The Actuarial Profession
making financial sense of the future

GIRO conference and exhibition 2010
Patrick Conlon, Markus Gesmann

Price Change monitoring in the Lloyd's market

From a finger in the air to a finger on the pulse

12-15 October 2010

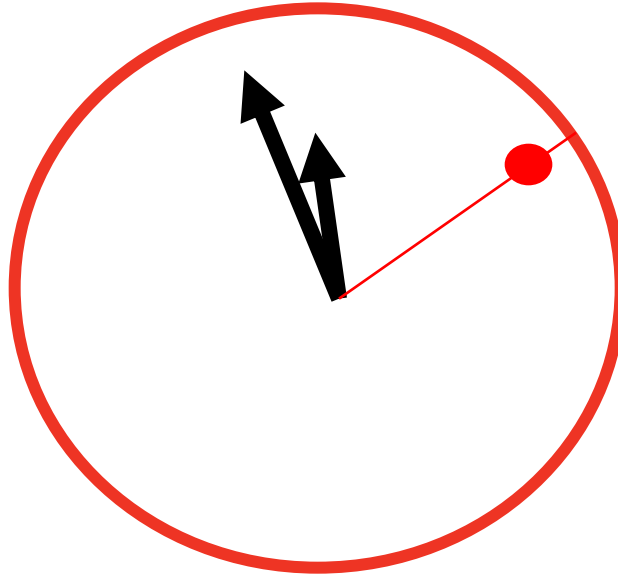# How do you value insurance?

Selling a Product vs. Making a Promise

- Insurers sell the promise to pay future unknown claims over a given time horizon for an upfront premium

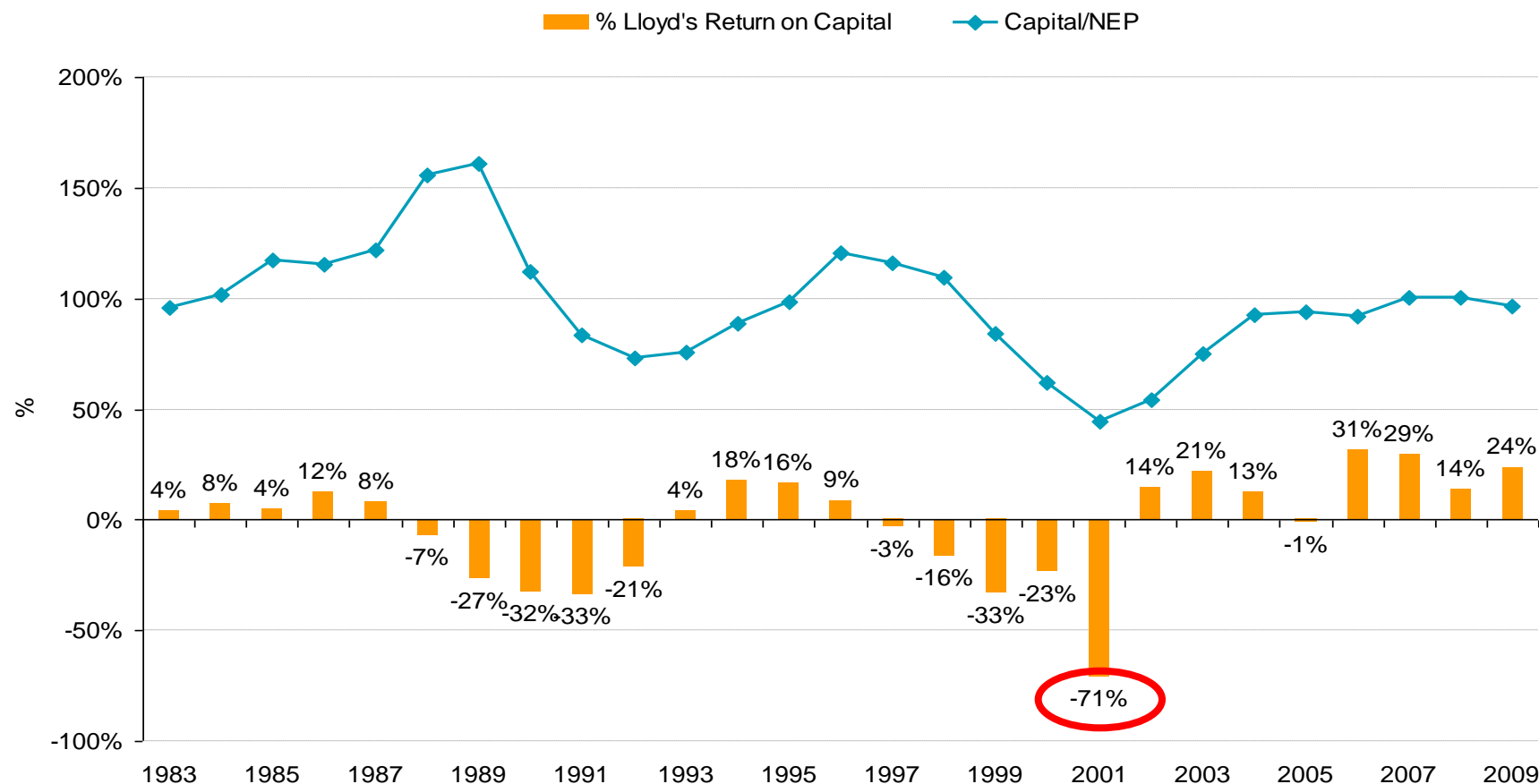- Unlike other industries insurers don't know the production cost of their product

