

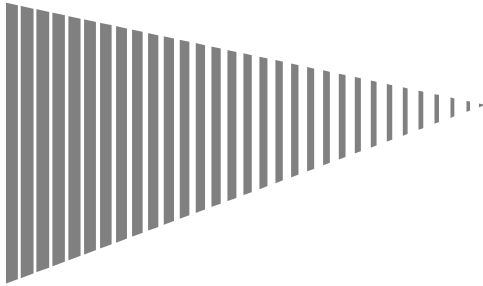
Blowing through the range

2014 CLRS presentation

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Christopher Andersen, FCAS, MAAA

Ron Fowler, FCAS, MAAA



Building a better
working world

Agenda

- ▶ Actuarial ranges and their context
- ▶ Communication of the actuarial range
- ▶ When things go wrong – Case studies
 - ▶ Financial guarantee
 - ▶ Catastrophes
 - ▶ Asbestos

What is in an actuarial range?

- ▶ Actuarial standards of practice No. 43
 - ▶ Property / Casualty Unpaid Claim Estimates
- ▶ Actuarial central estimate
 - ▶ An estimate that represents an expected value over the range of reasonably possible outcomes (“range”).
 - ▶ 3.3.1 ...may not include all conceivable outcomes, as, for example, it would not include conceivable extreme events where the contribution of such events to an expected value is not reliably estimable.

What disclosures are proper for an actuary to communicate?

▶ 3.6.7 – External conditions

- ▶ Claim obligations are influenced by ... potential economic changes, regulatory actions, judicial decisions, or political or social forces. ...the actuary is not required to have detailed knowledge of or consider all possible external conditions...

▶ 3.6.7 – Changing conditions

- ▶ The actuary should consider whether there have been significant changes in conditions ...Examples include reinsurance program changes, ... claims personnel [changes], ...

What disclosures are proper for an actuary to communicate? [cont.]

▶ 3.6.8 – Uncertainty

- ▶ The actuary should consider the uncertainty ... This standard does not require or prohibit the actuary from measuring this uncertainty. ... the actuary should consider the types and sources of uncertainty ... [and] may include uncertainty due to model risk, parameter risk, and process risk.

▶ 4.2 – Additional disclosures (re: range of estimates)

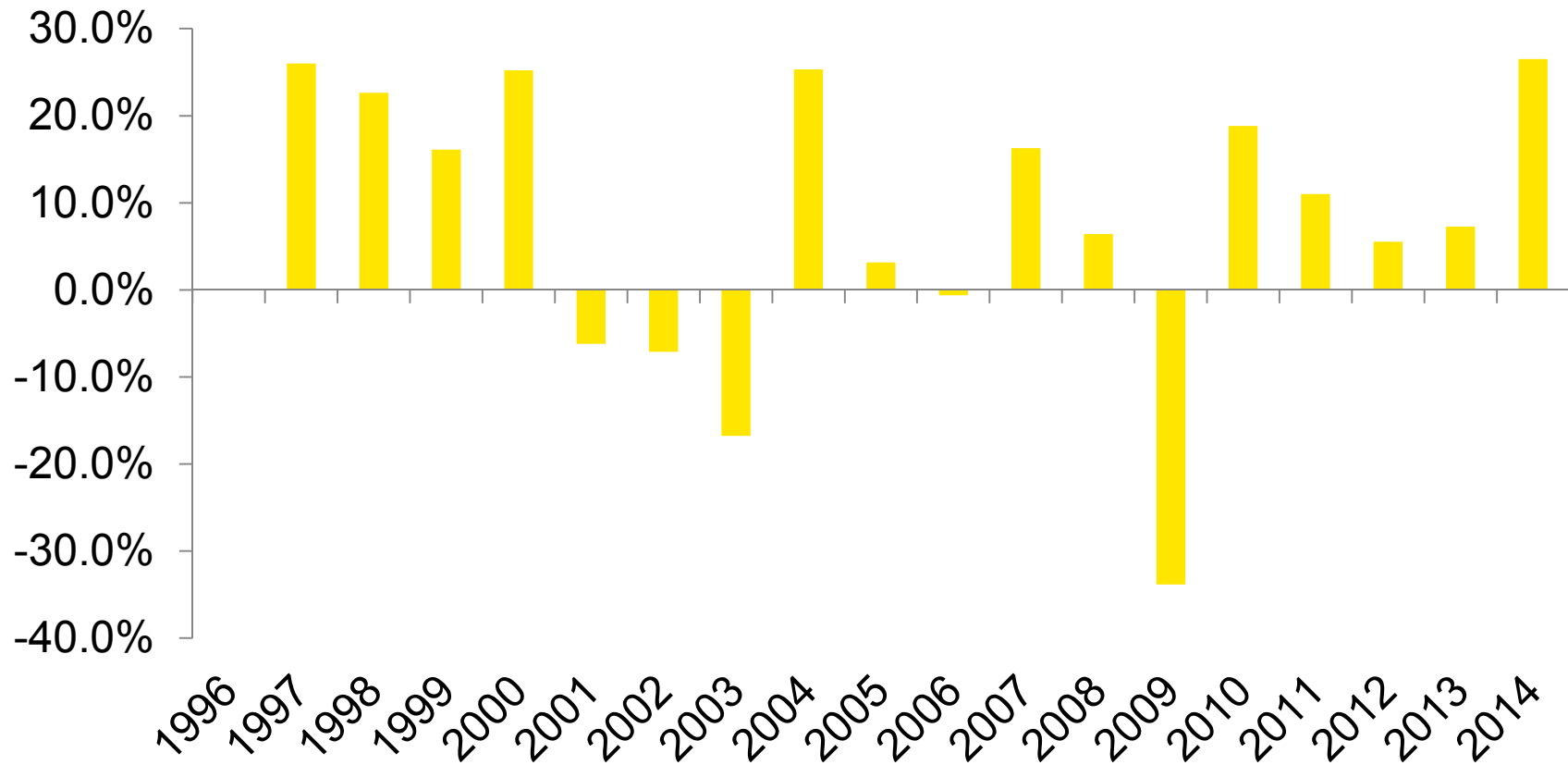
- ▶ In the case when the actuary specifies a range of estimates, the actuary should disclose the basis of the range provided

