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34TH ANNUAL GIRO CONVENTION

CELTIC MANOR RESORT, NEWPORT, WALES

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Reserving through the soft market

How Can Actuaries Do Better This Time?

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Deloitte & Touche LLP
04 October 2007

Reserving as the market softens

How can actuaries do better this time?

Agenda

- The underwriting and reserving cycles
- Robust premium rate recording
- Understanding the business
- Methods for reserving in the soft market
- Discussion

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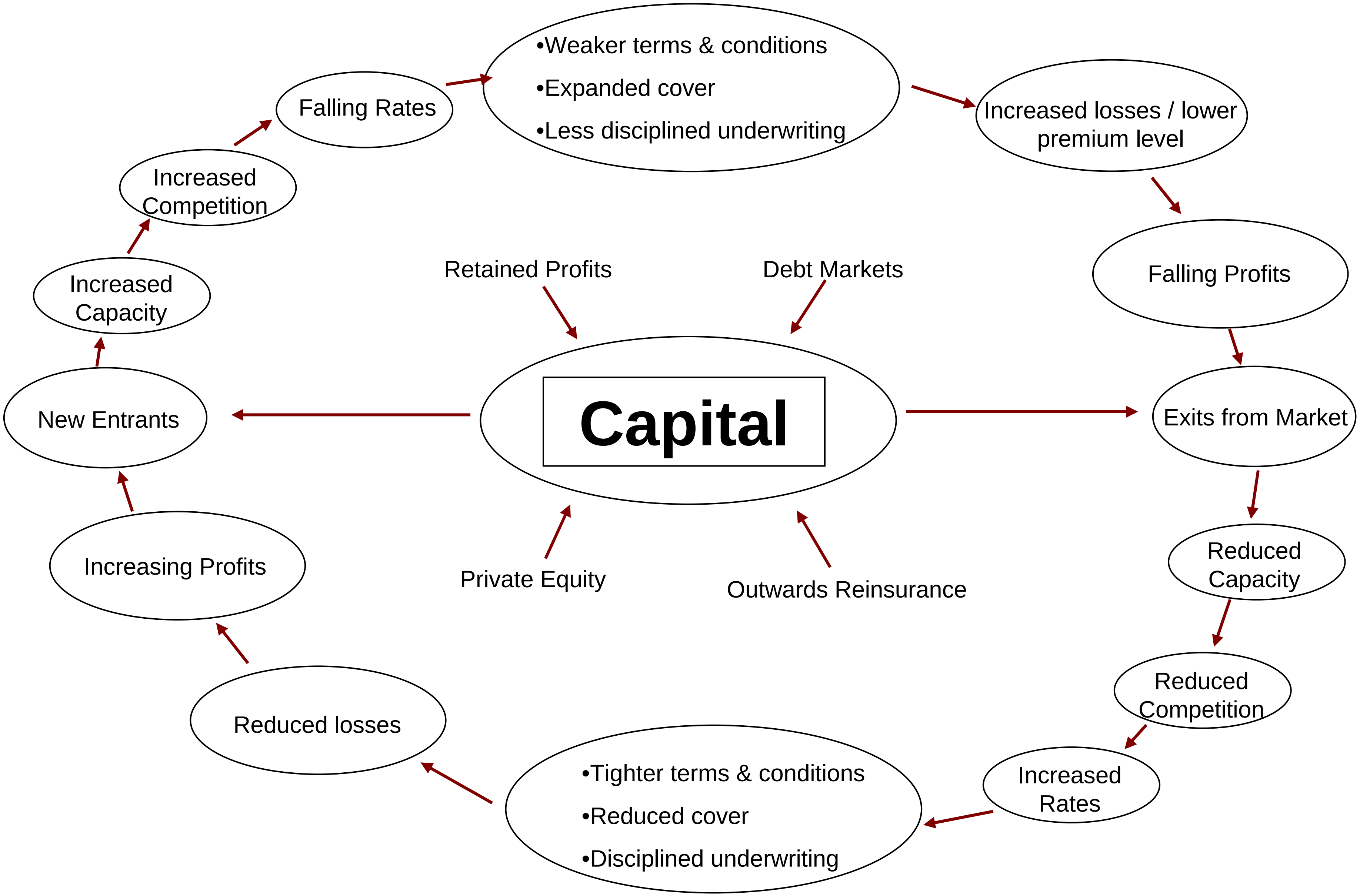
The Underwriting and Reserving Cycle

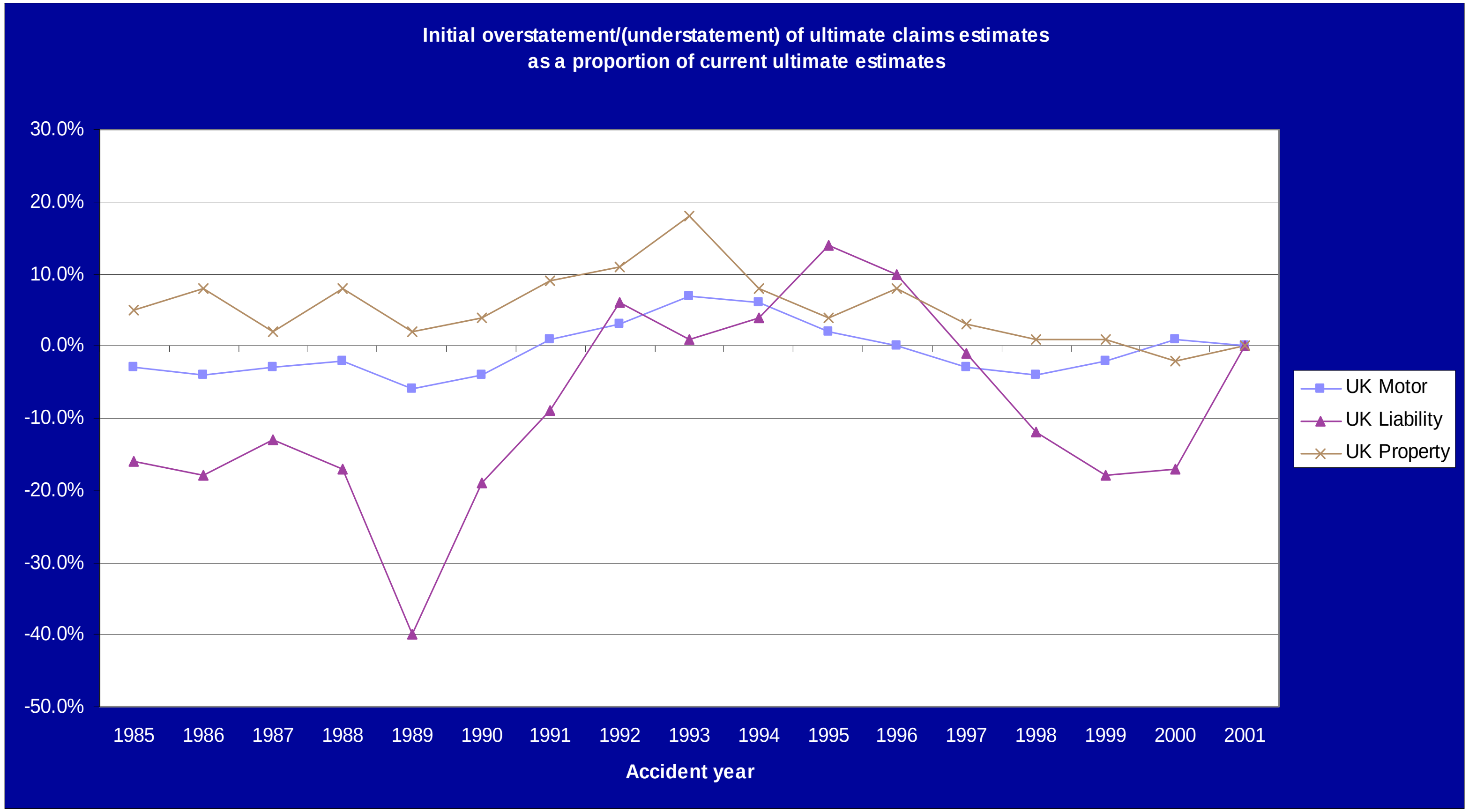


•Weaker terms & conditions
•Expanded cover
•Less disciplined underwriting
Falling Rates
Increased Competition
Increased Capacity
New Entrants
Increasing Profits
Reduced losses
•Tighter terms & conditions
•Reduced cover
•Disciplined underwriting
Increased Rates
Reduced Competition
Reduced Capacity
Exits from Market
Falling Profits
Increased losses / lower premium level
Retained Profits
Debt Markets
Capital
Private Equity
Outwards Reinsurance

