



Basic Track I

2013 CLRS

September 15-17, 2013

Boston, Massachusetts

Introduction to Loss Reserving

- CAS Statement of Principles
 - Definitions
 - Principles
 - Considerations
- Basic Reserving Techniques
 - Paid Loss Development Method (PLDM)
 - Incurred Loss Development Method (ILDm)

Definitions

- What is a Loss Reserve?

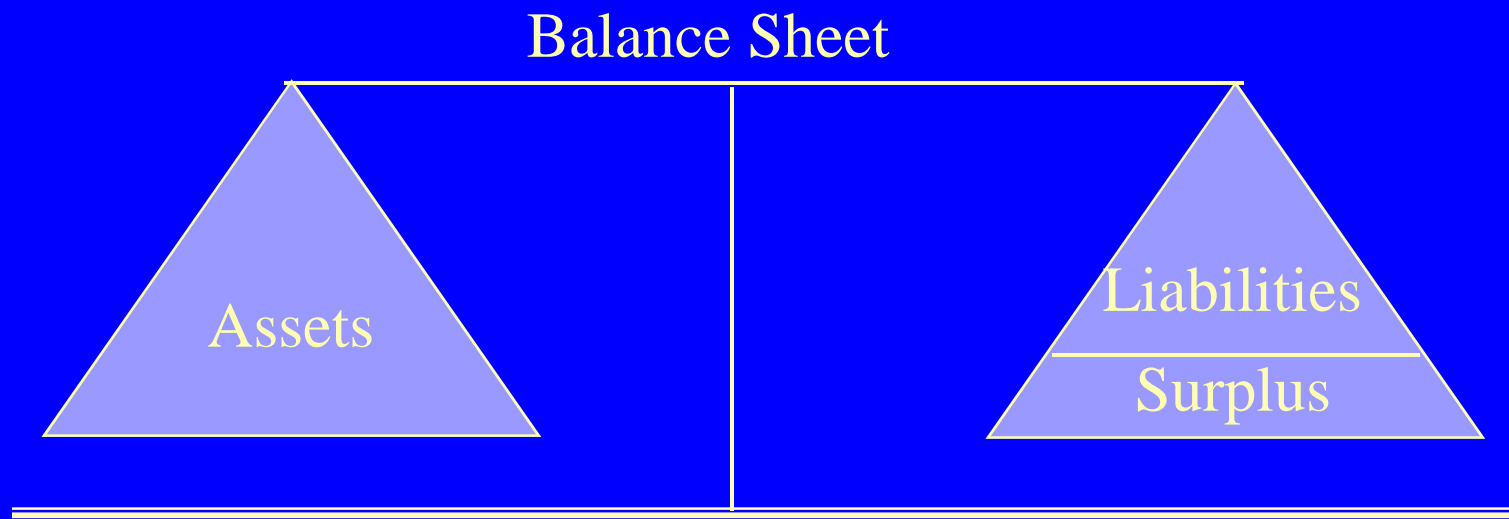
Unpaid amount required to settle all claims, whether reported or not, for which liability exists on a particular accounting date.

- Why are Loss Reserves Important?