When things go wrong – Case studies

- ▶ 2008 financial crises
 - ▶ Financial guarantee insurance
- ▶ Unusual catastrophes
 - ▶ Hurricane Katrina
 - ▶ Thailand flooding
 - ▶ New Zealand earthquake
- ▶ Asbestos

The 2008 financial crises was more sudden than previous depressions in the financial markets

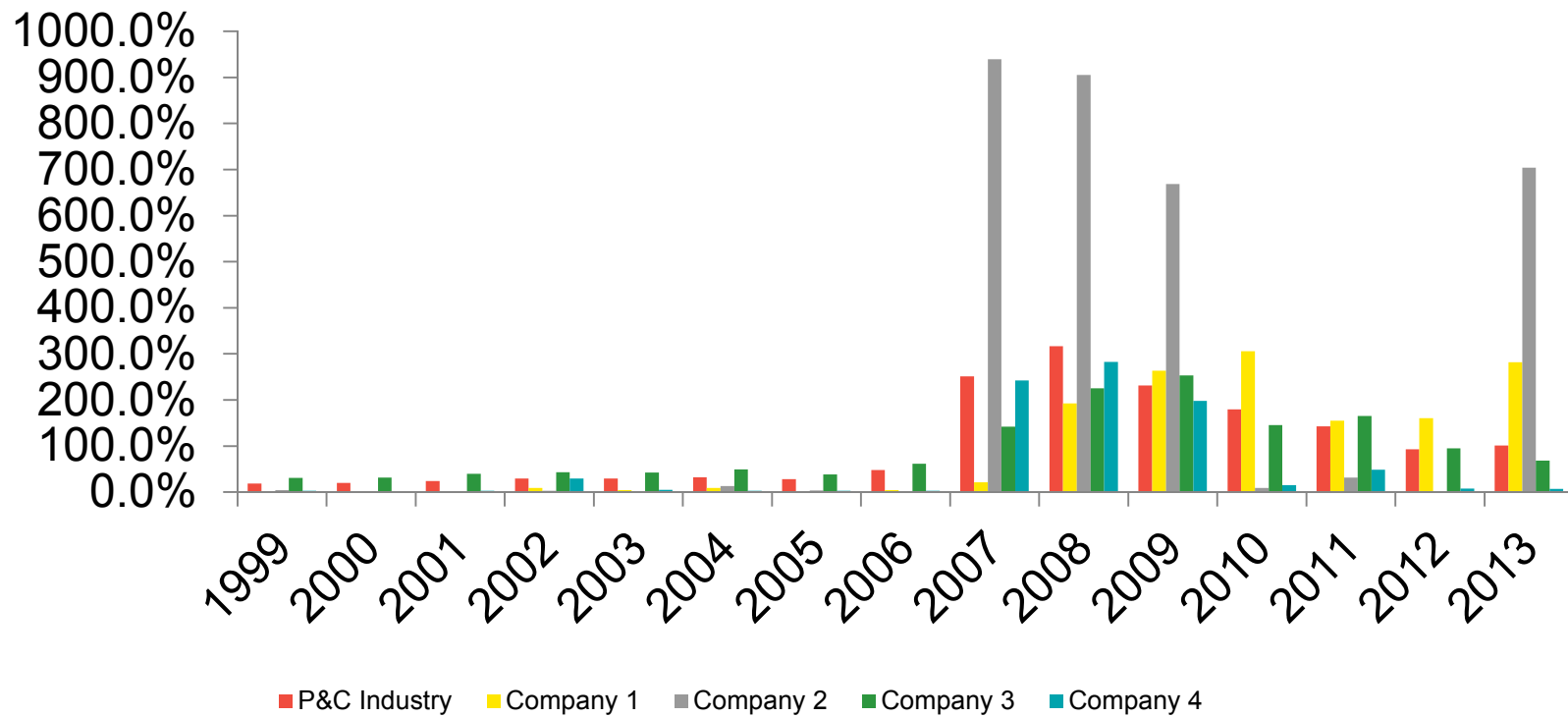
DJIA – Year over year percentage change



Prepared by EY

Industry loss ratio spiked to 200% to 300% and have still not recovered to pre-financial crisis levels