When do you know the price was right?

The pricing of casualty business was disastrous in the late 90's
It took years to realise the true underlying position
Years in which we continued to write poor business

Lloyd's historical Return on Capital

Legend: ■ % Lloyd's Return on Capital — ◆ Capital/NEP

Bar values (% Lloyd's Return on Capital) by year:
- 1983: 4%
- 1984: 8%
- 1985: 4%
- 1986: 12%
- 1987: 8%
- 1988: -7%
- 1989: -27%
- 1990: -32%
- 1991: -33%
- 1992: -21%
- 1993: 4%
- 1994: 18%
- 1995: 16%
- 1996: 9%
- 1997: -3%
- 1998: -16%
- 1999: -33%
- 2000: -23%
- 2001: -71%
- 2002: 14%
- 2003: 21%
- 2004: 13%
- 2005: -1%
- 2006: 31%
- 2007: 29%
- 2008: 14%
- 2009: 24%

Performance Management Data Return: Objective

- Timely information on underwriting to revalidate business plans continuously, answering:
  - Are we getting the business as planned?
 - Are we getting the business at the price we planned?

What is PMDR ?

- Monthly data feed from syndicates' underwriting systems
- Information on premium income by risk, including
    - Price changes for renewals
    - Price comparison against business plans
- Key tool to monitor syndicates' business plan

- More information on **www.lloyds.com/pmd**

What is the price change? A non-insurance example
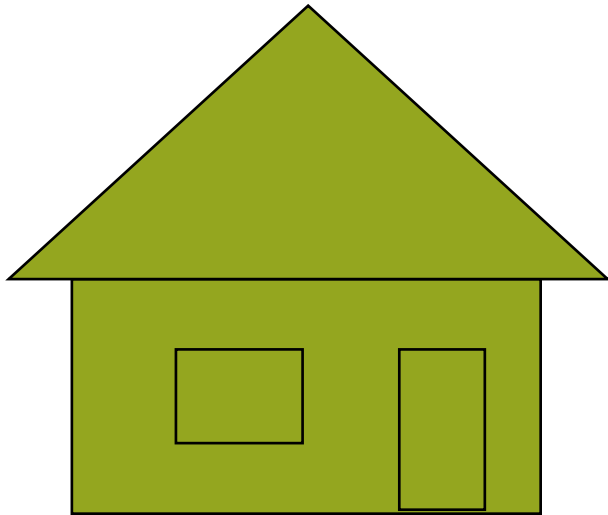
During the year:
Added extension
valued last year at
£50,000

