

LIMA Programme

Basic Reinsurance Pricing -
Basic Loss Element

12 September 2023
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NOT IF, BUT HOW



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and Development

04

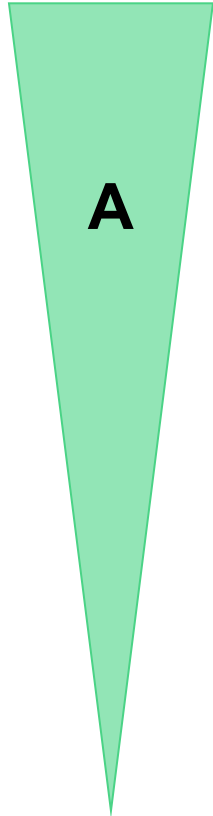
Basic Loss Exercise



Image: Munich Re

01

Basic Loss: Pricing of Basic Losses



Analysis of the total loss statistics going back up to at least 5 years:

- Less the large losses in each year
- Less catastrophe losses in each year
- Projection of the values to ultimate

= basic loss ratio of the past at today's values

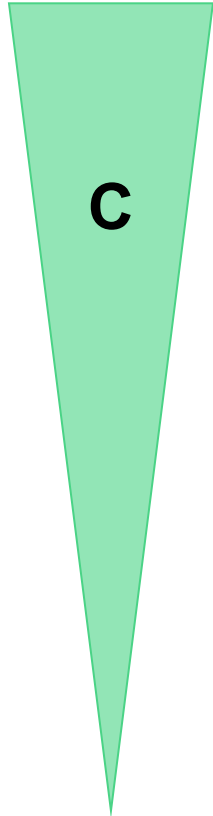


B

Assessment of changes affecting the loss ratio for the treaty period to be quoted:

- change of underwriting policy affecting the reinsured portfolio
- changes of the tariff (rates to be applied to the reinsured portfolio)
- Changes of the reinsurance structure (retention, treaty limits, coverage)

= basic loss ratio of the past at today's values



Other considerations:

- Portfolio composition / Risk selection & distribution
- Prices
- Claims Handling
- Extraordinary claims expenses
- Technological developments
- Social, economical and legal developments
- Inflationary processes



How does one adjust data to allow for these influences?



Image: Munich Re

02

Basic Loss: Indexation

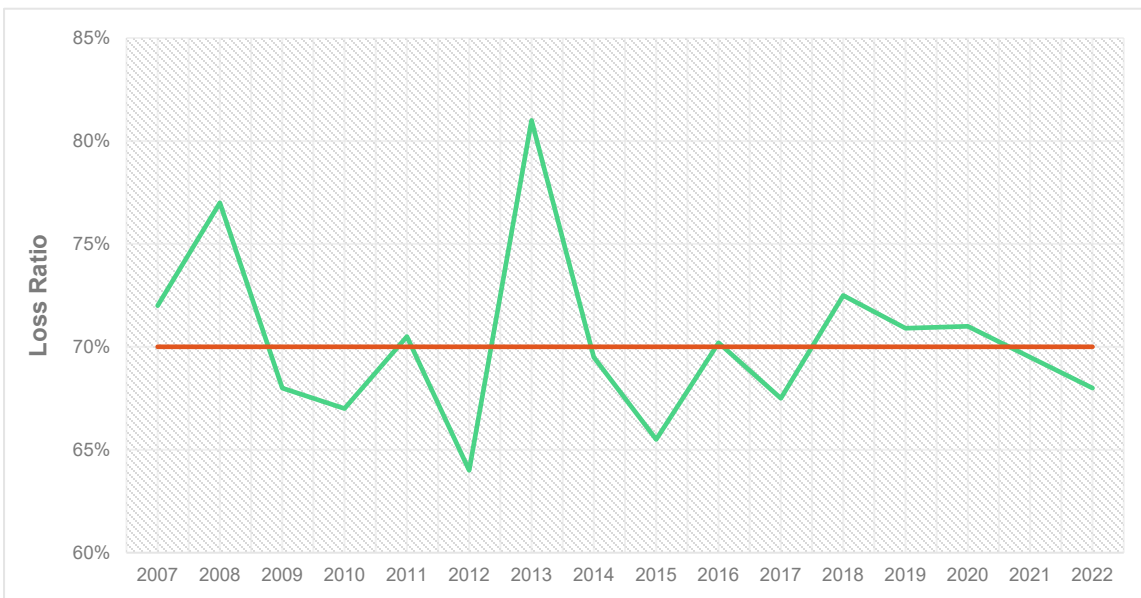
Why Indexation?