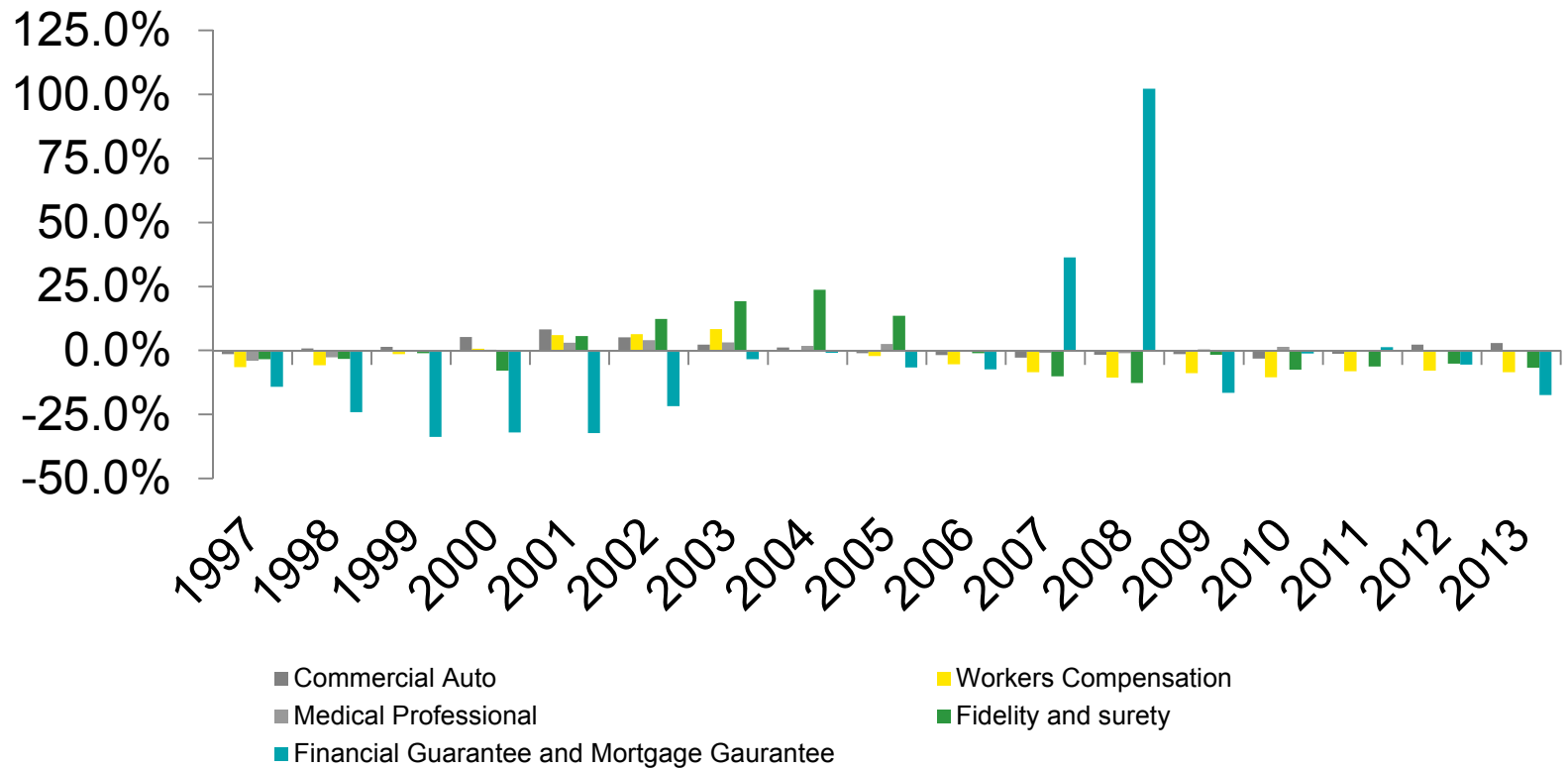
Loss ratios for Industry and Top Financial Guarantee and Mortgage-Back Securities writers



Based on SNL data; Prepared by EY

Unprecedented financial market performance underlined inadequate reserve amounts in financial guarantee and mortgage guarantee products