The Reserving Cycle

- **What is the reserving cycle?**
  - Distinct from the underwriting cycle…
    …but has a strong relationship with it
  - Clear cycle of over and under reserving
  - Visible across underwriting classes
  - More pronounced for funded business than accident year
  - More pronounced for longer tailed business
- **Why does the reserving cycle occur?**
  - Inappropriate use of historic trends and patterns due to the impact of the underwriting cycle
  - Inappropriate use of rating indices due to the impact of the underwriting cycle
  - Poor understanding of the business
  - Booked reserved differ from actuarial best estimate
  - Actuaries or management may deliberately choose to move away from best estimate figures at different stages of the cycle

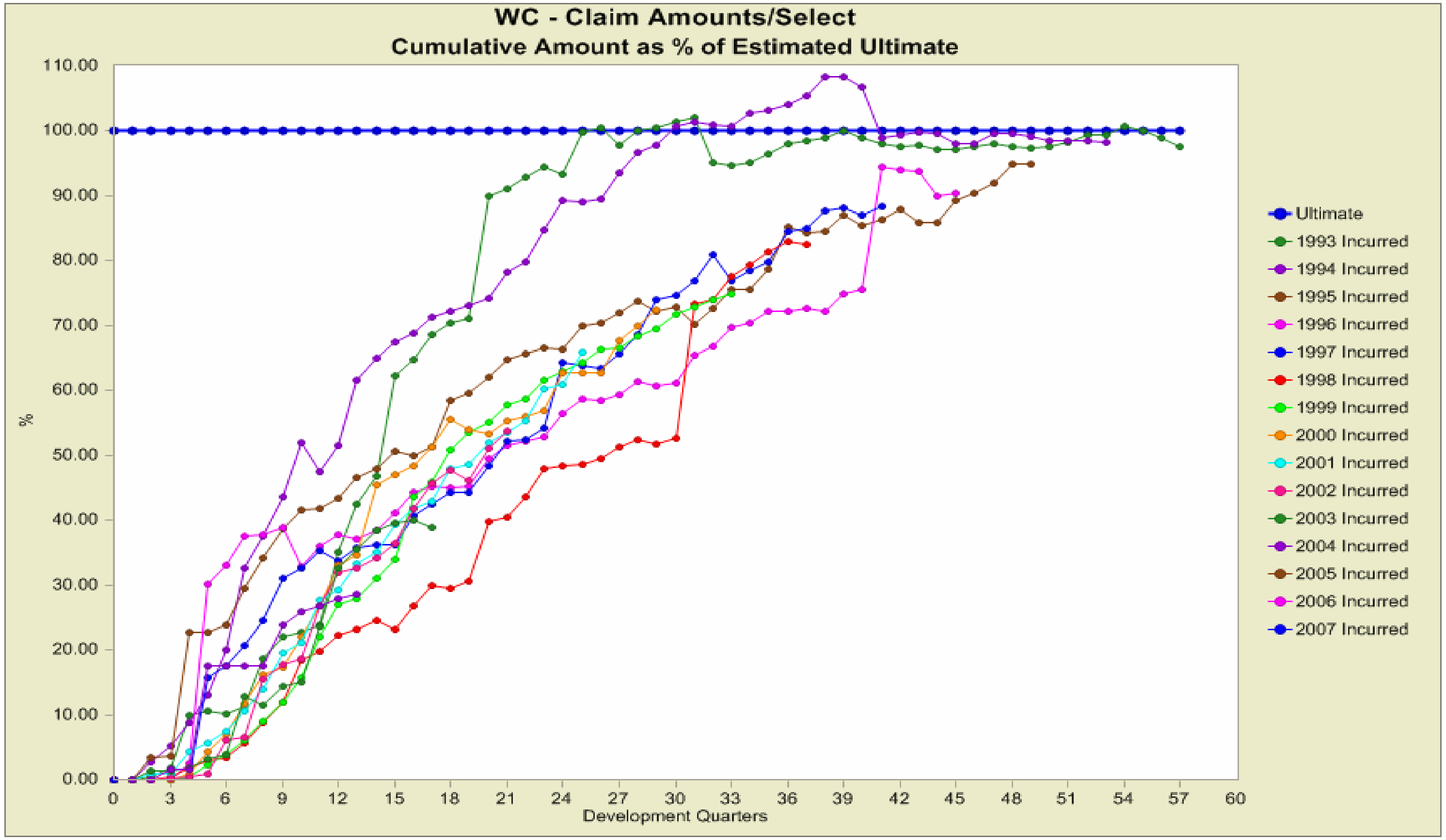
The Reserving Cycle



Source: 2002 GIRO Working Party – The Cycle Survival Kit

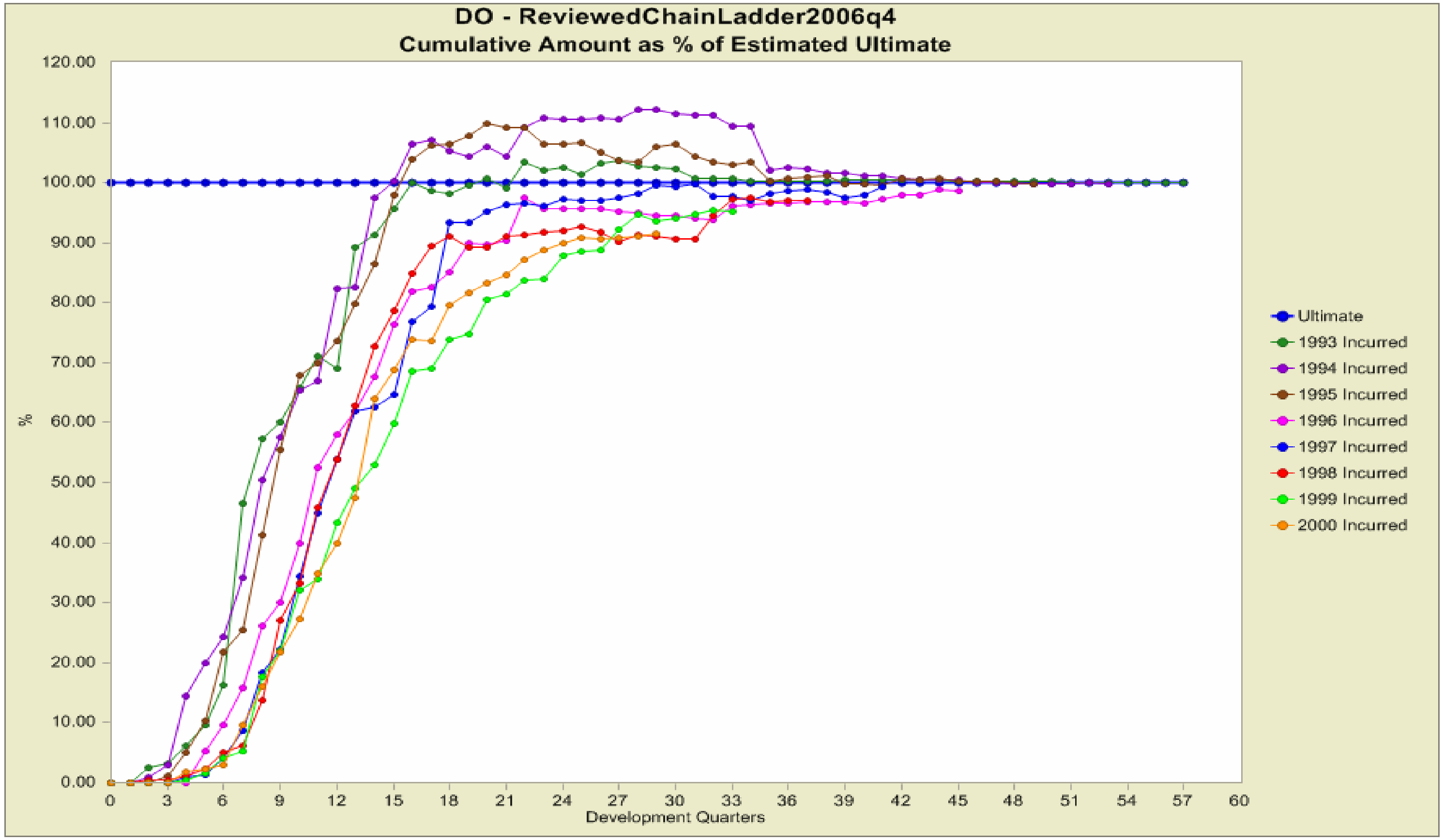
The Reserving Cycle

Development pattern graph – Workers Compensation



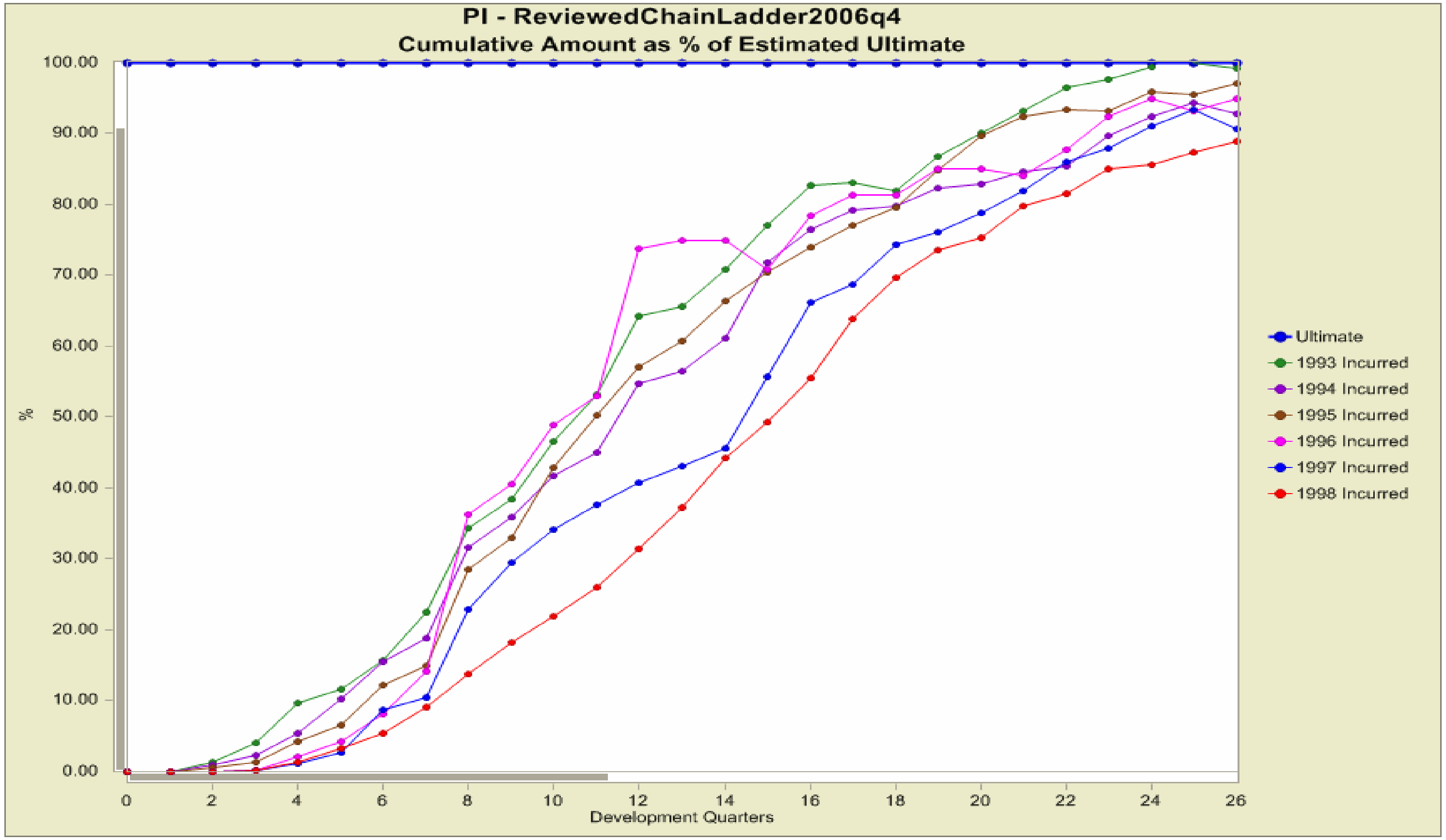
The Reserving Cycle

Development pattern graph – Directors & Officers



The Reserving Cycle

Development pattern graph – Professional Indemnity



The Reserving Cycle

- **What can be learned?**
  - Regular communication with underwriters to understand change in mix of business
  - Advantage of paid chain ladder over incurred chain ladder
  - Need for robust rate indices with accurate recording and controls
  - Need for actuarial judgment in conjunction with statistical approach
  - Consistency year to year requires consideration of factors impacting underwriting and reserving cycles
  - Level of prudence may change dependent on underwriting cycle, which impacts reserving cycle.

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Robust Premium Rate Recording

Robust Premium Rate Recording (1)

- Robust rate recording is essential for good reserving
  - Key piece of information used in the reserving process

- Non robust mechanism for capturing premium rates
  - Inaccurate recording of rates
  - Failure to allow fully for T&C changes
  - Lack of awareness as to what the rate index means
  - Danger: rate index is used inappropriately in the reserving exercise

- In a “soft” market, underestimation of the true drop in premium rates
- Danger: possible underestimation of reserves

Robust Premium Rate Recording (2)

- **Historical concerns over approach to rate recording**
  - Over dependence on underwriting staff
  - Failure to adequately break down rate movements
  - Inadequate allowance for T&C changes
  - Lack of consistency (both internal and external)
  - Inadequate allowance for new business

Robust Premium Rate Recording (3)