Needed for accurate evaluation of financial condition & underwriting income

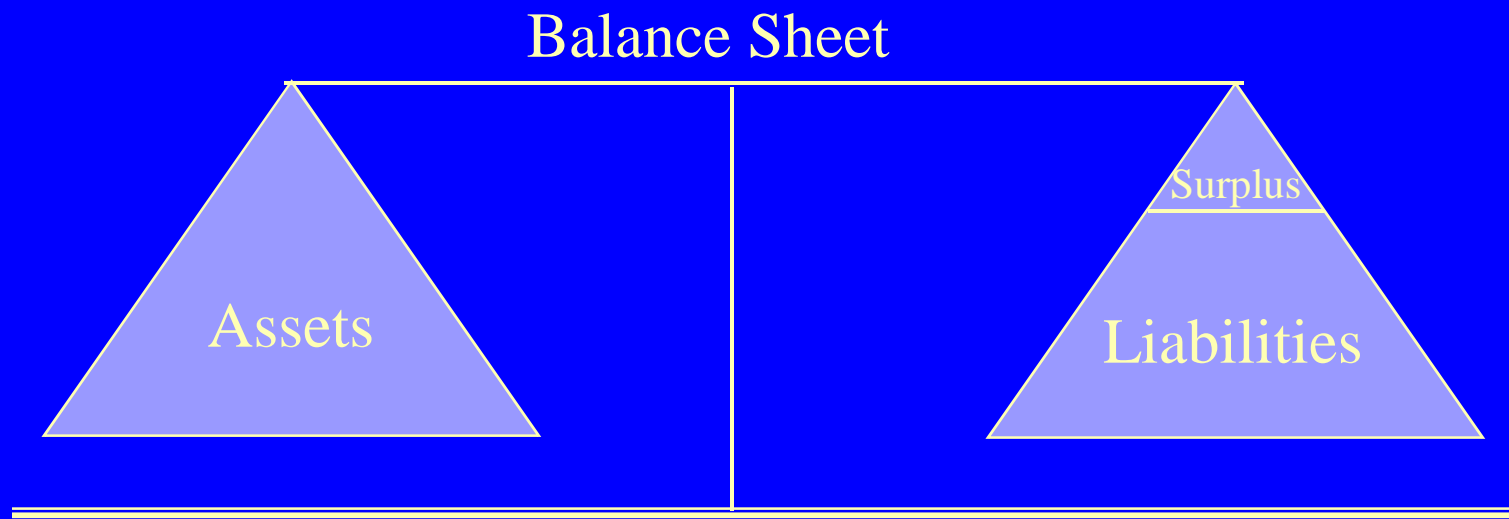
Definitions

- Accounting Aspects of Loss Reserves



Definitions

- Accounting Aspects of Loss Reserves



Definitions

- **Carried Loss Reserve**

The amount shown in a published statement or an internal statement of financial condition.

- **Indicated Loss Reserve**

The amount that results from the application of a particular loss reserving method.

- **Reserve Margin/Deficit**

The difference between an indicated loss reserve and a carried loss reserve.

Definitions

- Elements of a Loss Reserve
 - Incurred But Not Reported (“Pure” IBNR)
 - Claims in Transit (Reported Not Reserved Yet)
 - Formula Reserve/Case Reserve
 - Development on Known Claims
 - Reopened Claims Reserve

Life Cycle of a Claim Reserve



Definitions

■ Case Reserves

- For specific claim reported but not yet settled
- Assigned a value by a claims adjuster or by formula based on information known for that claim

■ Bulk + IBNR Reserves

- Reserves for claims not yet reported (“pure” IBNR)
- Claims in transit
- Development on known claims
- Reserves for reopened claims

Definitions

- Loss Adjustment Expenses (LAE) are costs to investigate, defend and effect the settlement of all claims, whether reported or not. It is the sum of:
 - Defense & Cost Containment (DCC) Expense
 - Adjusting and Other (AO) Expense

Definitions

- Defense & Cost Containment (DCC) Expense
 - Includes all defense, litigation, and medical cost containment related expenses, whether internal or external to a company.
 - In general, includes costs associated with controlling the severity of cases.

Definitions

- Adjusting & Other (AO) Expense
 - Includes all other claims adjusting expenses, whether internal or external to a company.
 - In general, includes costs associated with recording and adjusting cases.

Other Terminology in Use

- Carried Loss Reserve = Unpaid Losses, Outstanding Reserve, Total Reserve
- Indicated Loss Reserve = Unpaid Claim Estimate, Best Estimate, Point Estimate, Actuarial Central Estimate
- Reserve Margin/Deficit = Redundancy/Deficiency
- Incurred Losses = Ultimate Losses (incl. IBNR) or sometimes Reported Losses (excl. IBNR)
- Losses may mean Losses and LAE (e.g. Casualty Loss Reserve Seminar)

Principles

- Actuarially sound reserves
 - based on *estimates*
 - derived from reasonable *assumptions*
 - using appropriate *methods*
- Inherent Uncertainty
 - a range of reserves can be actuarially sound
 - true value known only after all claims settled

Principles

- Most appropriate indicated reserve depends on:
 - relative likelihood of estimates in range
 - financial reporting context

Considerations: Data Organization

■ Accident Date

- The date on which the loss occurred.



■ Report Date



- The date on which the loss is first reported to the insurer.

■ Recorded Date

- The date on which the loss is first entered into the statistical records of the insurer.