1 year reserve development / Prior year reserves

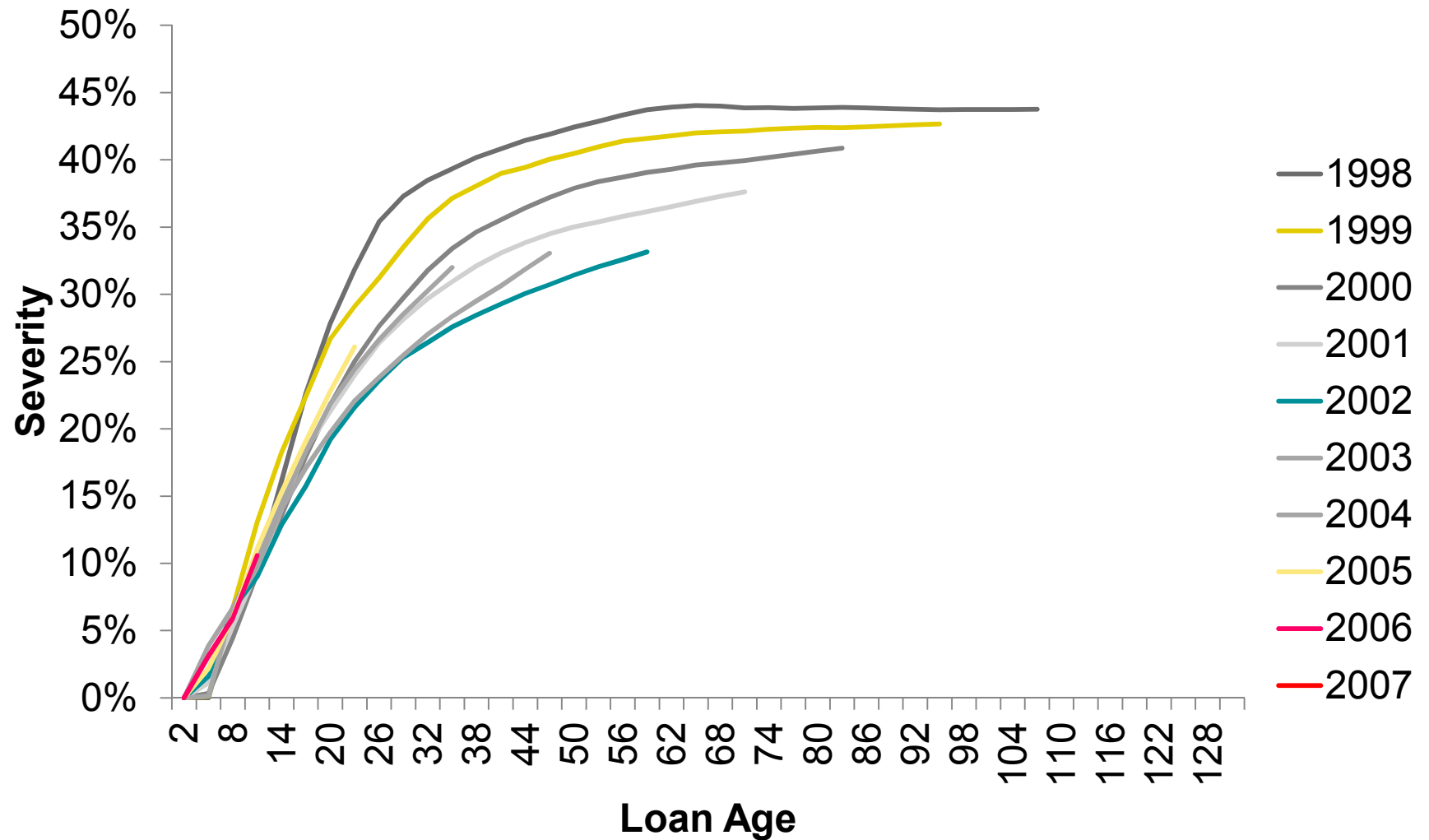


Based on SNL data; Prepared by EY

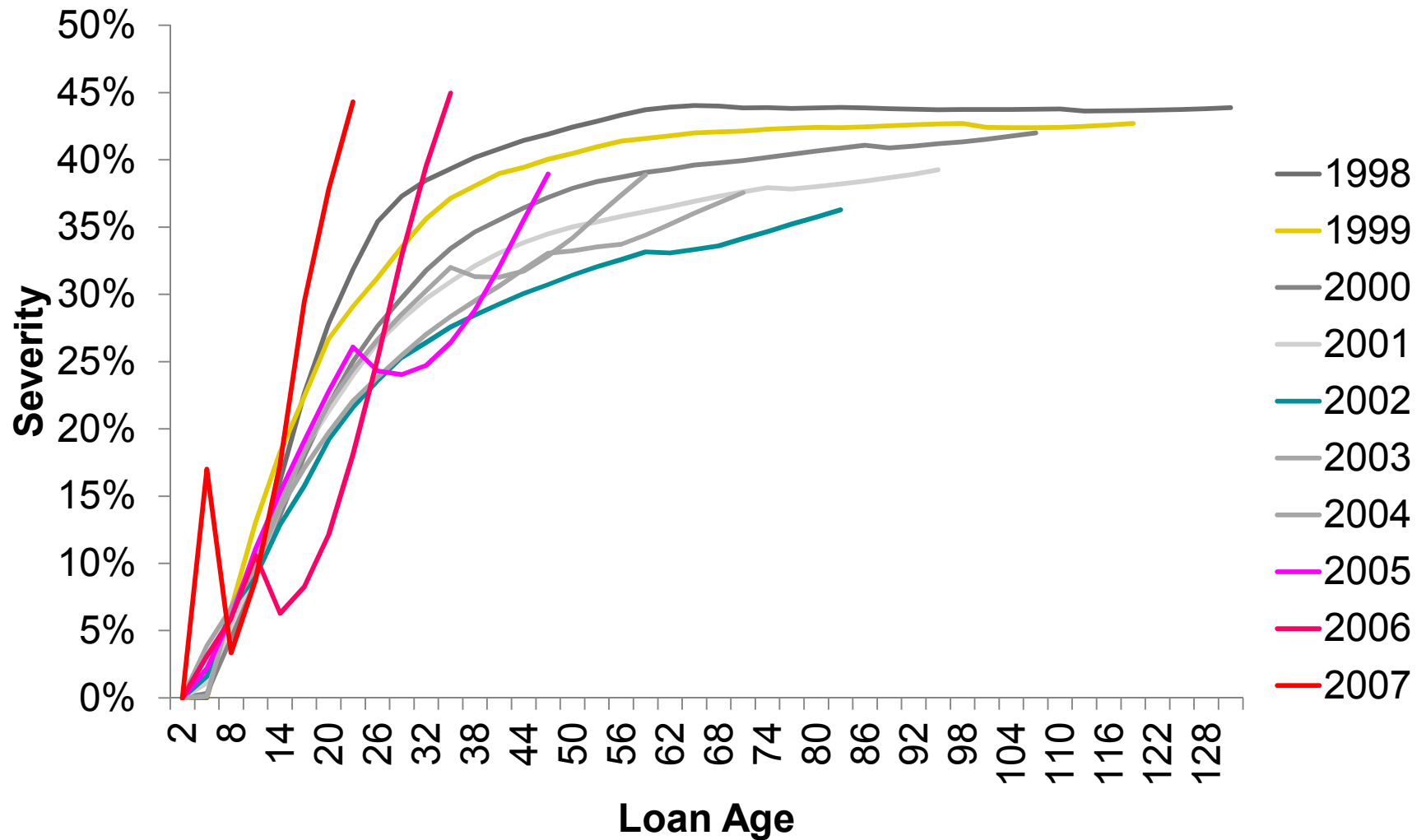
Financial guarantee insurance

- ▶ What went wrong?
 - ▶ Was the cause of the reserve development due to process risk or parameter risk?
- ▶ The development was due to a “tail event” or process risk
- ▶ How did the actuarial models uphold?
 - ▶ New information needed to be reflected that was not traditional to historical analysis and development
 - ▶ Economic projections
 - ▶ TARP program
 - ▶ Scenario testing is critical in developing a range of expectations

2006 vintage curves indicated stability



Post 2008 financial crisis the historical development was no longer relevant



Financial guarantee insurance

Case study – Post-crisis estimates and range

- ▶ Scenario testing was employed as future state after shock was difficult to ascertain from historical data
 - ▶ What movement in transition probabilities is plausible?
 - ▶ How high can loss severities be?