Housing Market Crashed

Value Last Year:
£100,000

ValueThis Year:
£100,000
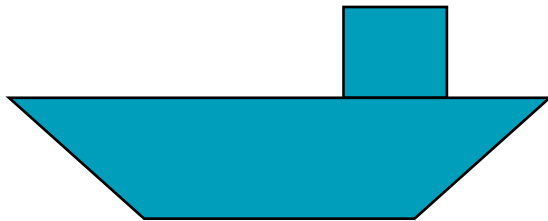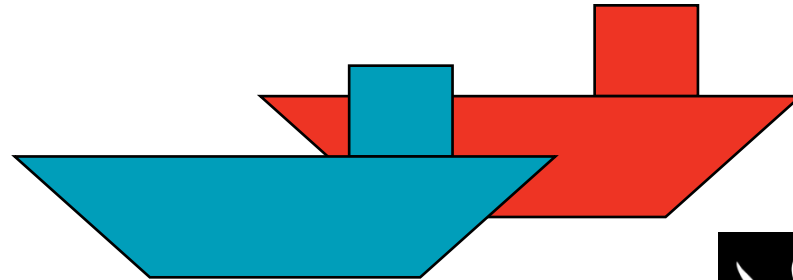
What is the risk adjusted price change?

Last year we charged a rate of 2% of the insured value of £10m.

Premium = £200k

This year we insure two ships with an insured value of £22m and we add piracy as a new cover. Last year we would have charged a rate of 10% for this year's T&C.
However, this year we achieve a rate of 11%.
Premium = £2.42m

PMDR – Reporting Rate Movements

F170	F180	F190	F200	F210	F220
Expiring 100% Prem	Deductible Change	Breadth of Cover Change	Other Change	Pure Rate Change	Current 100% Prem

Risk-adjusted price change
= (Price charged this year
– Price charged for this year's coverage last year)
/ Price charged for this year's coverage last year

Key principles

- All values captured in PMD are in monetary amounts
- Changes due to deductible, and due to breadth of cover are on the expiring exposure
- Changes due to breadth of cover focus on changes on the coverage for perils
- Changes in deductible and changes in breadth of cover have to be treated independently
- When changes of exposure of the same kind are added (e.g. changes in the indemnity size) these have to be priced on this year's policy terms and the price you would have achieved last year

PMDR – Example

- Expiring Terms: One ship, sum insured £10m, rate 2%
- Change of Terms: One ship added with sum insured £12m. Piracy cover added @ rate 8%.
- Current Terms: Two ships, sum insured £22m, rate 11%
- **Risk adjusted price change equals +10%**

F170	F180	F190	F200	F210	F220
Expiring 100% Prem	Deductible Change	Breadth of Cover Change	Other Change	Pure Rate Change	Current 100% Prem
200,000	+0	+800,000	+1,200,000	+220,000	2,420,000