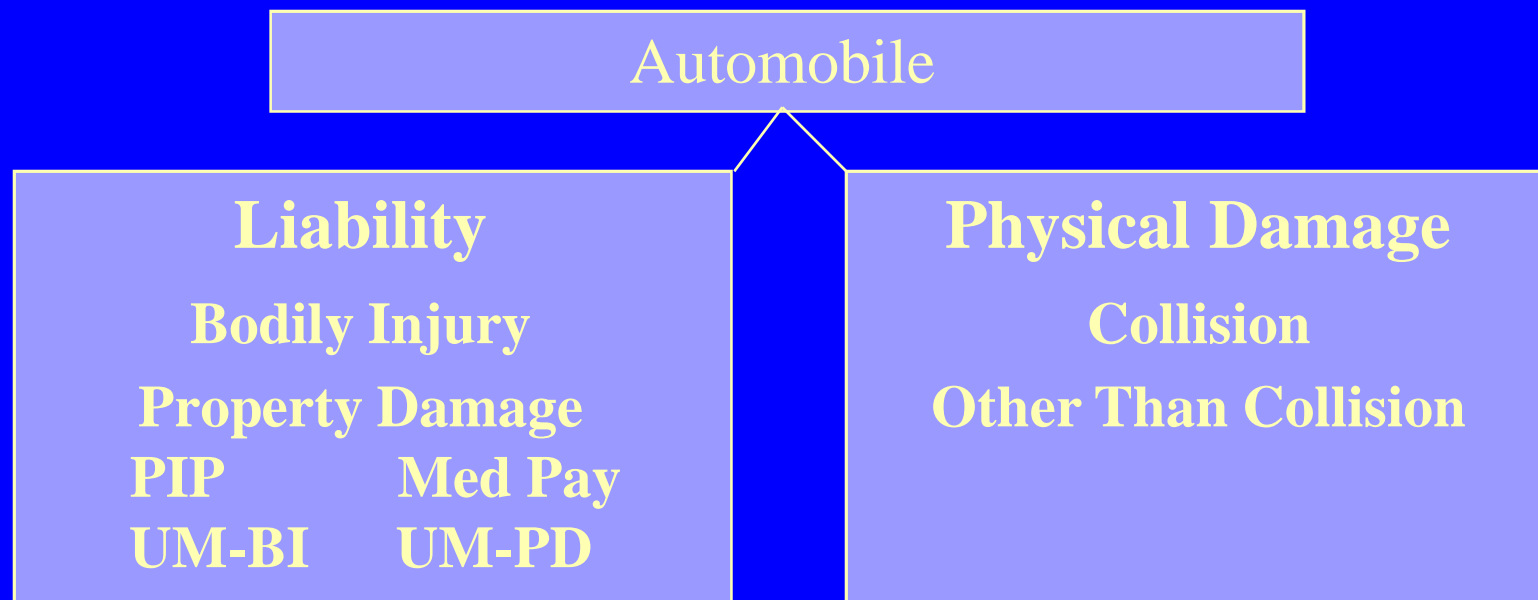
Considerations: Data Organization

- Accounting Date
 - Defines a group of claims for which liability may exist.
 - All claims incurred on or before the accounting date.
- Valuation Date
 - Defines the time period for which transactions are included when evaluating the existing liability.



Considerations: Homogeneity

Accuracy is often improved by subdividing claims into groups exhibiting similar claim experience or settlement patterns.



Considerations: Credibility

- A measure of the predictive value that is attached to a body of data.
- A group of claims should be large enough to be statistically reliable.
 - May be a point at which subdividing claims will form groups that are too small to provide credible development patterns.
- Use of supplementary data sources
 - Examples include industry data, countrywide data.

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Techniques: Definitions

- Loss Development

The financial activity on claims from the time they occur to the time they are eventually settled and paid.

- Triangles

Compiled to measure the changes in cumulative claim activity over time in order to estimate patterns of future activity.

- Loss Development Factor

The ratio of losses at successive evaluations for a defined group of claims (e.g. accident year).

Basic Reserving Techniques: Compilation of Paid Loss Triangle

- The losses are sorted by the year in which the accident occurred.
- The payments from inception are summed at the end of each year.
- Losses paid to date are shown on the most recent column (accounting) or diagonal (actuarial).
- Actuarial triangle shows that more recent accident years are at earlier stages of claim life cycle.
- Future development might be similar to historical.