Scenarios	Transition probabilities	Loss Severities	Difference to Median
A	No change	Decrease by 5%	-36%
B	Used 1 month look back	No change	-28%
C	Used 2004 probabilities	Increased by 5%	-4%
D	Lag vintage 1 year	Increased by 5%	+4%
E	Used 2005 probabilities for all older vintages	Increased by 7.5%	+57%
F	Used 2007 probabilities for all vintages	No change	+118%

Developing a range using non-traditional information and scenario testing

- ▶ Scenario testing
 - ▶ Search for relevant information from non-traditional sources
 - ▶ Economic data and trends
 - ▶ Understand reform and its impact
 - ▶ Discuss with client reasonability of assumptions and apply professional skepticism to avoid biases
 - ▶ Develop a maximum probable loss scenario
 - ▶ Consider industry perspective on phenomenon

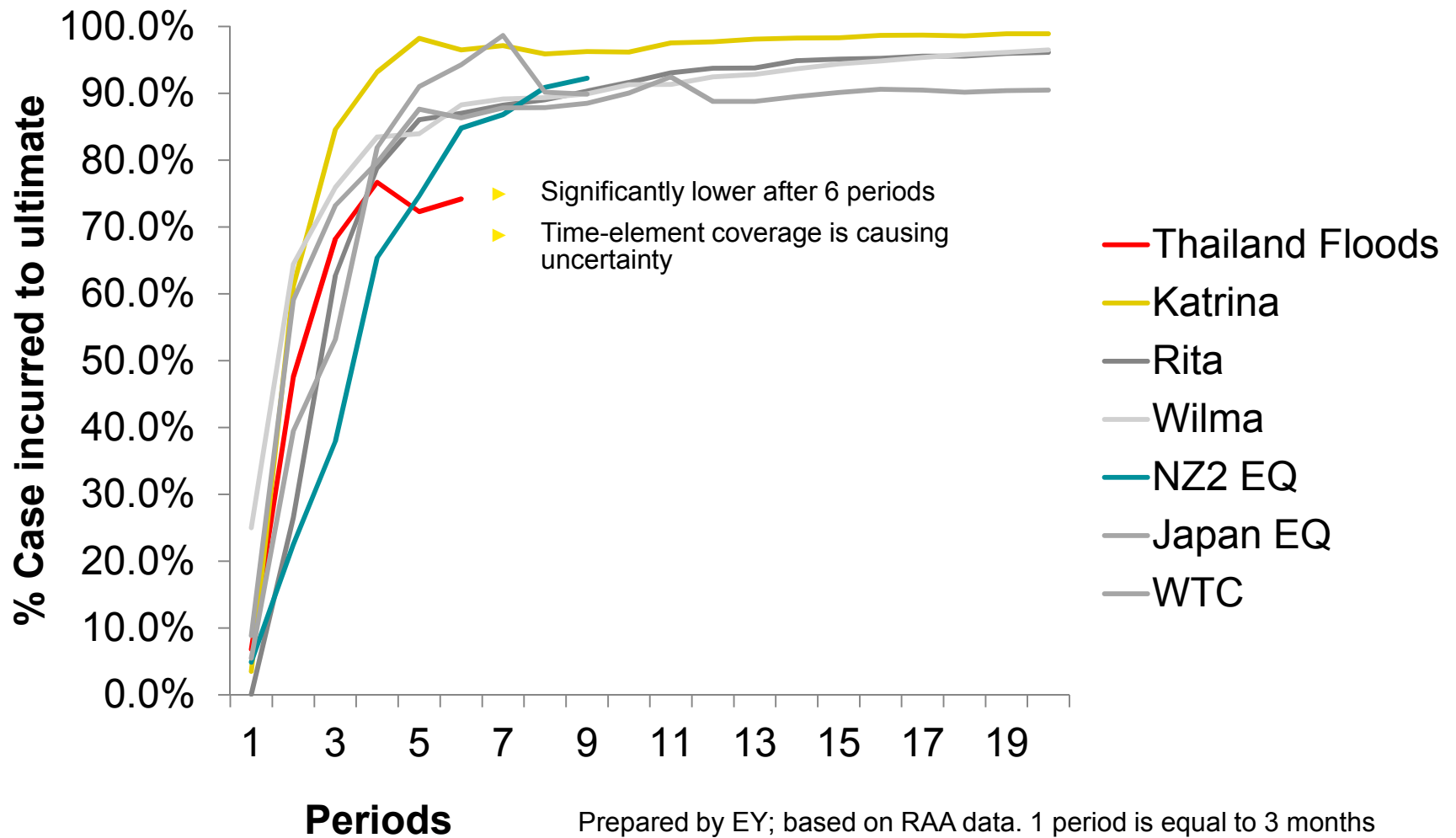
When things go wrong – Case studies