- **Lloyd's Market Bulletin (May 2004)**
  - Aim to address the robust recording of rates

- **Current best practice:**
  - Risk by risk analysis
  - Rate change split into 5 components:
    - Pure rate
    - Underlying exposure
    - Attachment point
    - Terms and conditions
    - Claims inflation
  - Actuarial input into process
  - New/ renewal business
  - Nominated responsible person
  - Process for use of the information

Robust Premium Rate Recording (4)

So, what questions should you be asking yourself at the year-end?

- How are you currently capturing your premium rate change information?
- Do you have a robust mechanism in place?
- Are rate changes being considered in the 5 components:
  - Pure rate
  - Underlying exposure
  - Attachment point
  - Terms and conditions
  - Claims inflation
- Have you carried out any reasonableness checks on the level of rate movements?
- Has there been any actuarial input into the process?
- Are the rate indices being interpreted in the right way?

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Understanding the Business

Reserving in Changing Markets
The “Blind” Actuary

- What if we ignore the underwriting and reserving cycles?
- What if we use only our data to reserve?
- Are we being professional if we do so?

Reserving in Changing Markets
The "Blind" Actuary

Incurred Claims as at 31 March 2007

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1993	5.0	46.7	56.4	81.6	82.2	83.8	83.9	82.2	81.7	82.0	81.9	81.9	81.6	81.6	81.6
1994	10.5	37.1	60.6	78.3	78.0	81.2	82.4	81.7	75.3	74.4	73.8	73.4	73.5	73.4	
1995	7.8	62.7	111.8	157.4	166.6	161.5	156.9	156.8	152.5	151.1	152.5	151.5	151.3		
1996	0.2	49.8	110.6	155.9	170.9	181.9	180.9	178.7	183.7	183.8	188.4	187.9			
1997	3.8	83.4	246.0	350.3	434.2	443.1	446.8	445.2	449.6	446.4	452.6				
1998	7.0	87.6	341.2	537.2	564.5	582.9	577.6	597.8	613.8	614.5					
1999	3.0	133.3	327.9	517.8	607.3	662.6	715.5	720.6	718.9						
2000	15.5	138.3	345.2	639.0	720.8	777.3	786.6	792.0							
2001	4.3	67.1	215.0	574.4	648.9	642.9	641.9								

- No adjustment for hard/soft market.
- No judgement used.
- Assume that all future underwriting years will exhibit the same characteristics as past underwriting years.

Reserving in Changing Markets

The “Blind” Actuary – Chain Ladder

Predicted Ultimates (£ 000s)				
Year	Blind Ultimate Claims	Latest Estimated Ultimate	Absolute Difference	% Difference
1993	82	82	0	(0.0%)
1994	73	74	0	0.2%
1995	151	152	0	0.3%
1996	187	190	3	1.8%
1997	453	455	2	0.5%
1998	616	633	17	2.7%
1999	718	755	36	4.8%
2000	805	864	60	6.9%
2001	662	731	68	9.4%

- Massively under reserved in soft years.
- Could the BF method solve this problem…?