- How much will a claim from the past cost today?
- What has the market cycle's influence been on premium?
- Loss data/premiums are not comparable over the years because of price inflation.
- Requires adjustment of the losses/premiums to today's price level. (How high is the loss/premium of the past from today's point of view?)

Comparability of the different years as at today's view

So what are we looking for?

We would like to have a set of ULRs, in which no trends or cycles are left and which randomly fluctuate around an expected ULR.



Definition

By indexation we aim to adjust our complete set of historical premium and loss data, such that all figures reflect the circumstances expected for the treaty year

Losses:

- Consumer Price index (CPI) or Construction Cost Index (CCI) Price Inflation, Claims Frequency, Claims Severity, Currency fluctuations, etc

Premium:

- CCI and CPI adjusted for Client rate changes, Risk profiles, Industry/market information, etc

Why Premium Index/Rate Changes?

There are several possibilities for a change in premium over the years:

1. Change in the underlying exposure
2. Change in original rates, but still same exposure

A premium index should be applied that removes all non-exposure related influences from the premium basis.

Indexation

How is it calculated

Generation of an adequate index for the indexation of premium and losses, for example:

	2022	2021	2020	2019
Index	129	118	110	100

To calculate an indexed loss/premium we have to

1. divide the loss/premium by the index of the respective treaty year and
2. multiply it with the index of the treaty year of the quotation.

Indexation

How is it calculated

	2022	2021	2020	2019
GNPI	320,000	290,000	270,000	240,000
Index	129	118	110	100

What is the 2020 GNPI in 2022 terms

$$270,000 * 129 / 110 = 316,636$$

	2022	2021	2020	2019
Indexed GNPI	320,000		316,636	

Indexation

How is it calculated

	2022	2021	2020	2019
GNPI	320,000	290,000	270,000	240,000
Index	129	118	110	100

What is the 2021 and 2019 GNPI in 2022 terms?

	2022	2021	2020	2019
Indexed GNPI	320,000	317,033	316,636	309,600

Indexation

How is it calculated

	2022	2021	2020	2019
Index	129	118	110	100
Total losses		121,800	151,200	139,200
Indexed Total Losses				

**For simplicity reasons the same index has been used for premium and loss.
Ideally we should develop a separate premium and loss index*

Indexation

How is it calculated

	2022	2021	2020	2019
Index	129	118	110	100
Total losses		121,800	151,200	139,200
Indexed Total Losses		133,154	177,316	179,568

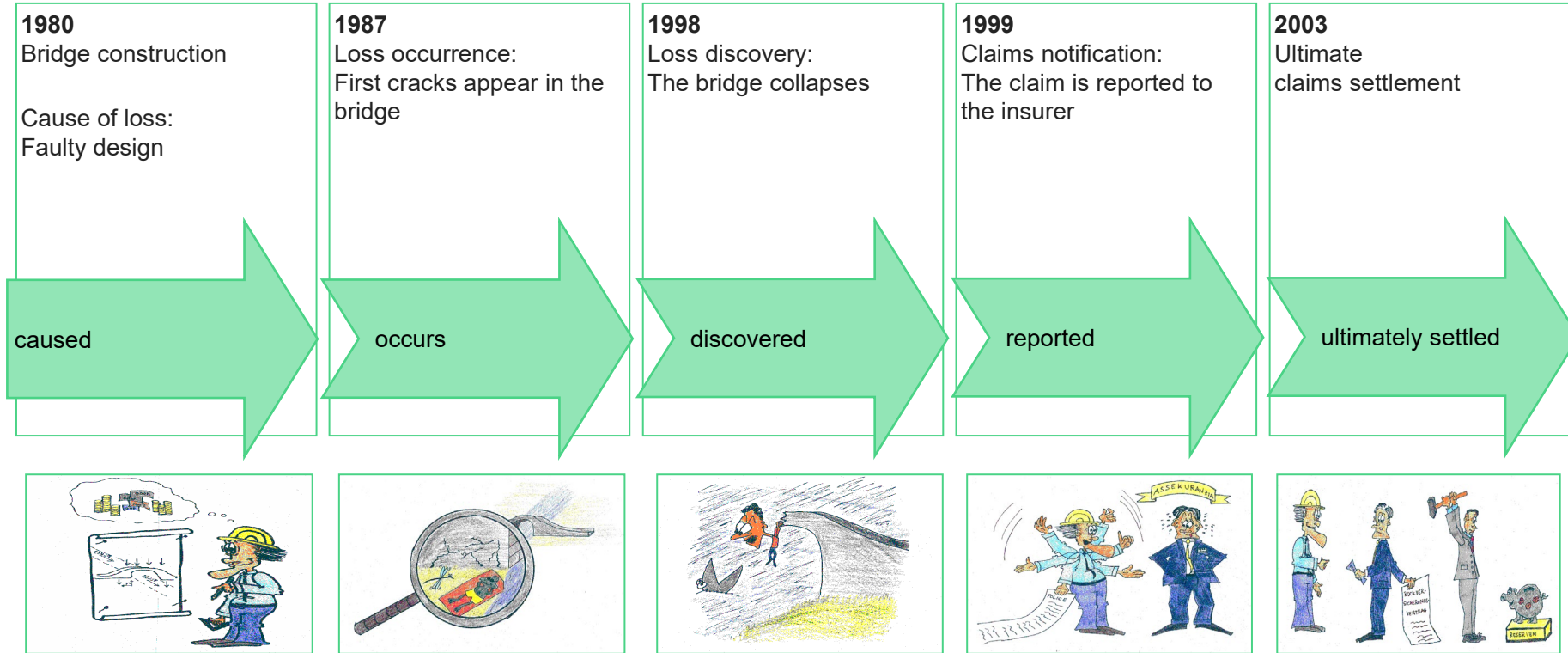
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Ideally we should develop a separate premium and loss index*