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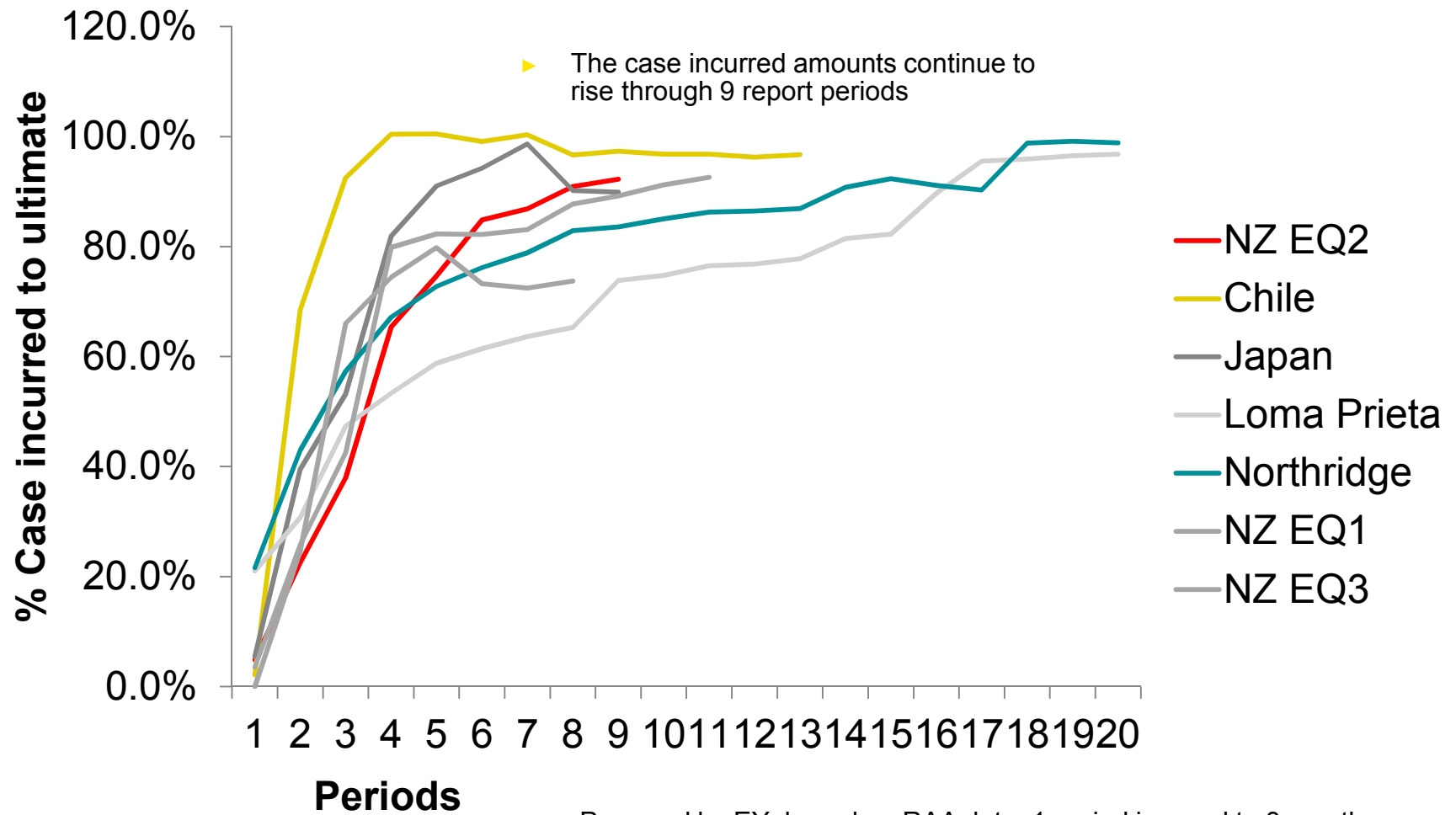
Recent catastrophes have proven to have stipulations that make predicting ultimate losses more uncertain

- ▶ Hurricane Katrina
 - ▶ Wind versus water disputes
 - ▶ Extended recovery and rebuilding period
- ▶ Thailand flooding
 - ▶ Claim investigation was severely delayed due to standing water and the inability to investigate claim sites
 - ▶ Largest claims were business interruption and have a time-element
- ▶ New Zealand earthquake

The Thailand Flooding claims have been harder to identify and investigate due to the lingering water in warehouses



Historical earthquake % of case incurred to ultimate development



Prepared by EY; based on RAA data. 1 period is equal to 3 months

New Zealand earthquake has experience high “event creep” than other recent natural catastrophes