Market Questionnaires

Percentage of correct answers received from agents
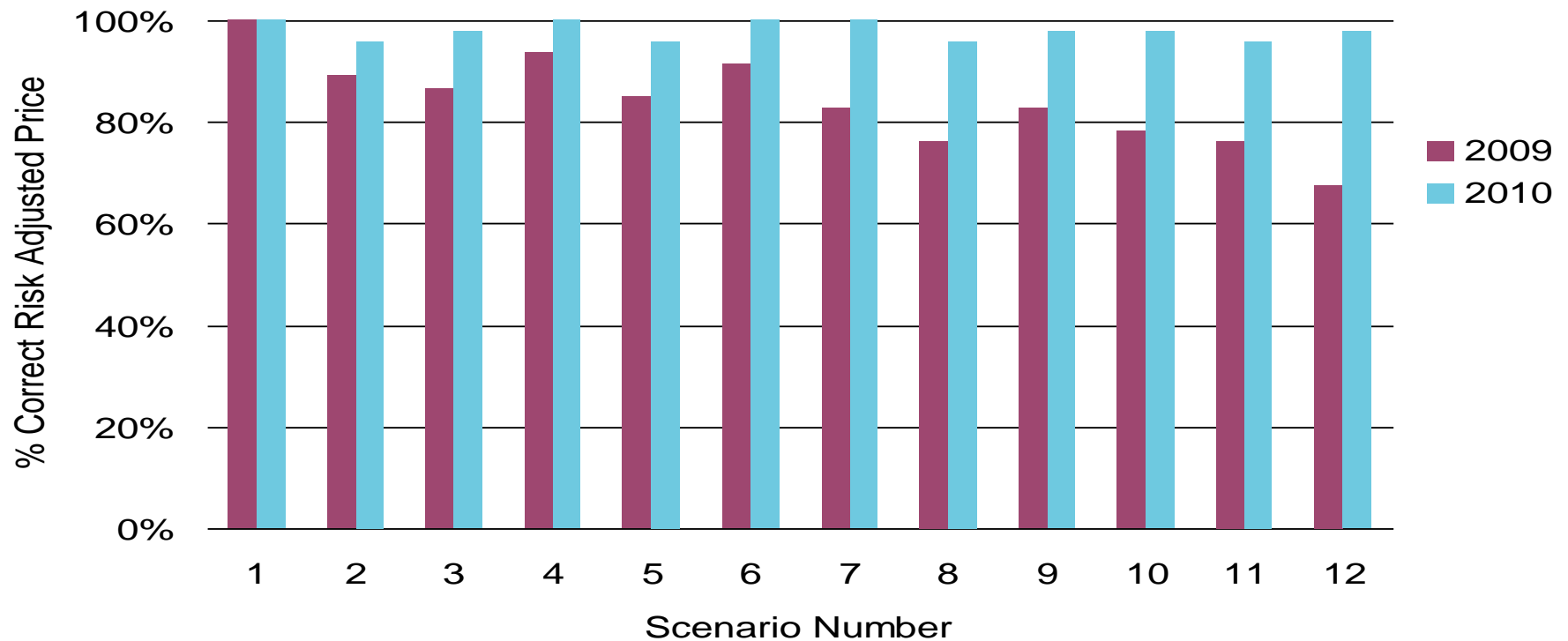
Achieved price vs. planned price

- PMDR benchmark price is defined as the price to deliver the loss ratio approved in the business plan

- Achieved Price % = Price Achieved / Planned Price

- Required on new and renewed risks

- **Example:**

  – Planned ULR: 60%

  – Achieved Price %: 95%

  – Updated target ULR: 60 / 95 = 63%

PMDR in practice

May 2010	Premium and policies				Rate Change		Benchmark Price		Loss Ratio %		
Syndicate No / COB	PMDR Written Premium (000's)	Current Year PMDR % of Approved Plan	Lapsed Premium %	New Premium %	Current Year Rate Change % (RARC)	Previous Year Rate Change % (RARC)	% of Total Premium with Benchmark Price	Benchmark Price Overall	Plan Loss Ratio %	Loss Ratio % with benchmark price applied	Latest Actual Loss Ratio %
xxx	yyy	51%	18%	25%	-1%	3%	100%	94%	68%	72%	74%
xxx	yyy	66%	18%	18%	0%	2%	100%	95%	68%	72%	67%
xxx	yyy	51%	13%	19%	-1%	4%	85%	117%	73%	62%	78%
xxx	yyy	62%	30%	30%	-2%	5%	100%	111%	72%	65%	71%
xxx	yyy	52%	23%	17%	-1%	8%	46%	115%	65%	56%	67%
xxx	yyy	59%	32%	34%	-1%	5%	87%	111%	67%	60%	82%
xxx	yyy	53%	26%	11%	-1%	3%	47%	100%	64%	63%	75%

Business Plan (SBF) — Plan Loss Ratio %

Latest Reforecast (QMR) — Latest Actual Loss Ratio %

- Are we getting the business as planned?
- Are we getting the business at the planned price?