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Techniques:

Compilation of Paid Loss Triangle Accounting Format

Goal: Calculate the total paid-to-date

Accident Year	Cumulative Paid Losses (\$000 Omitted)					
	Cumulative Accident Year Paid as of Year End					
	2007	2008	2009	2010	2011	2012
2007	3,780	6,671	8,156	9,205	9,990	10,508
2008		4,212	7,541	9,351	10,639	11,536
2009			4,901	8,864	10,987	12,458
2010				5,708	10,268	12,699
2011					6,093	11,172
2012						6,962

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Techniques:

Compilation of Paid Loss Triangle Actuarial Format

Goal: Estimate the total ultimately paid

Accident Year	Cumulative Paid Losses (\$000 Omitted)						Final Total Cost
	Development Stage in Months						
	12	24	36	48	60	72	
2007	3,780	6,671	8,156	9,205	9,990	10,508	???
2008	4,212	7,541	9,351	10,639	11,536		???
2009	4,901	8,864	10,987	12,458			???
2010	5,708	10,268	12,699				???
2011	6,093	11,172					???
2012	6,962						???

Basic Reserving Techniques: Paid Loss Development Factors

Accident Year	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
2007	1.765	1.223	1.129	1.085	1.052	???
2008	1.790	1.240	1.138	1.084		
2009	1.809	1.240	1.134			
2010	1.799	1.237				
2011	1.834					
2012						

Sample Calculation for Accident Year 2008:

12-to-24 Months	1.790	=	7,541 / 4,212
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From the end of the accident year (at 12 months) to the end of the following year (at 24 months), paid losses for 2008 grew 79%. During the next year (from 24 to 36 months), paid losses experienced an additional 24% growth (or development) and so forth.

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Techniques:

Compilation of Paid Loss Triangle

Accident Year	Cumulative Paid Losses (\$000 Omitted)		
	Development Stage in Months		
	12	24	36
2007	3,780	6,671	8,156
2008	4,212	7,541	

Accident Year	Cumulative Paid Losses (\$000 Omitted)	
	Evaluation Interval In Months	
	12-24	24-36
2007	+6,671 / 3,780	+8,156 / 6,671
2008	+7,541 / 4,212	

Basic Reserving Techniques: Compilation of Paid Loss Triangle

Accident Year	Cumulative Paid Losses (\$000 Omitted)	
	Evaluation Interval In Months	
	12-24	24 - 36
2007	+6,671 / 3,780	+8,156 / 6,671
2008	+7,541 / 4,212	

Accident Year	Evaluation Interval in Months	
	12-24	24-36
2007	1.765	1.223
2008	1.790	

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Techniques:

Paid Loss Development Factors

Loss Development Factors (LDFs) are also known as:

- Age-to-Age Factors
- Link Ratios

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Techniques:

Paid Loss Development Factors

Accident Year	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
2007	1.765	1.223	1.129	1.085	1.052	
2008	1.790	1.240	1.138	1.084		
2009	1.809	1.240	1.134			
2010	1.799	1.237				
2011	1.834					
2012						
Average - All Years	1.799	1.235	1.134	1.085	1.052	
Average - Latest 3 Years	1.814	1.239	1.134	XXX	XXX	
Average - Excl Hi & Lo	1.799	1.239	1.134	XXX	XXX	
Wt Average - All Years	1.803	1.235	1.134	1.085	1.052	
Selected LDF	1.800	1.235	1.134	1.085	1.052	1.070

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Techniques:

Application of Paid LDM

		Evaluation Interval in Months					
		12-24	24-36	36-48	48-60	60-72	72 to Ultimate
LDFs		1.800	1.235	1.134	1.085	1.052	1.070
Accident Year	Cumulative Paid Losses (\$000 Omitted)						Final Total Cost
	Development Stage in Months						
	12	24	36	48	60	72	
2007	3,780	6,671	8,156	9,205	9,990	10,508	11,244
2008	4,212	7,541	9,351	10,639	11,536	12,136	12,985
2009	4,901	8,364	10,987	12,458	13,517	14,220	15,215
2010	5,708	10,258	12,699	14,401	15,625	16,437	17,588
2011	6,053	11,172	13,797	15,646	16,976	17,859	19,109
2012	6,962	12,532	15,477	17,550	19,042	20,032	21,435

Sample Calculations for Accident Year 2012:

At 24 Months: $12,532 = 6,962 \times 1.800$

At 36 Months:
 $13,797 = 11,172 \times 1.235$
 $15,477 = 6,962 \times 1.800 \times 1.235$