Reserving in Changing Markets

The “Blind” Actuary – Bornhuetter-Ferguson Ultimate

Predicted Ultimates (£ 000s)				
Year	Bornhuetter-Ferguson Ultimate	Latest Estimated Ultimate	Absolute Difference	% Difference
1993	82	82	0	(0.0%)
1994	73	74	0	0.2%
1995	151	152	0	0.3%
1996	187	190	3	1.8%
1997	453	455	2	0.5%
1998	616	633	17	2.7%
1999	719	755	36	4.8%
2000	798	864	66	7.6%
2001	653	731	78	10.7%

- Selected ULRs based on 1993-1998 average.
- Still under reserved on soft years.

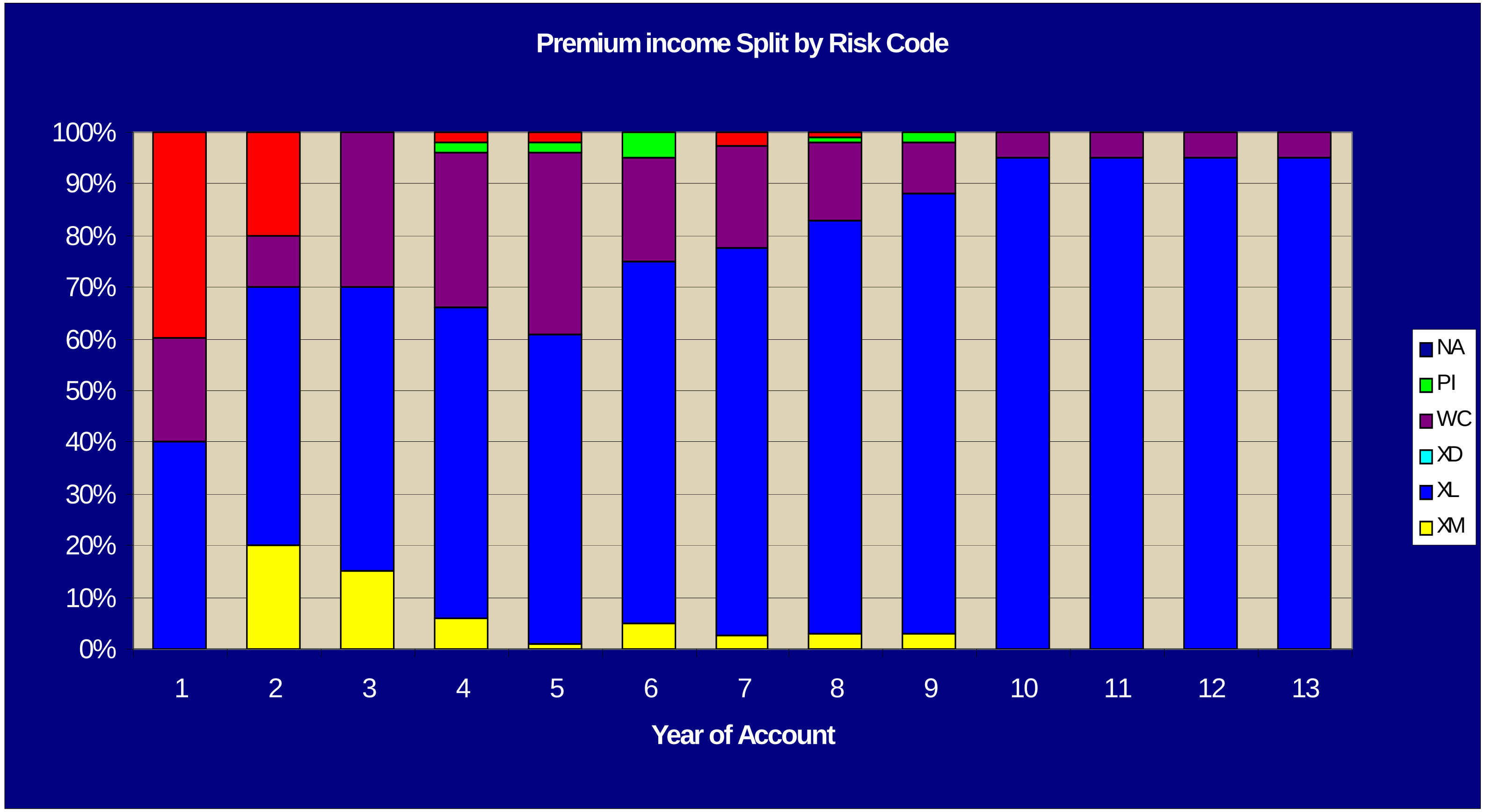
Understanding the business

- **The importance of understanding the business**
  - validate appropriateness of statistical methods
  - gain confidence of underwriting colleagues
  - recommendation of GRIT
  - improve pricing methods

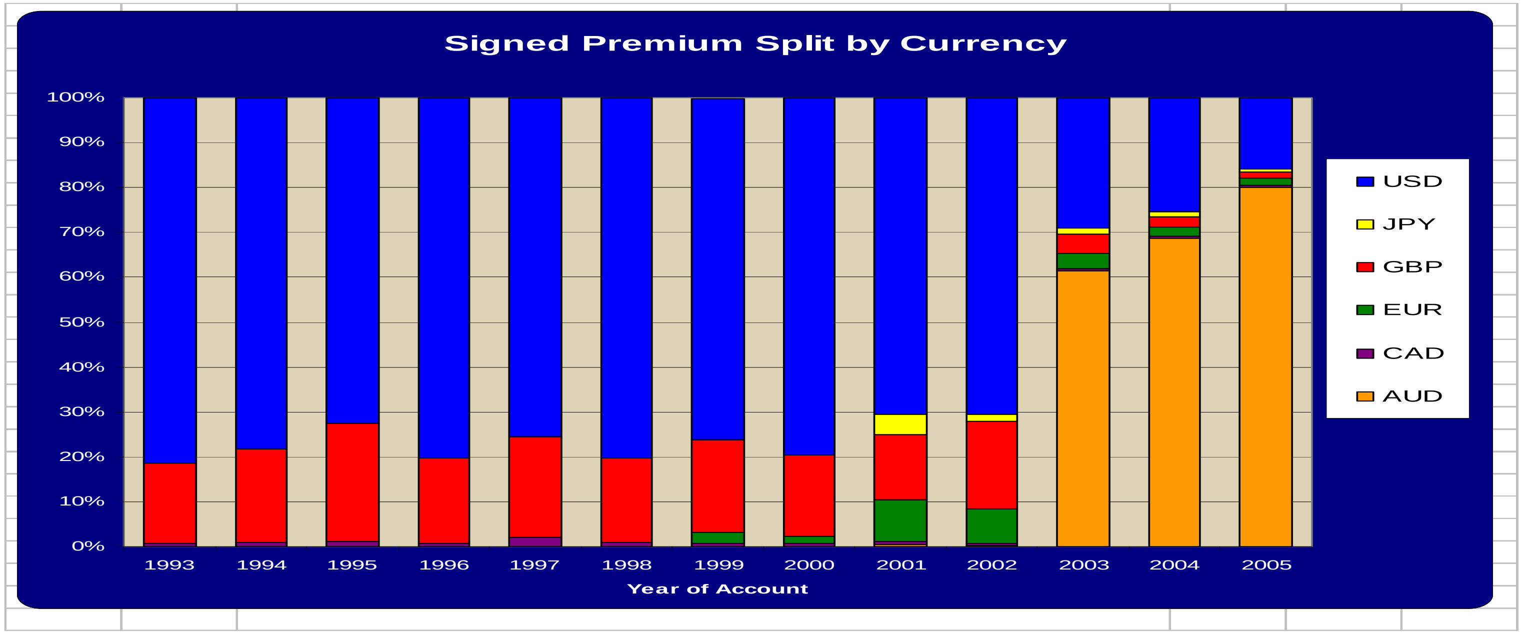
- **Important to understand changes in historical mix of business**
  - RAD vs LOD vs CMD
  - Changes in underlying exposure
  - Inception date profile
  - Geographical mix
  - Concentration of account
  - Currency profile
  - Loss profile
  - Changes in personnel