PMDR Benefits

- Huge enhancement in Lloyd's ability to oversee the market's underwriting performance

- PMDR improves proactive cycle management

- Consistent market view on reporting price movements

- More granular data allow rigorous data validation and integrity checks

- Better protection of Central Fund, Brand and Rating

Past	Present	Future
Quarterly Monitoring Return	PMDR	Syndicate Business Plan
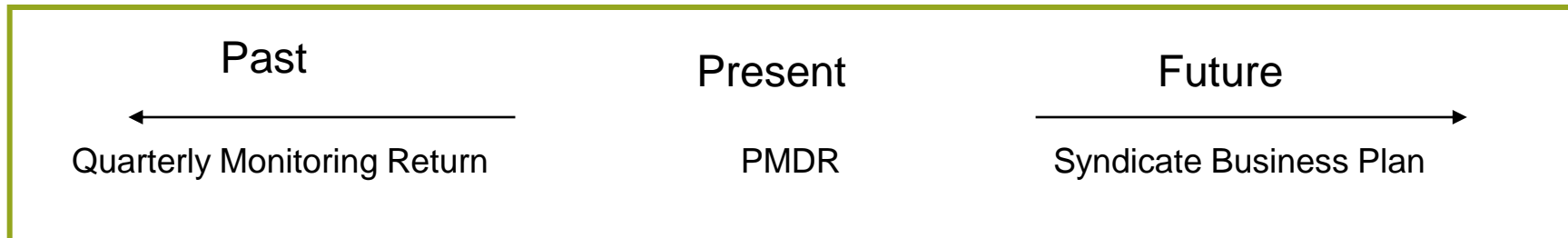
Where in the cycle are we?

- PMDR started in 2009
- PIM started in 2005
- Very little information available prior to 2005