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Techniques:

Paid LDM Projections & Reserves

Loss Reserve Estimate @ 12/31/12 = \$32.241 million

Accident Year	Actual Paid Losses 12/31/12	Selected LDFs	Cumulative Development Factors to Ultimate	Estimated Ultimate Losses [(2) x (4)]	Actual Paid Losses 12/31/12	Estimated Loss Reserves [(5) - (6)]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	10,508	1.070	1.070	11,244	10,508	736
2008	11,536	1.052	1.126	12,985	11,536	1,449
2009	12,458	1.085	1.221	15,215	12,458	2,757
2010	12,699	1.134	1.385	17,588	12,699	4,889
2011	11,172	1.235	1.710	19,109	11,172	7,937
2012	6,962	1.800	3.079	21,435	6,962	14,473
Total	65,335			97,576	65,335	32,241

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Techniques:

Issues to Consider for Paid LDM

Issues to Consider	Examples
<p>Have there been any changes which might make the older years irrelevant?</p>	<p>There are more motorcycle losses in the oldest year; Typical P&C no longer insures motorcycles.</p>
<p>Are the more recent years better predictors of the future?</p>	<p>Typical P&C has begun writing more business in state X.</p>
<p>Are there outlier points that need to be ignored or adjusted?</p>	<p>In one year, there were bad ice storms at the end of December. Late reporting caused unusually high development in the next year.</p>

Basic Reserving Techniques: Incurred Loss Triangle

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Accident Year	Case Reserves (\$000 Omitted) Development Stage in Months					
	12	24	36	48	60	72
2007	5,557	4,176	2,936	1,987	1,245	742
2008	6,328	4,664	3,200	2,051	1,189	
2009	6,974	4,968	3,251	1,955		
2010	7,635	5,274	3,367			
2011	8,376	5,604				
2012	9,599					

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Accident Year	Cumulative Paid Losses (\$000 Omitted) Development Stage in Months					
	12	24	36	48	60	72
2007	3,780	6,671	8,156	9,205	9,990	10,508
2008	4,212	7,541	9,351	10,639	11,536	
2009	4,901	8,864	10,987	12,458		
2010	5,708	10,268	12,699			
2011	6,093	11,172				
2012	6,962					

Basic Reserving Techniques: Incurred Loss Triangle

Accident Year	Cumulative Case Reported Losses (\$000 Omitted)						Final Total Cost
	Development Stage in Months						
	12	24	36	48	60	72	
2007	9,337	10,847	11,092	11,192	11,235	11,250	???
2008	10,540	12,205	12,551	12,690	12,725		???
2009	11,875	13,832	14,238	14,413			???
2010	13,343	15,542	16,066				???
2011	14,469	16,776					???
2012	16,561						???

Basic Reserving Techniques: Selected Incurred LDFs

Accident Year	Evaluation Interval in Months					
	12-24	24-36	36-48	48-60	60-72	72 to Ultimate
2007	1.162	1.023	1.009	1.004	1.001	???
2008	1.158	1.028	1.011	1.003		
2009	1.165	1.029	1.012			
2010	1.165	1.034				
2011	1.159					
2012						
Average - All Years	1.162	1.029	1.011	1.004	1.001	
Average - Latest 3 Years	1.163	1.030	1.011	XXX	XXX	
Average - Excl Hi & Lo	1.162	1.029	1.011	XXX	XXX	
Wt Average - All Years	1.162	1.029	1.011	1.003	1.001	
Selected LDF	1.162	1.030	1.011	1.003	1.001	1.000
Cumulative LDF	1.215	1.045	1.015	1.004	1.001	1.000