- **External consultants used to build 'Underwriting Bibles' to**
  - facilitate understanding of business
  - document changes in business mix
  - useful guide for new staff
  - quick reference for internal and external actuarial staff

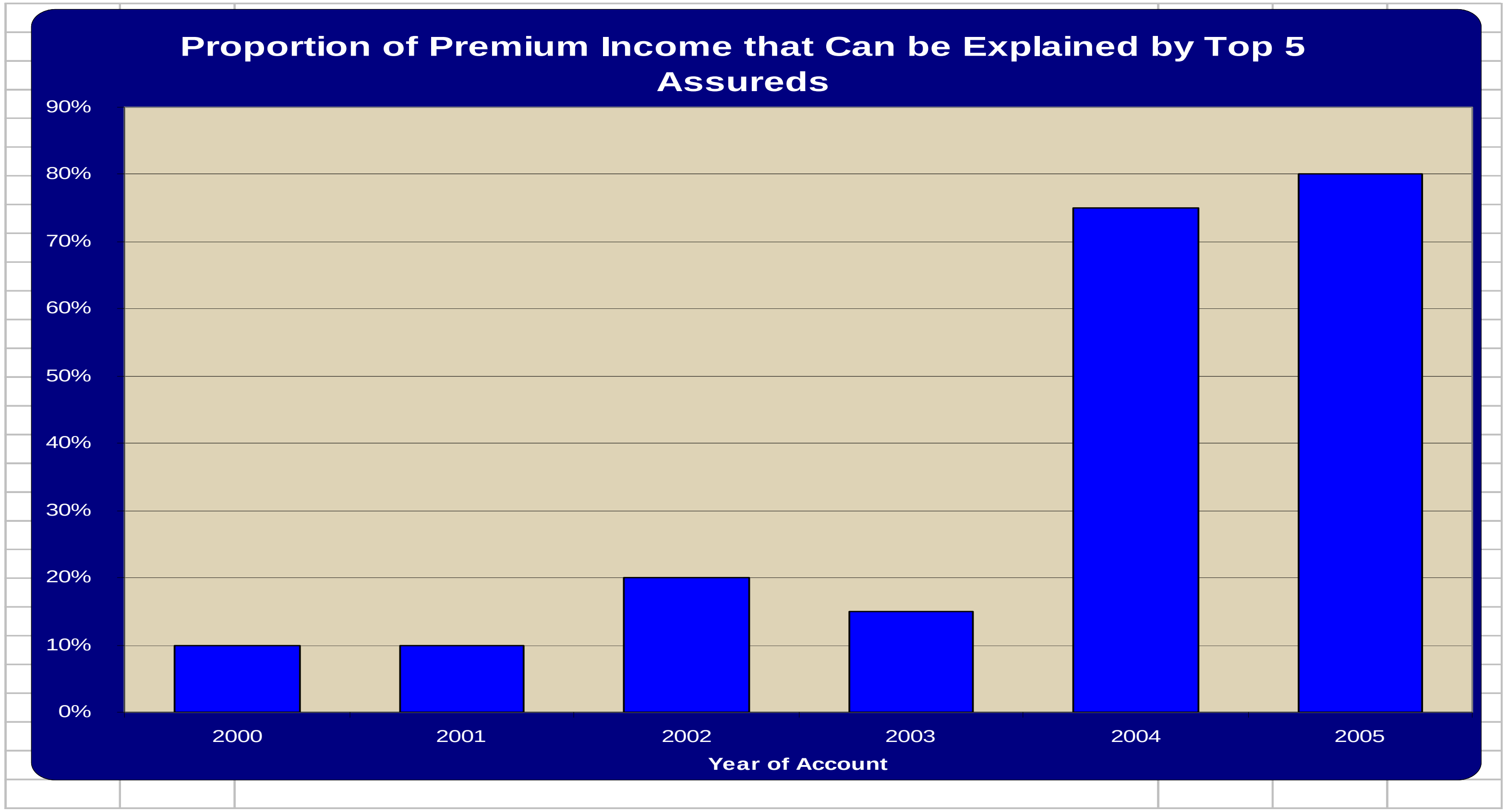
Understanding the business
Risk code mix