Historical Premium Rates

- **Aim**
  - Premium Rate Index by class of business from 1993 onwards
- **Purpose**
  - Historic PRI can be used for:
    - Business planning / cycle management
    - To review reserves
    - To adjust historical data for price fluctuations
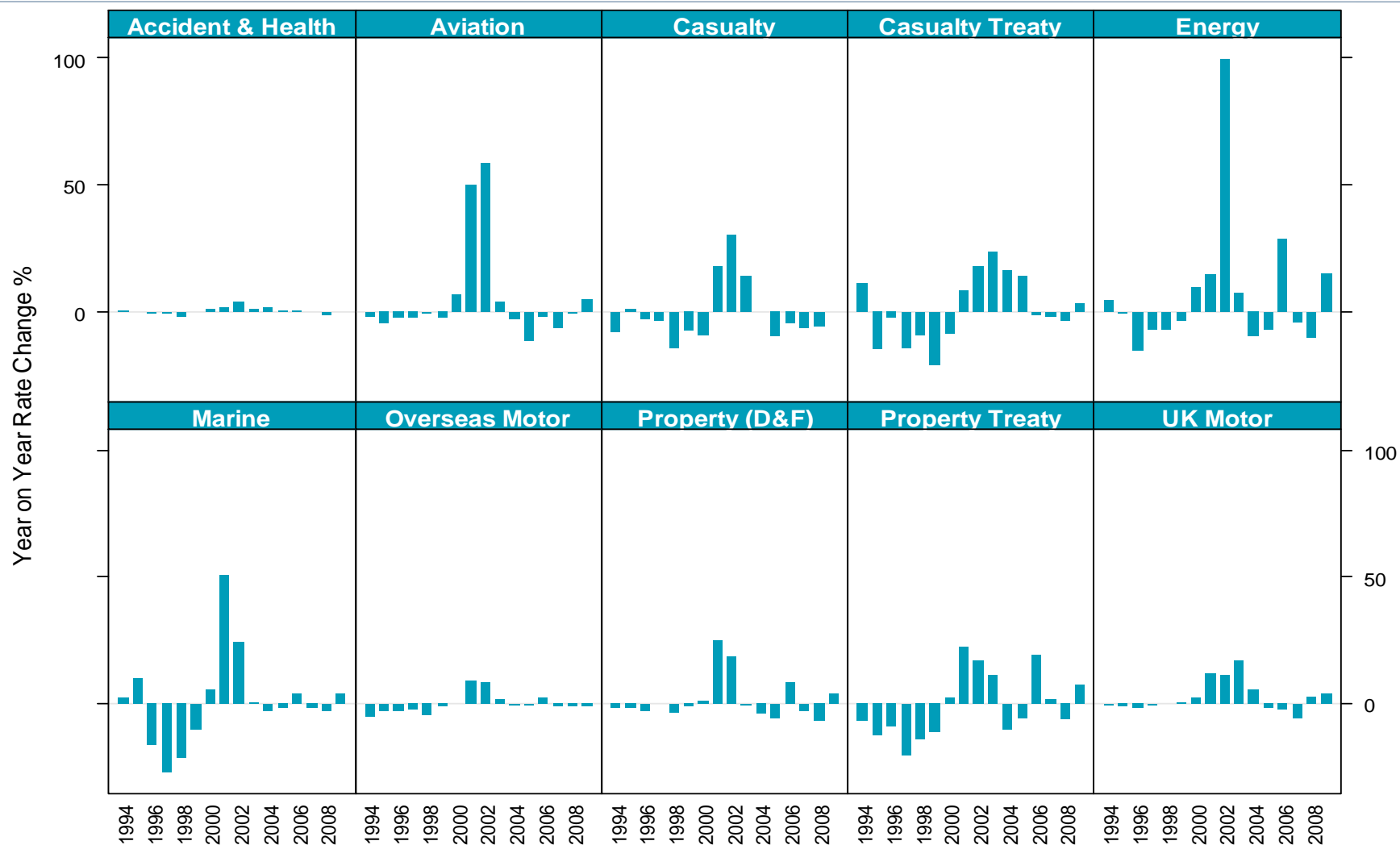
Our approach

- **Review of historical data**
  - External publications:
    - Brokers, Managing Agents, Members Agents, Industry Publications
  - Lloyd's internal data
    - Regression analysis based on historical loss ratios
  - Consultations with class of business experts

Current view on historical rate changes

Year on Year Rate Change % from 1994 - 2009

Next Steps

- We share our analysis
  - Contact us

- You share your insight
  - Complete questionnaire

- We all improve our understanding
  - Playback in Lloyd's Statistics 2011
  - Participants receive previews