Image: Munich Re

03

Basic Loss: Projection and Development



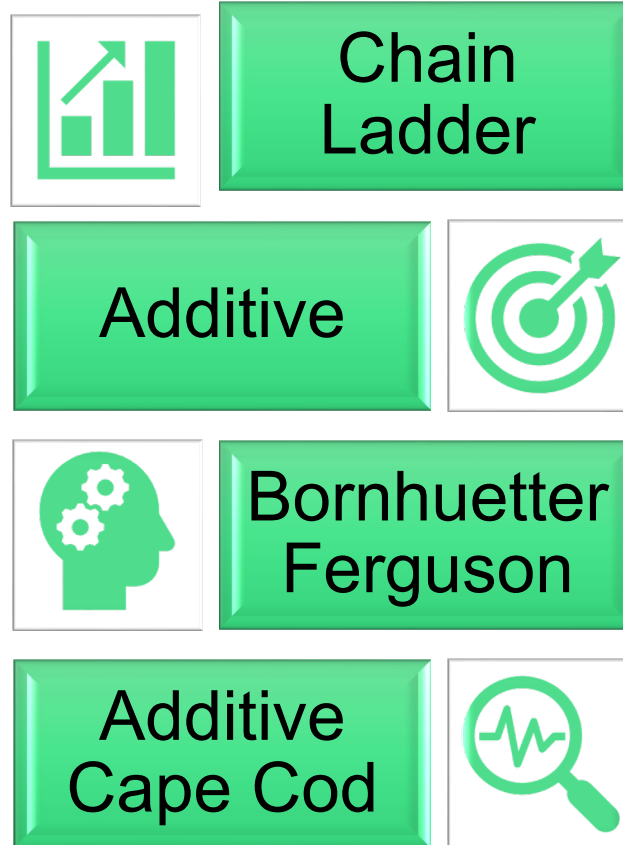
Why Projections?

- Translate claim in today's terms to future period of cover.
- How is the exposure expected to grow/change?

- Premiums are earned over multiple years
- Long tail losses develop over a number of years
- Project 6 months stats into full years stats – even in short tail business with no tail

Comparability of the different years as at a future date

Projection and Development Methods

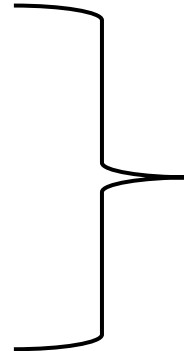


Projection and Development

For pricing we require ultimate loss amounts. These include estimates for IBNR & IBNER

Example: Indexed Incurred loss triangle

	DY1	DY2	DY3	DY4	DY5
2018	1000	1950	2550	2700	2700
2019	950	1800	2400	2900	
2020	1100	2200	2800		
2021	1200	2300			
2022	1300				



Ultimate loss?

Projection and Development

Basic Chain ladder:

Year on year development is the sum overall years of development period divided by the sum over the same years of current development.

	DY1	DY2	DY3	DY4	DY5
2018	1000	1950	2550	2700	2700
2019	950	1800	2400	2900	
2020	1100	2200	2800		
2021	1200	2300			
2022	1300				

$$\begin{aligned}
 & \text{DY 1>2:} \\
 & (1950+1800+2200+2300) \\
 & \quad \div \\
 & (1000+950+1100+1200)
 \end{aligned}$$

	DY1>2	DY2>3	DY3>4	DY4>5
Year on Year Development factor	1.94			

Projection and Development

Basic Chain ladder:

Year on year development is the sum overall years of development period divided by the sum over the same years of current development.