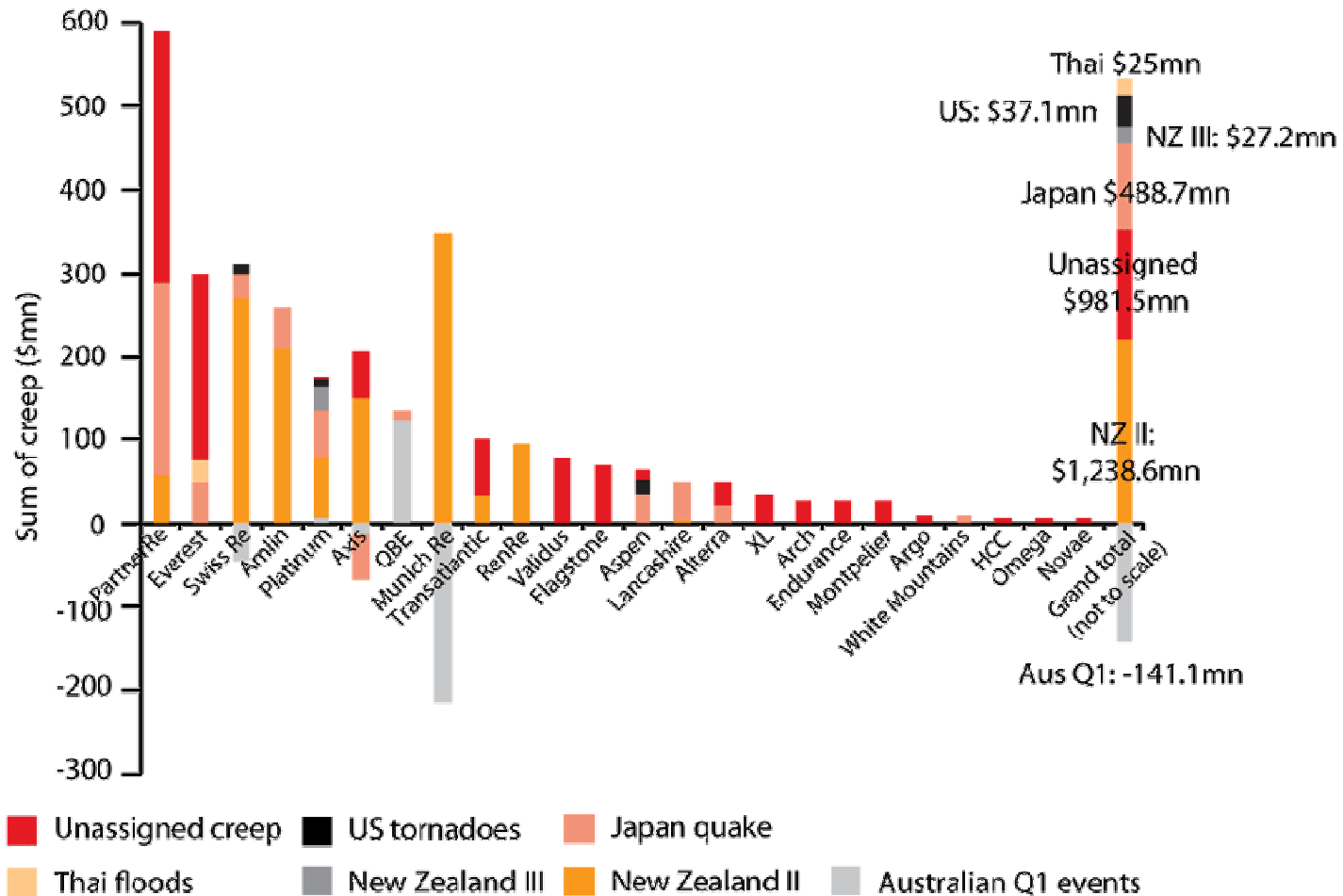
- ▶ Event creep (New Zealand)
 - ▶ New Zealand Earthquakes: Christchurch, NZ
 - ▶ NZ I: October 2010
 - ▶ NZ II: February 2011
 - ▶ Many smaller aftershocks
 - ▶ New Zealand Earthquake Commission pays up to 100,000 NZD property, 20,000 NZD contents
 - ▶ Suncorp and IAG have majority of the market share for additional insurance
 - ▶ Reinsurers then provide excess cover (they get the effects of the creep)

Reason for event creep for New Zealand earthquake

- ▶ Scope of event (largest natural CAT year in NZ)
- ▶ Apportionment: losses were apportioned between the two events, often with complicated models
- ▶ Renewals: the two earthquakes are treated as two events and renewals separate the contracts so there are new limits
- ▶ Liquefaction (some neighborhoods abandoned), this was not factored into many loss models
- ▶ Claim settlement time (government insurer handling claims, slower than private insurance to process)
- ▶ Cordoned off areas (Red Zone) causes BI losses

2011 loss creep tally

Loss creep defined as changes to previous estimates



Source: *The Insurance Insider* (as of 7 February)