Statistics relating to Lloyd's 2010

- Summary of market statistics

- P&L and balance sheet information by syndicate

- Underlying data available

- Online: **www.lloyds.com/stats**

LLOYD'S

STATISTICS RELATING TO LLOYD'S

2010 EDITION
as at 31 December 2009
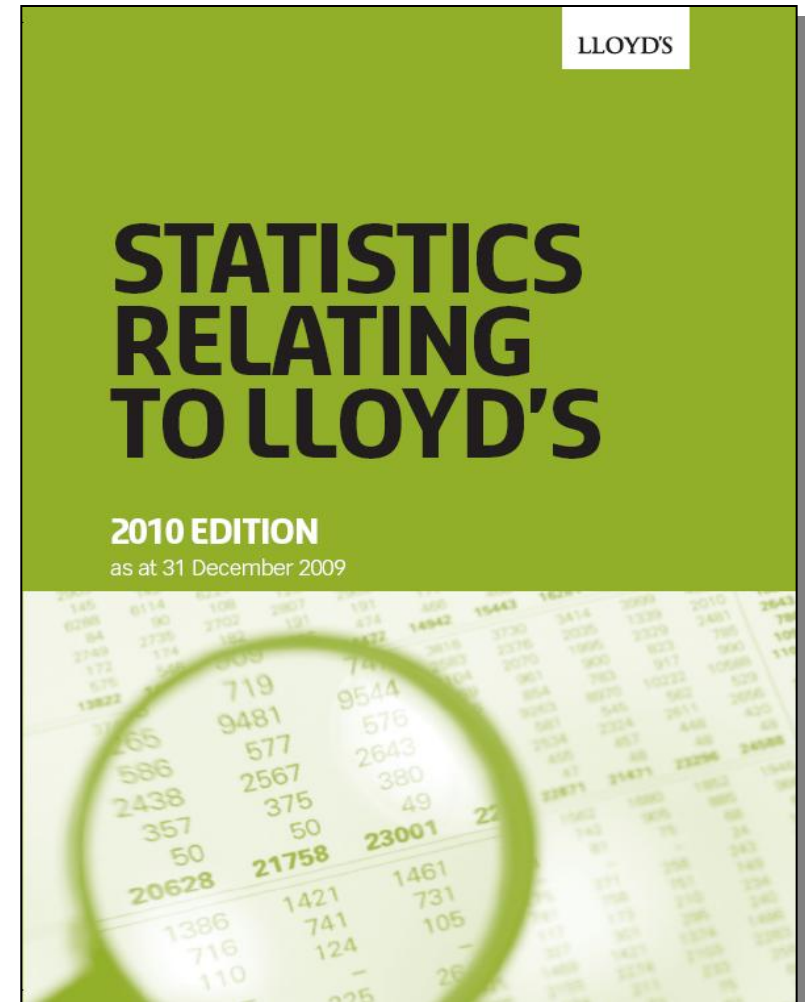
Thank you.

- ## Questions?

- ## Contacts:
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Appendix

PMDR Price Change Examples

PMDR Price Change Examples: Exposure Change

Expiring terms	1 hotel Fire and flood cover @ £100 gross net premium per hotel
Change of terms	Deductible change worth +£15 gross net premium per hotel on expiring premium terms Fire cover removed worth -£20 gross net premium per hotel on expiring premium terms 9 new hotels added
Current terms	10 hotels Flood cover only @ £100 gross net premium per hotel

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
100	+15	−20	+855	+50	1000
				Risk-adjusted rate change =	**5.3%**

- Change values recorded in fields 180 and 190 relate to the original exposure of the policy (1 hotel)

- Addition of the 9 hotels is recorded in field 200 at the price allowing for the revised terms and conditions

PMDR Price Change Examples: Brokerage

Expiring terms	£100 <u>gross gross</u> premium charged with £20 brokerage
Change of terms	No changes in terms or conditions other than increase in brokerage to £25
Current terms	£100 <u>gross gross</u> premium charged with £25 brokerage

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
80	+0	+0	+0	−5	75

	Risk-adjusted rate change =	−6.3%

- Figures in PMDR are recorded after deduction of acquisition costs

- The change in brokerage therefore reduces the final premium in field 220 and so there is a corresponding

- balancing price change item in field 210

PMDR Price Change Examples: No Claims Discount

Expiring terms	A motor policy charges £150 gross net premium
Change of terms	Following a long period with a benign claims history, a 'no claims' discount is introduced The premium is reduced by £20 gross net The policy terms, conditions, exposure and claims rates remain unchanged
Current terms	A motor policy charges £130 gross net premium

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
150	+0	+0	+0	−20	130

	Risk-adjusted rate change =	−13.3%

- The no claims discount reduces the premium received but the expected claims for this policy have not changed

- A price change is recorded in field 210

PMDR Price Change Examples: Claims Cost Change

Expiring terms	A property portfolio's long term average earthquake claims are modelled at £100 Gross net premium charged is £230
Change of terms	A new geological fault is discovered in the area The revised model estimates an increase in expected <u>claim costs</u> from £100 to £120 Gross net premium charged is increased by £20
Current terms	Gross net premium charged increased to £250 for £120 long term average modelled claims