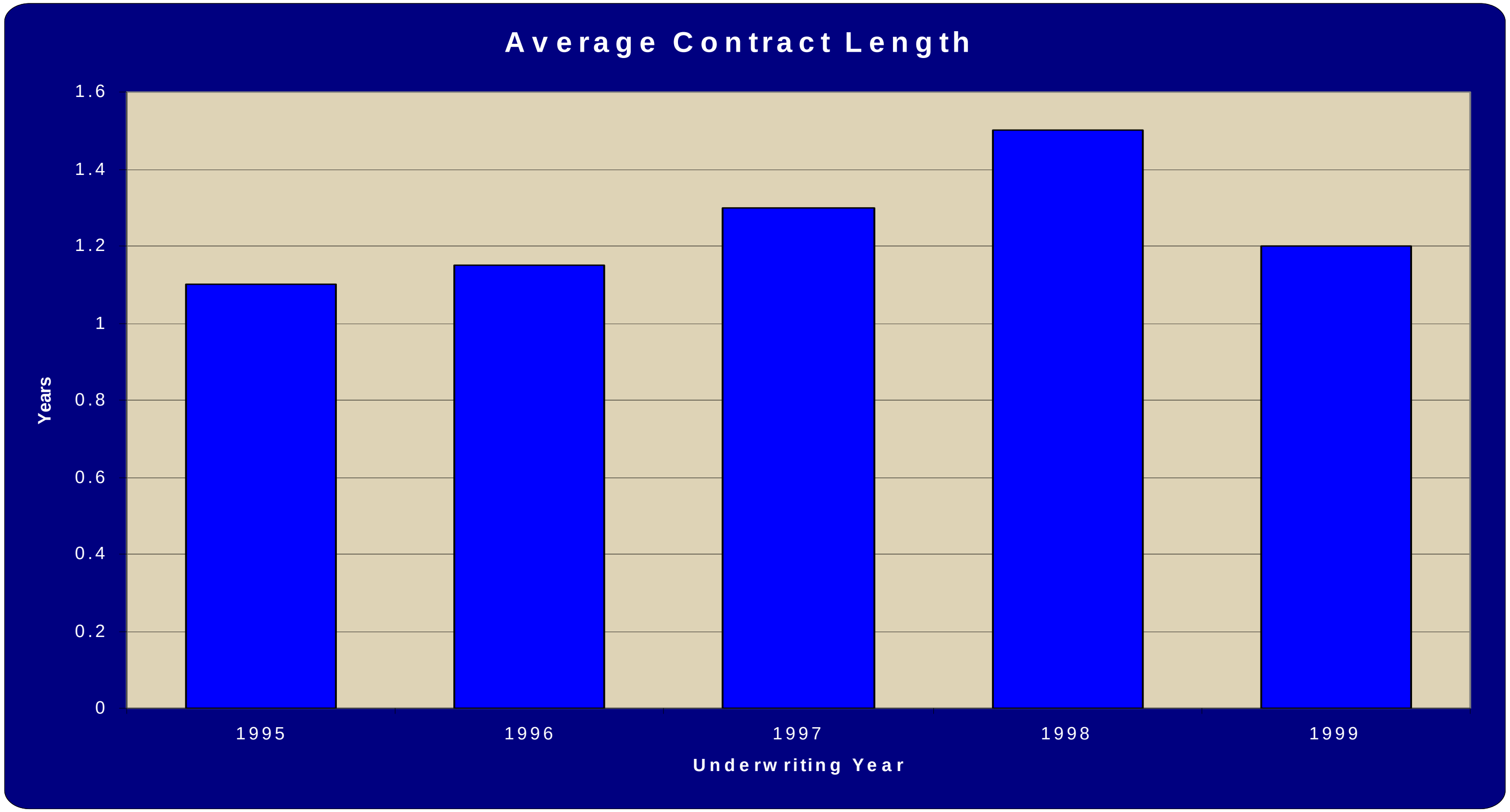
Understanding the business
Currency mix



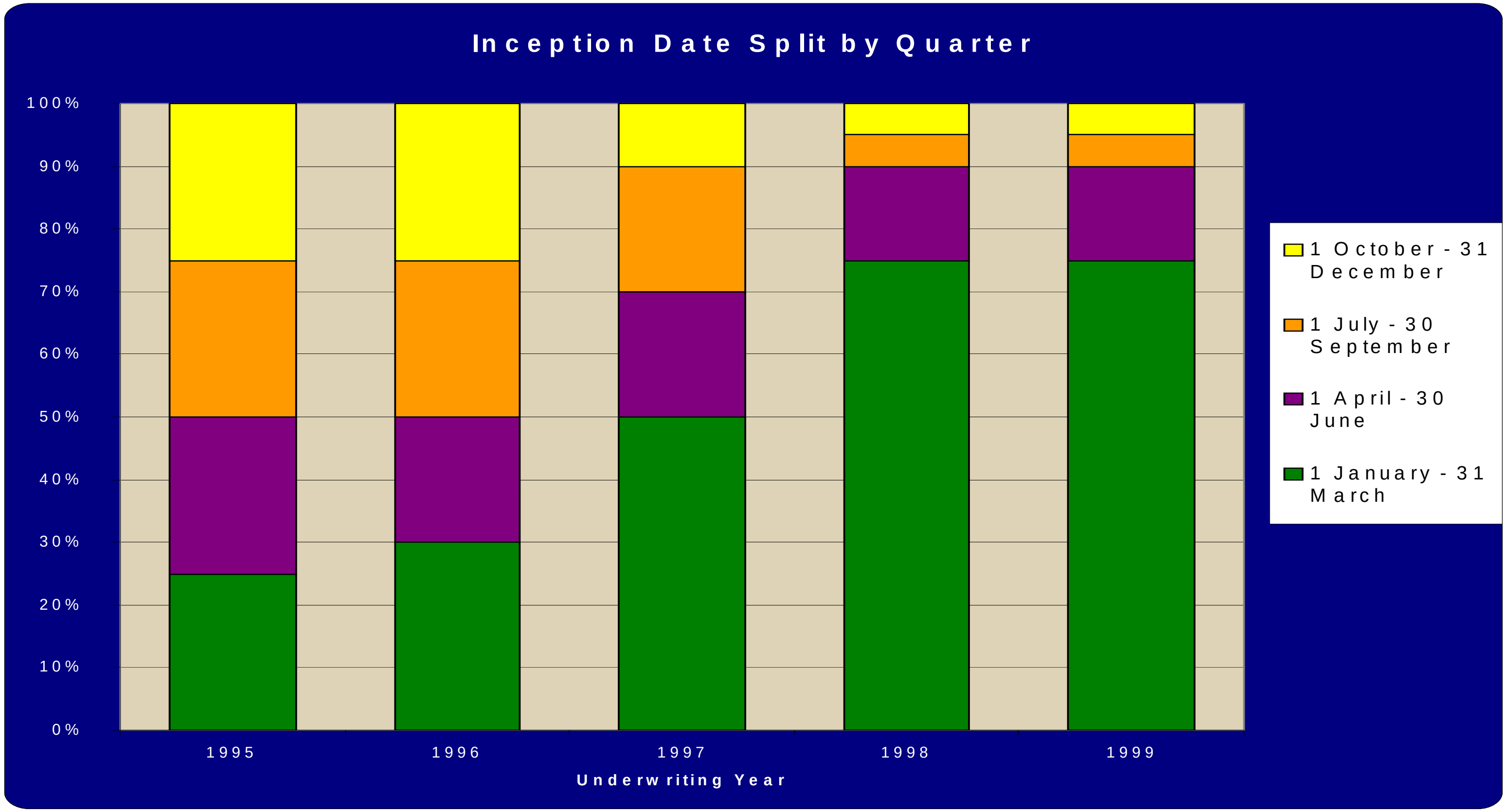
Understanding the business
Concentration of account



Understanding the business
Average Contract Length



Understanding the business
Inception date mix



Method 1:Understanding the business
Description of method

- Insurance companies change various aspects of their business and policy terms and condition in light of a hard or soft market
- These changes are usually subjective
- This Method would involve looking closely at the specifics of the business and making adjustments
- Examples of changes include:
  - Average inception period
  - Average coverage length
  - Risk Code mix
  - Currency mix
  - Concentration of account

Method 1:Understanding the business
Example

- The table below gives an example of the kind of changes that might take place in a company

	Hard			Soft		
Factors	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Average Coverage Length (days)	402	402	402	548	511	529
Average Day of Inception	15-Jan	15-Jan	20-Jan	15-Jun	15-Jul	01-Jul
Average Exposure (days from 1 Jan)	215	215	220	440	451	446
Risk Code Mix	PI (30%), DO (30%), Banks (40%)	PI (28%), DO (28%), Banks (44%)	PI (31%), DO (35%), Banks (36%)	PI (50%), DO (30%), Banks (20%)	PI (52%), DO (28%), Banks (20%)	PI (50%), DO (25%), Banks (25%)
% Claims Made Policies	20%	20%	19%	66%	80%	79%
Concentration of Account	15%	16%	16%	68%	70%	65%

Method 1:Understanding the business
Example – lagging patterns

Adjusting development patterns for changes to average inception

	1:2	2:3	3:4	4:5	5:6	6:7	7:8	8:9	Avg Inc Date
1993	9.32	1.21	1.45	1.13	1.02	1.00	1.00	1.00	15-Jan
1994	3.52	1.63	1.29	1.21	1.04	1.01	1.00	1.00	15-Jan
1995	8.03	1.78	1.41	1.20	1.03	1.01	1.00	1.00	20-Jan
1996	10.32	5.30	1.30	1.36	1.19	1.01	1.00	1.00	15-Jun
1997	12.32	7.20	1.59	1.40	1.07	1.01	1.00	1.00	15-Jul
1998	12.43	6.70	1.77	1.26	1.07	1.01	1.00	1.00	01-Jul

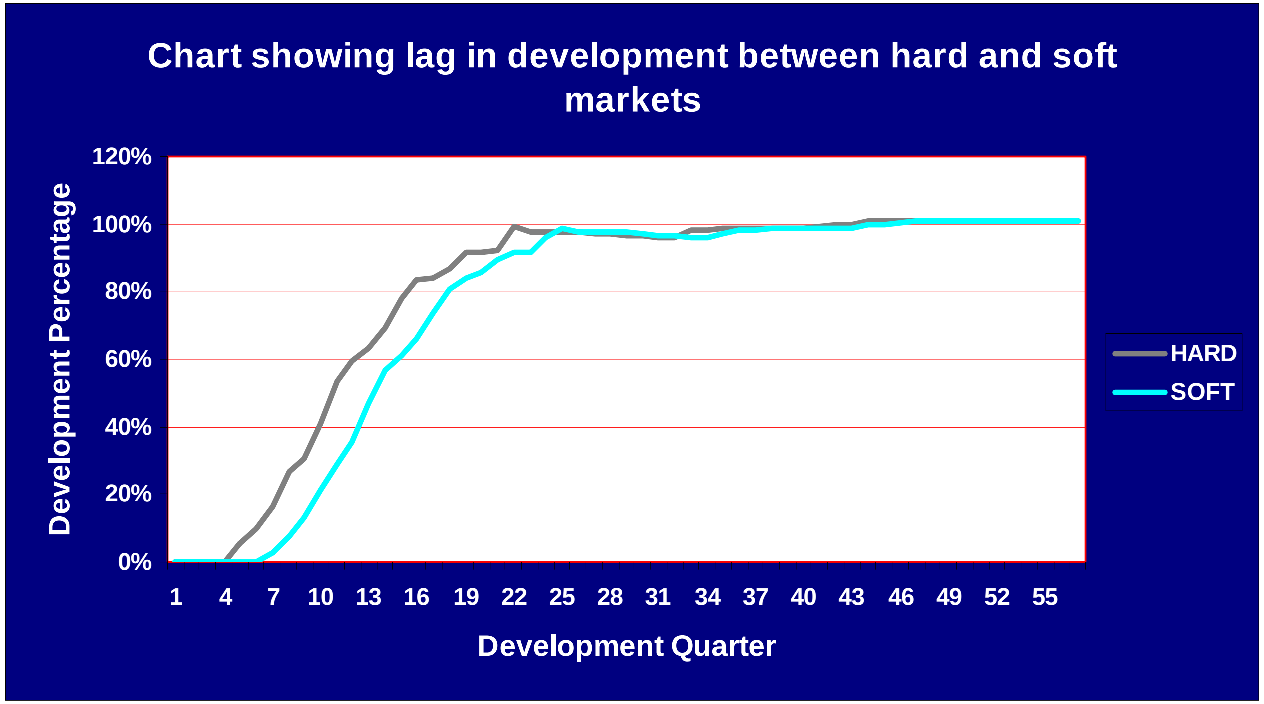
	1:2	2:3	3:4	4:5	5:6	6:7	7:8	8:9
1993	9.32	1.21	1.45	1.13	1.02	1.00	1.00	1.00
1994	3.52	1.63	1.29	1.21	1.04	1.01	1.00	1.00
1995	8.03	1.78	1.41	1.20	1.03	1.01	1.01	1.00
1996	10.32	5.30	1.30	1.36	1.19	1.03	1.01	1.00
1997	12.32	7.20	1.59	1.40	1.18	1.03	1.01	1.00
1998	12.43	6.70	1.77	1.38	1.18	1.03	1.01	1.00