Liquefaction

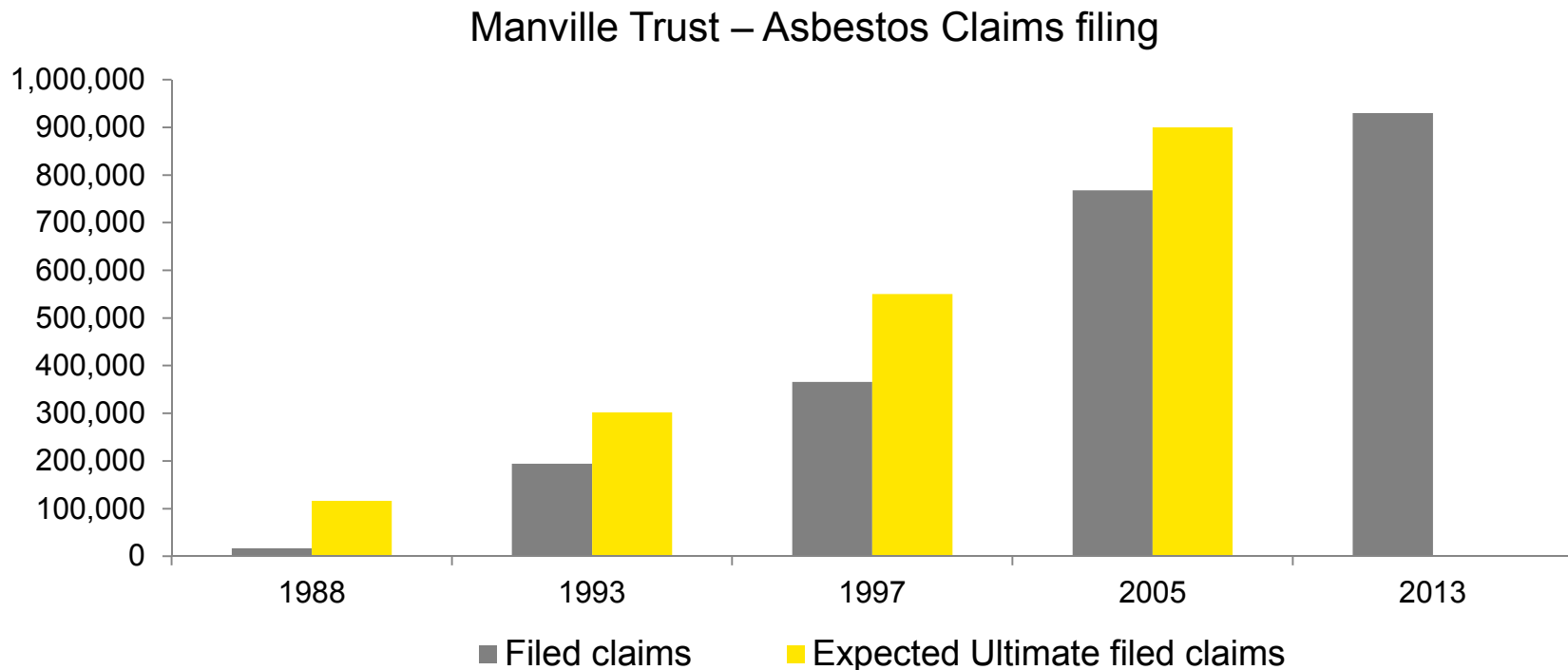


When things go wrong – Case studies

- ▶ 2008 financial crises
 - ▶ Financial guarantee insurance
 - ▶ Mortgage-back security insurance
- ▶ Unusual catastrophes
 - ▶ Hurricane Katrina
 - ▶ Thailand flooding
 - ▶ New Zealand earthquake
- ▶ **Asbestos**

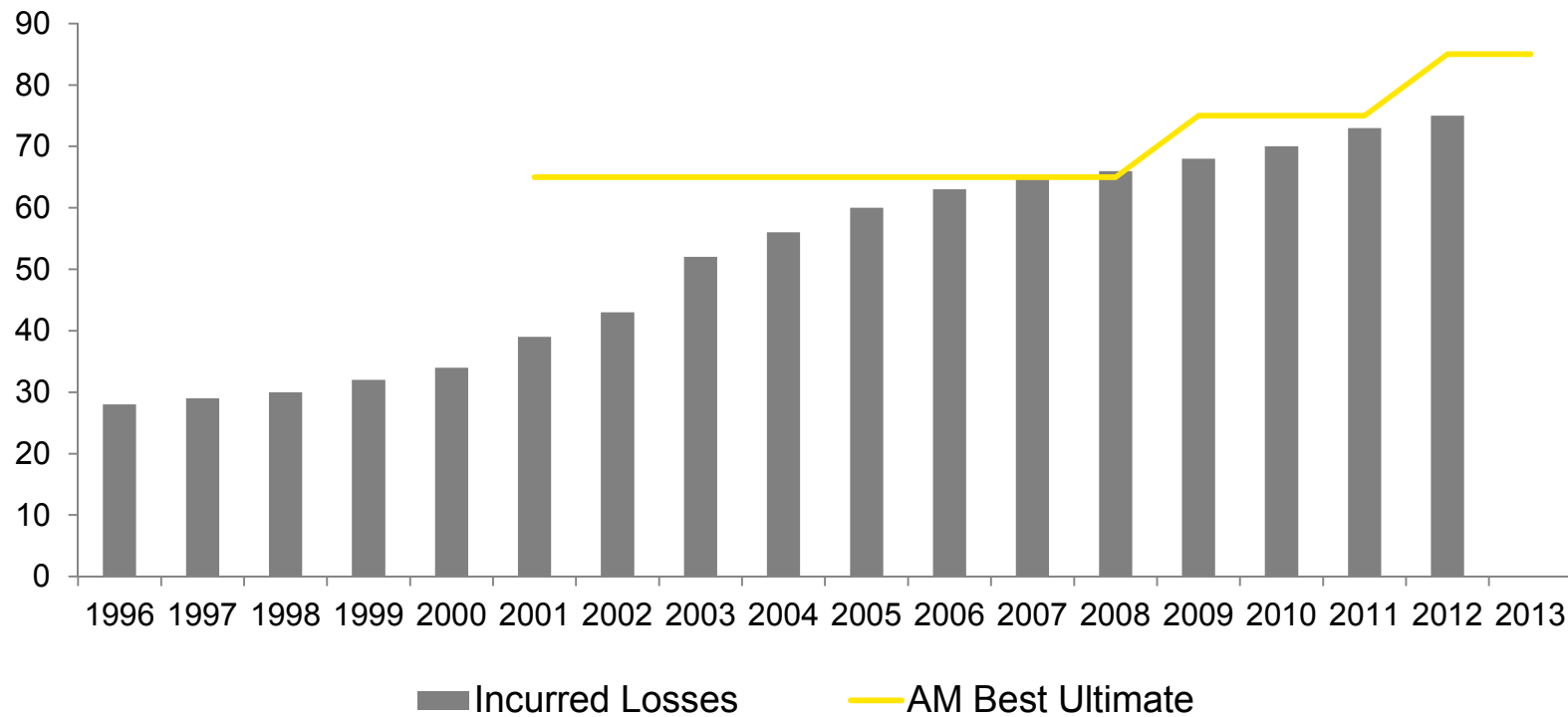
A history of predictions and re-predictions

- ▶ The poor track record of estimating asbestos



AM Best's asbestos and environmental studies have a similar shape

P/C Industry Net Asbestos Losses



Based on annual statement data and AM Best

So what's in an asbestos range estimate?

- ▶ Historical development may have been considered an (un)conceivable extreme scenario or event
- ▶ Ranges are based on the best available data at that time
 - ▶ Survival ratio analyses
 - ▶ Exposure analyses
 - ▶ Market share and industry estimates
- ▶ Wide range of estimates may result – what is the right range?