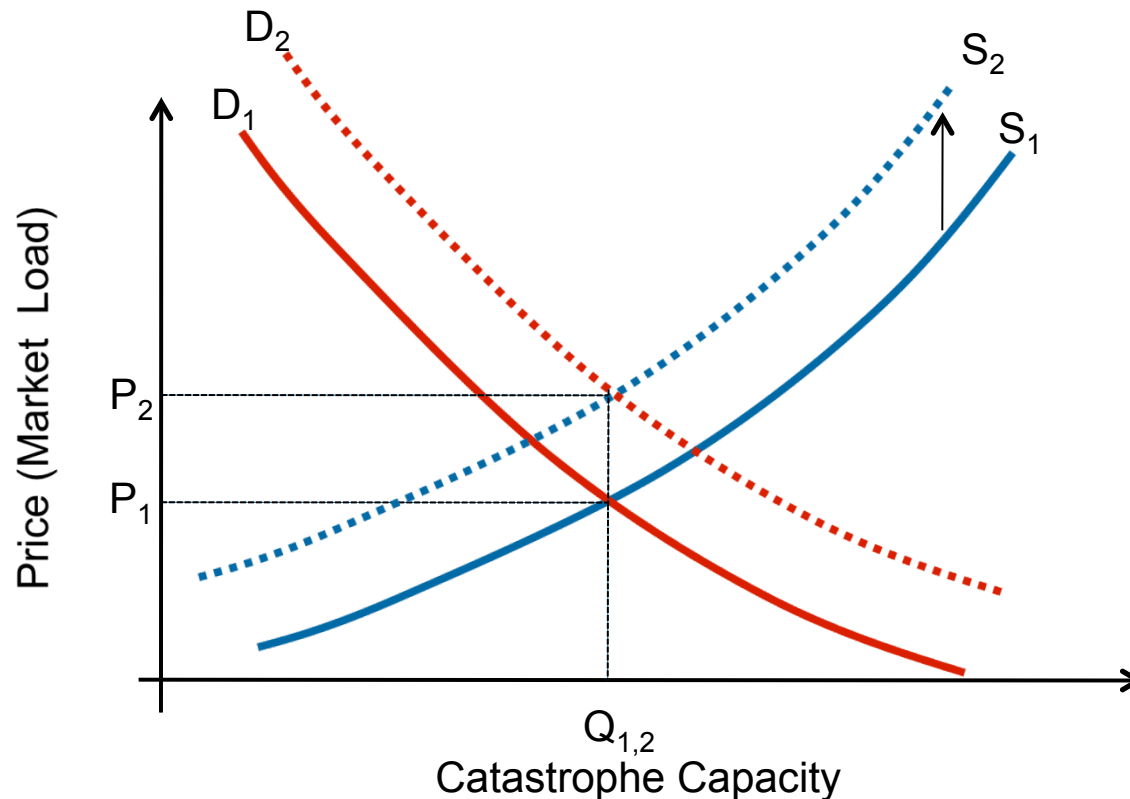
# Catastrophe Reinsurance Market Pricing

- Exceedance Probability Loss curves are
  - Usually supplied by catastrophe models (RMS, AIR, EQE, etc)
  - Sometimes calibrated to company specific loss experience
  - Difficult to validate
  - Can be very sensitive to small changes in assumptions for frequency and severity
  - The medium / near term hurricane models had a leveraged effect on expected loss in catastrophe layers



# Catastrophe Reinsurance Market Pricing

- Reinsurance market pricing for natural catastrophes:
  - Supply / Demand driven biases
  - Perspectives on climate change can affect both sides
    - Increased cost of capital for reinsurers
    - Higher risk perception may drive increased demand, potential capacity shortfalls, affordability and availability



## Taking Action in the Face of Uncertainty

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“... as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns - the ones we don't know we don't know.”

- US Defense Secretary, Donald Rumsfeld



# Catastrophe Risk Management Perspectives

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- Treat climate uncertainty the same way as other sources of uncertainty from natural perils:
  - Process Risk
  - Parameter Risk
  - Model Risk
  - “Black Swan” Risk
- Manage accumulations pro-actively
  - Aggregates
  - PMLs (VaRs)
  - TCEs (TVaRs)
- Sensitivity Testing
  - Frequency
  - Severity
  - Correlations
    - Clustering
    - Claims Inflation
    - Market Failure