Method 1:Understanding the business
Example – Bornhuetter Ferguson

Year	ULR Based on Inc Link Ratio	Blind "a priori" ULR	Risk Code			Concentration	Revised "a priori" ULR
			PI	DO	Banks		
2002	50%	50%	30%	30%	40%	15%	50%
2003	55%	55%	28%	28%	44%	16%	55%
2004	60%	60%	31%	35%	36%	16%	60%
2005	57%	55%	50%	30%	20%	68%	85%
2006	61%	55%	52%	28%	20%	70%	85%
2007	58%	55%	50%	25%	25%	65%	85%

Method 1:Understanding the business

- There is an obvious lag in Soft development, this is because:
  - Average inception being later in the year
  - Average coverage period being longer



Method 2:Hard and soft patterns

Description of method

Overview of method

Within a class of business, recognising the different cumulative paid or incurred development patterns:

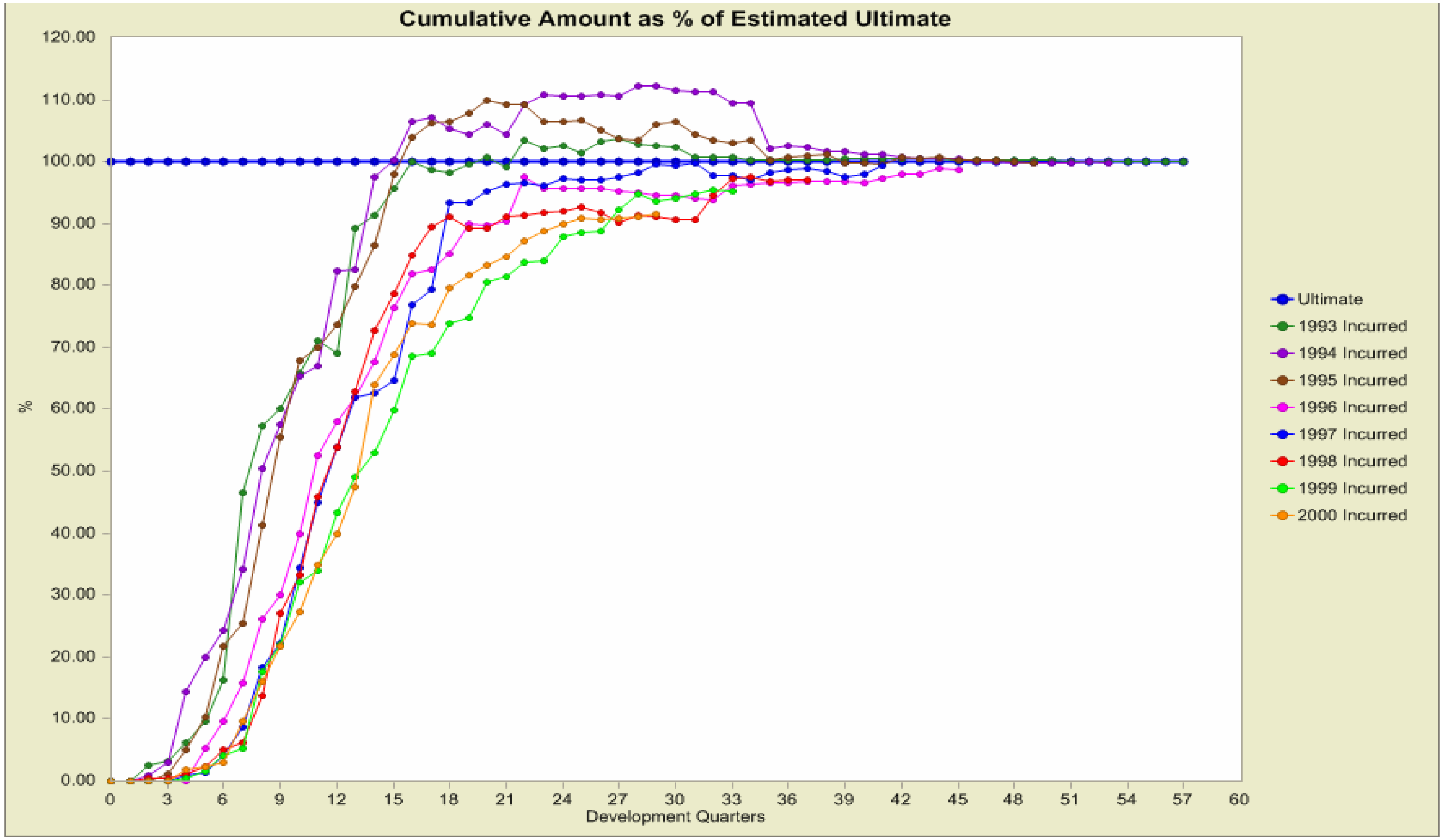
- for hard market years
- for soft market years

Steps to building the model

1. Identify which years are classed as hard and soft
2. Fit a basic chain ladder models separately to both hard and soft years
3. For recent years estimate where you are in the cycle then blend between the two patterns

Method 2:Hard and soft patterns

Development pattern graph – Casualty Class



Method 2:Hard and soft patterns
Method Illustration

Illustration of method

- The cumulative incurred claims triangle below has been split into hard (red) and soft (green) years
- A simple link ratio model can be estimated separately for hard and soft years
- The patterns can be applied to recent underwriting years dependant on whether they have been identified as hard or soft

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1993	5.0	46.7	56.4	81.6	82.2	83.8	83.9	82.2	81.7	82.0	81.9	81.9	81.6	81.6	81.6
1994	10.5	37.1	60.6	78.3	78.0	81.2	82.4	81.7	75.3	74.4	73.8	73.4	73.5	73.4	
1995	7.8	62.7	111.8	157.4	166.6	161.5	156.9	156.8	152.5	151.1	152.5	151.5	151.3		
1996	0.2	49.8	110.6	155.9	170.9	181.9	180.9	178.7	183.7	183.8	188.4	187.9			
1997	3.8	83.4	246.0	350.3	434.2	443.1	446.8	445.2	449.6	446.4	452.6				
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2000	15.5	138.3	345.2	639.0	720.8	777.3	786.6	792.0							
2001	4.3	67.1	215.0	574.4	648.9	642.9	641.9								

Hard Years
Soft Years

Method 2:Hard and soft patterns
Blending patterns

- We have estimated hard and soft market incurred development patterns
- Dependent on where we are in the soft/hard market the patterns can be blended