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
230	+0	+0	+46	−26	250

			Risk-adjusted rate change =	−9.4%

- The £20 increase in expected claims is not put directly into field 200

- PMDR records the premium equivalent of the exposure changes and so the additional claims musts be grossed up by the expected loss ratio implied by the claims to premium ratio

PMDR Price Change Examples: New Peril

Expiring terms	A treaty with an excess of £5,000 and limit of £2,000 charges a gross net premium of £200
Change of terms	A new peril is added to the treaty The pricing model values this change as an additional £50 gross net premium
Current terms	A treaty with additional perils and excess of £50 and limit of £20 charges a gross net premium of £210

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
200	+0	+50	+0	−40	210

Risk-adjusted rate change = −16.0%

- The change in premium calculated from the model is not reflected in the premium charged

- Hence there is a risk adjusted price change

PMDR Price Change & Multiplicative Method: Positive Deductible/Breadth of Cover Changes

Expiring 100% GNPW	£750,000
Change % ddctbl / atchmt pt	40%
Change % breadth of cover	60%
Change % other factors	40%
Current 100% GNPW	£2,116,800

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
750000	+372000	+558000	+672000	-235200	2116800

Risk-adjusted rate change =   **-10.0%**

Field 180 + Field 190 = 750,000 * (1 + 40%) * (1 + 60%) – 750,000 = 930,000

Therefore

Field 180 = 40% / (40% + 60%) * 930,000 = 372,000

Field 190 = 60% / (40% + 60%) * 930,000 = 558,000

Field 200 = 40% * 930,000 = 672,000

Field 210 = 2,116,800 – 672,000 – 558,000 – 372,000 – 750,000 = -235,000

PMDR Price Change & Multiplicative Method: Negative Deductible/Breadth of Cover Changes

Expiring 100% GNPW	£750,000
Change % ddctbl / atchmt pt	-50%
Change % breadth of cover	-20%
Change % other factors	40%
Current 100% GNPW	£378,000

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
750000	-321429	-128571	+120000	-42000	378000

| | | | | Risk-adjusted rate change = | -10.0% |

Field180 + Field 190 = 750,000 * (1 – 50%) * (1 – 20%) – 750,000 = -450,000

Therefore

Field 180 = -50% / (-50% – 20%) * -450,000 = -321,429

Field 190 = -20% / (-50% – 20%) * -450,000 = -128,571

Field 200 = 40% * 300,000 = 120,000

Field 210 = 378,000 – 120,000 + 128,571 + 321,429 – 750,000

PMDR Price Change & Multiplicative Method: Mixed Positive and Negative Changes

Expiring 100% GNPW	£750,000
Change % ddctbl / atchmt pt	30%
Change % breadth of cover	-30%
Change % other factors	40%
Current 100% GNPW	£859,950

Expiring 100% Gross Net Premium Written	Change in Expiring 100% Gross Net Premium Written Due to Change in Deductible / Attachment Point	Change in Expiring 100% Gross Net Premium Written Due to Change in Breadth of Cover	Change in Expiring 100% Gross Net Premium Written Due to Other Factors	Change in Expiring 100% Gross Net Premium Written Due to Pure Rate Change	Current 100% Gross Net Premium Written
170	180	190	200	210	220
750000	+157500	-225000	+273000	-95550	859950

	Risk-adjusted rate change =	-10.0%

Field 180 + Field 190 = 750,000 * (1 + 30%) * (1 − 30%) − 750,000 = -67,500

The negative change reduces the original premium total which is then acted upon

by the positive change for deductible / attachment point. Therefore:

Field 190 = -30% * -750,000 = -225,000

Field 180 = +30% * (750,000 − 225,000) = +157,500

Field 200 = 40% * (750,000 − 225,000 + 157,500) = 273,000

Field 210 = (859,950 − 273,000 − 157,500 + 225,000 − 750,000) = -95,550