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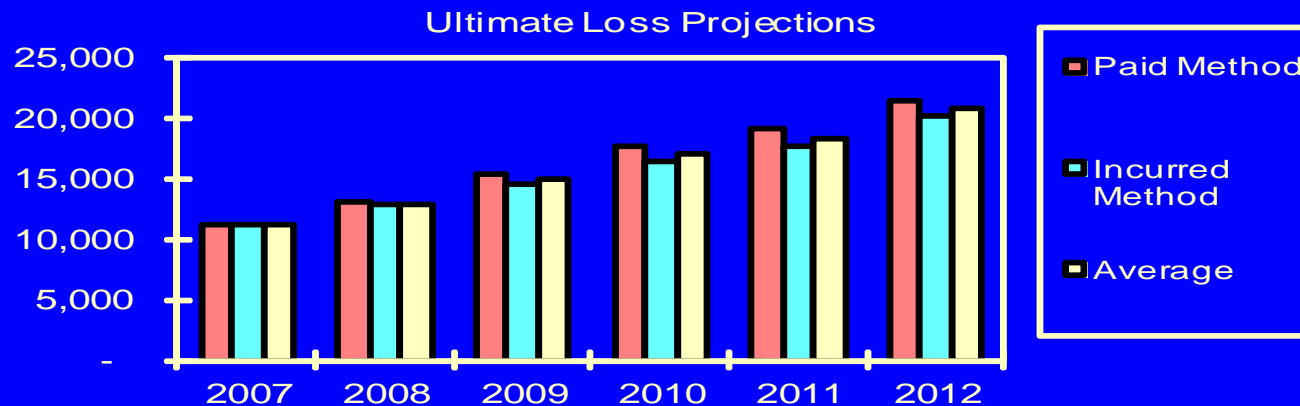
Techniques:

Incurred LDM Projections & Reserves

Accident Year	Actual Reported Losses 12/31/12	Development Factors to Ultimate	Estimated Ultimate Losses [(2) x (3)]	Actual Paid Losses 12/31/12	Estimated Loss Reserves {(4) - (5)}
(1)	(2)	(3)	(4)	(5)	(6)
2007	11,250	1.000	11,250	10,508	742
2008	12,725	1.001	12,738	11,536	1,202
2009	14,413	1.004	14,471	12,458	2,013
2010	16,066	1.015	16,308	12,699	3,609
2011	16,776	1.045	17,539	11,172	6,367
2012	16,561	1.215	20,119	6,962	13,157
Total	87,791		92,425	65,335	27,090

Comparison of LDM Projections

Accident Year	Estimated Ultimate Losses Based on:		
	Paid LDM	Incurred LDM	Average = Selected
	Paid Method	Incurred Method	Average
2007	11,244	11,250	11,247
2008	12,985	12,738	12,862
2009	15,215	14,471	14,843
2010	17,588	16,308	16,948
2011	19,109	17,539	18,324
2012	21,435	20,119	20,777
Total	97,576	92,425	95,001



Comparison of Loss Development Methods

Underlying Assumptions

- PLDM: No changes in the payment pattern
- ILDM: No changes in case reserve adequacy

Pro

PLDM: "Hard" data; no estimates involved

ILDM: Uses all available information

Con

PLDM: May generate large, volatile loss development factors & take longer to develop to ultimate

ILDM: Uses case reserves, which are estimates, to develop estimates of ultimate losses

Key Assumptions & Potential Problems

Assumptions	Potential Problems
Claims settlement patterns unchanging	Increasing delays in claim closing rates
Case reserving practices & philosophies unchanging	Conscious effort to improve case reserve adequacy; Introduction of new case reserving procedures
No claim processing changes	Change in data processing; Revised claim payment recording procedures
Policy limits have no impact on loss development	Increasing frequency of full policy limits claims; Changing policy limits

Key Assumptions & Potential Problems

Assumptions	Potential Problems
<p>Loss development unaffected by changing loss cost trends</p> <p>No change in mix of business</p> <p>No cyclical loss development</p>	<p>Surges in inflation; Increased litigation; Diminished policy defenses</p> <p>Changes in reinsurance coverages; Increased long-tail exposures; Introduction of new or revised coverages</p> <p>Underwriting cycles impact claims settlement or reserving practices</p>