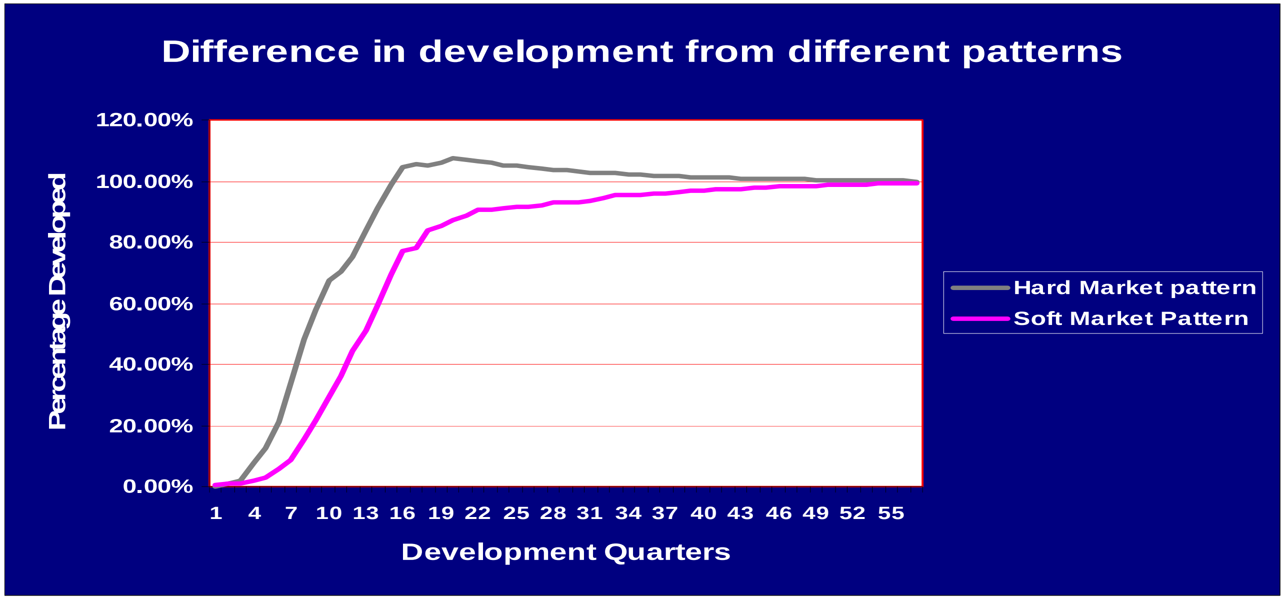
Year	Incurred % developed		
	Hard	Soft	Blended
1	8%	2%	6%
2	48%	15%	40%
3	75%	44%	68%
4	105%	77%	98%
5	108%	87%	103%
6	105%	91%	102%
7	104%	93%	101%
8	103%	94%	101%
9	102%	96%	100%
10	101%	97%	100%

Weighting %	
Hard	75%
Soft	25%

- In this example the 2007 underwriting year would be assumed to be 6% developed at the end of the first development year.
- This is based on a 75% hard market and 25% soft market weighting.

Method 2:Hard and soft patterns
Testing the method

- The chart below shows that the difference in the patterns when using only hard or soft years is quite substantial.



Method 2:Hard and soft patterns

Advantages

- Easy to use/ understand
- Pragmatic way of allowing for the reserve cycle
- No need for underlying business diagnostics
- Chain ladder method is widely used and understood

Disadvantages

- Not all hard/soft markets are the same
  - Pure rate change from hard to soft
  - Terms and conditions change from hard to soft
  - Contract certainty
  - Poor underwriting
- Position in the underwriting/reserving cycle needs to be estimated

Method 3:Benchmarking

- **Soft market can lead to:**
  - Businesses writing new classes of business
  - Underwriters accepting non standard risks to achieve income targets
  - Underwriters accepting different mixes of business within each reserving class

- **Benchmarking**
  - Can provide an additional estimate for more recent years
  - Can act as a reasonableness check

- **Key is to:**
  - understand the underlying business being benchmarked
  - understand the business underlying the benchmark

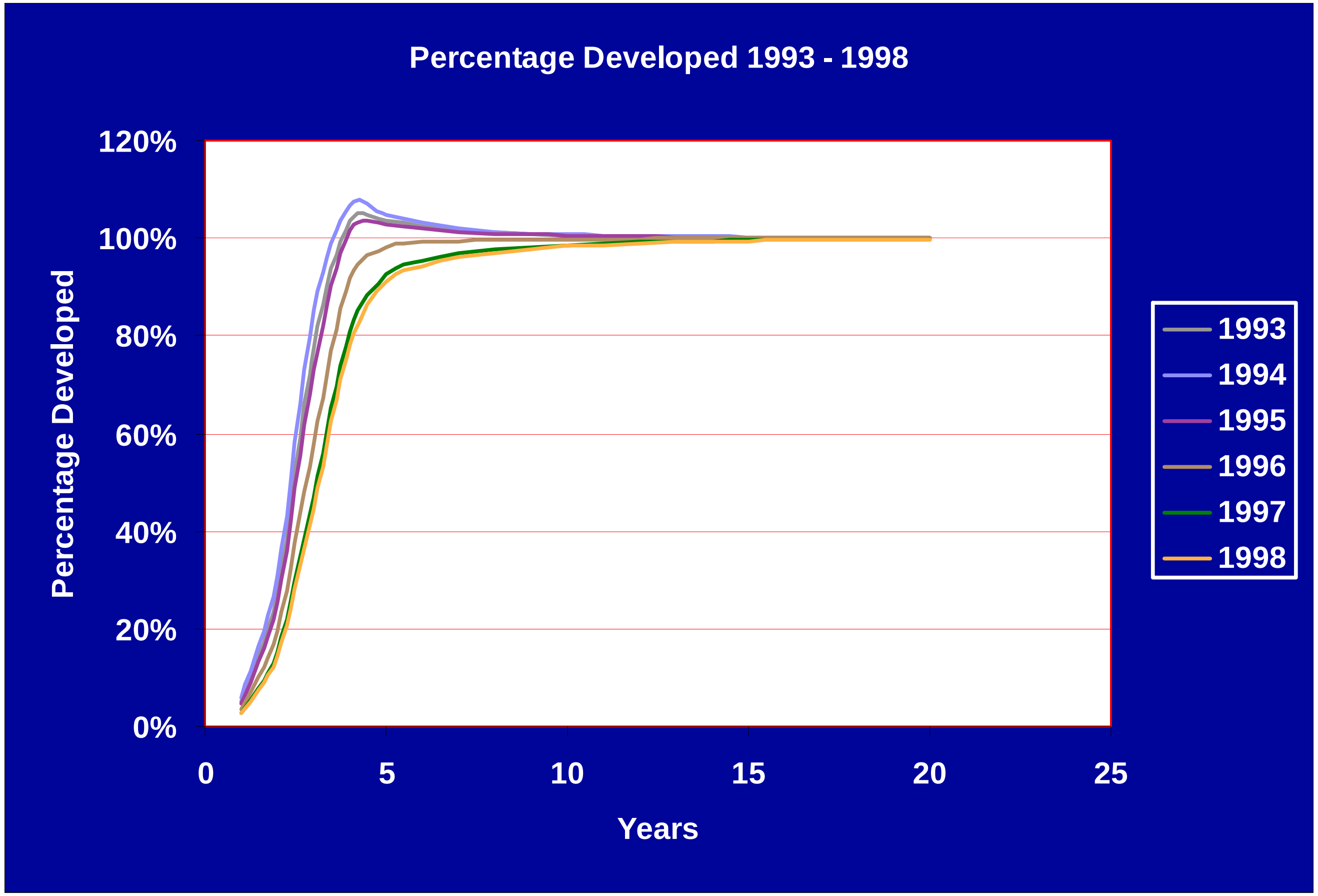
- **Sources**
  - Association of British Insurers
  - Rating Agencies
  - Lloyd's
  - External consultants

Method 4: More complex methods (1)
Curve Fitting

- **First introduced as an alternative to chain ladder back in 1979:**
  - Method proposed by David H Craighead
  - No allowance for reserving cycle
  - Single curve fitted to all years
  - Based on cumulative development data
  - Used a Weibull distribution

- **Extension of curve fitting method:**
  - Define parameters of curve in relation to a premium rating index
  - Extend to create a whole continuum of fitted curves
  - Need to make use of a wider family of curves

Method 4: More Complex methods (2)
Curve Fitting



Method 4: More complex methods (3)
Curve Fitting

Advantages of method

- Allows for reserving and underwriting cycles
  - Allows for additional data as compared to chain ladder method, e.g. premium rates
- Provides a set of additional estimates to consider
- Fully automated
- Subjectivity removed from initial curve fit

Limitations to method

- Can be complicated
- Does not take account of underlying business characteristics
- May produce spurious results – need to overlay judgement
- Future and past reserving cycles may exhibit different characteristics
- Reliance on accuracy of premium rates
- Lack of historical data may cause a problem

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Discussion

Discussion

- **Reserve Cycles**
  - How are people allowing for the impact of the “reserve cycle” in their reserving exercises?
  - Where do people think we are in the underwriting cycle, do we feel terms and conditions / coverage are widening?

- **Premium Rate Indices**
  - Where do we think the market is in terms of having robust rate recording?
  - How are people factoring in changes in Terms and Conditions into their indices?

- **Understanding the Business**
  - Are people considering “Underwriting Bibles” as part of their reserving analyses?
  - What do we think are the most useful bits of additional information to support the reserving analysis?

- **Reserving Methods**
  - What methods are people using themselves to improve reserving in the soft market?