Key Assumptions & Potential Problems

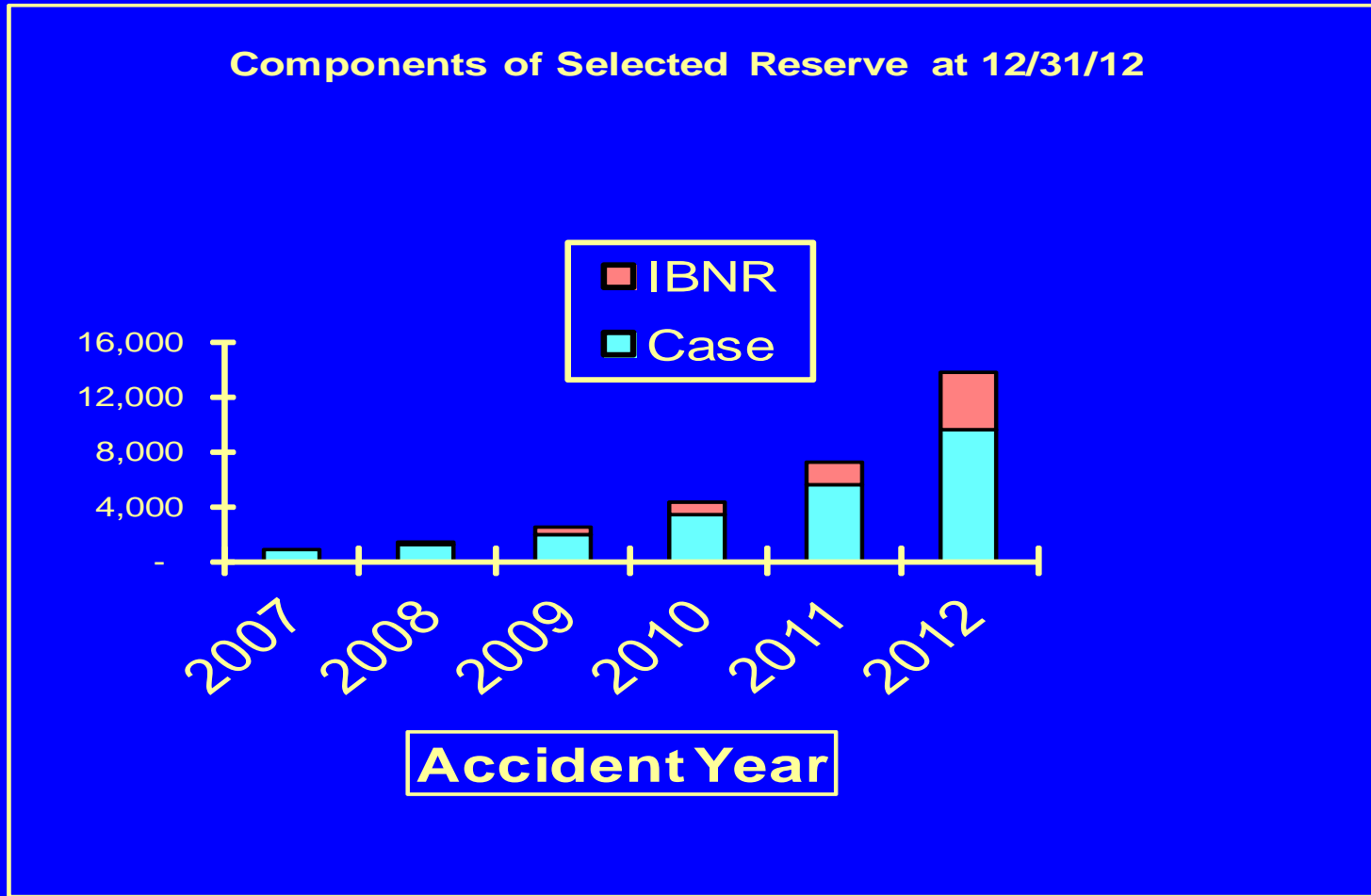
Assumptions	Potential Problems
No data anomalies	Catastrophic or unusual losses reflected in loss experience; Unusual claim settlement/reporting delays

Comparison of Estimated Reserves

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Accident Year	Estimated Loss Reserves Based on:		
	Paid LDM	Incurred LDM	Average = Selected
	Paid Method	Incurred Method	Average
2007	736	742	739
2008	1,449	1,202	1,326
2009	2,757	2,013	2,385
2010	4,889	3,609	4,249
2011	7,937	6,367	7,152
2012	14,473	13,157	13,815
Total	32,241	27,090	29,666

Comparison of Estimated Reserves



Comparison of Estimated Reserves

- Which estimate is right?
- Which estimate is best?
- How will you know?
- When will you know?

Session I Review

- CAS Statement of Principles
 - Definitions
 - Principles
 - Considerations

- Basic Reserving Techniques
 - Paid Loss Development Method (PLDM)
 - Incurred Loss Development Method (ILDMD)

Looking Ahead

- Evaluating for Reasonability
- Factors Influencing Sensitivity of Estimates
- Other Basic Reserving Techniques
- Loss Adjustment Expense Reserves
- Schedule P
- Examples - You set the reserve!



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