	DY1	DY2	DY3	DY4	DY5
2018	1000	1950	2550	2700	2700
2019	950	1800	2400	2900	
2020	1100	2200	2800		
2021	1200	2300			
2022	1300				

$$\begin{aligned}
 & \text{DY 1>2:} \\
 & (1950+1800+2200+2300) \\
 & \quad \div \\
 & (1000+950+1100+1200)
 \end{aligned}$$

	DY1>2	DY2>3	DY3>4	DY4>5
Year on Year Development factor	1.94	1.30	1.13	1

Projection and Development

Completing the triangle

	DY1	DY2	DY3	DY4	DY5
2018	1000	1950	2550	2700	2700
2019	950	1800	2400	2900	
2020	1100	2200	2800		
2021	1200	2300			
2022	1300				

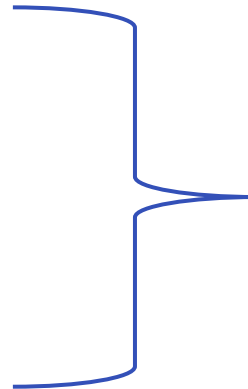
	DY1	DY2	DY3	DY4	DY5
2018					2700
2019				2900	2900
2020			2800	3168	3168
2021		2300	2996	3389	3389
2022	1300	2524	3287	3719	3719

	DY1>2	DY2>3	DY3>4	DY4>5
Year on Year Development factor	1.94	1.30	1.13	1

Projection and Development

Developed our losses to ultimate

	DY1	DY2	DY3	DY4	DY5
2018	1000	1950	2550	2700	2700
2019	950	1800	2400	2900	2900
2020	1100	2200	2800	3168	3168
2021	1200	2300	2996	3389	3389
2022	1300	2524	3287	3719	3719



Ultimate losses
2700
2900
3168
3389
3719



Image: Munich Re

04

Basic Loss: Exercise Projection

Basic Loss: Exercise Projection (Part 1)

		Development Year				
Incurred Claims		12	24	36	48	57
UY Year	2019	17,619,327	35,872,448	31,024,151	29,761,064	29,448,885
	2020	11,761,262	29,640,174	24,242,570	23,196,790	
	2021	32,217,878	47,999,704	48,403,790		
	2022	23,790,754	44,342,274			
	2023	15,706,669				

- Highlights the development pattern
- Year on Year Development factor = sum over all years of next development period divided by sum over the same years of current development period (%)
- Development to ultimate = Product of year on year dev factor calculated above from current development period to ultimate development period
- Inverse results in the Incurred pattern = 1 divided by development to ultimate

This results in the incurred loss pattern

Exercise Projection (Part 1)

		Development Year					
	Incurred Claims	12	24	36	48	57	Ultimate
UY Year	2019	17,619,327	35,872,448	31,024,151	29,761,064	29,448,885	29,448,885
	2020	11,761,262	29,640,174	24,242,570	23,196,790	22,953,467	22,953,467
	2021	32,217,878	47,999,704	48,403,790	46,381,634	45,895,114	45,895,114
	2022	23,790,754	44,342,274	40,497,683	38,805,819	38,398,765	38,398,765
	2023	15,706,669	29,036,100	26,518,594	25,410,732	25,144,186	25,144,186
	Year on Year Dev Factor	1.85	0.91	0.96	0.99	1.00	
	Dev to Ultimate	1.60	0.87	0.95	0.99	1.00	
	Inverse Incurred Pattern	0.62	1.15	1.05	1.01	1.00	

Exercise Projection (Part 2)

		Development Year				
Paid Claims		12	24	36	48	57
UY Year	2019	12,313,574	27,025,863	28,716,662	29,129,698	29,448,885
	2020	8,219,563	22,330,544	22,439,477	22,704,681	
	2021	22,516,026	36,162,388	44,803,653		
	2022	16,626,583	33,406,926			
	2023	10,976,880				
	Year on Year Dev Factor					
	Dev to Ultimate					
	Inverse Incurred Pattern					

Exercise Projection (Part 2)

		Development Year					
	Paid Claims	12	24	36	48	57	Ultimate
UY Year	2019	12,313,574	27,025,863	28,716,662	29,129,698	29,448,885	29,448,885
	2020	8,219,563	22,330,544	22,439,477	22,704,681	22,953,466	22,953,466
	2021	22,516,026	36,162,388	44,803,653	45,397,670	45,895,113	45,895,113
	2022	16,626,583	33,406,926	37,485,580	37,982,573	38,398,765	38,398,765
	2023	10,976,880	21,875,443	24,546,217	24,871,657	25,144,187	25,144,187
	Year on Year Dev Factor	1.99	1.12	1.01	1.01	1.00	
	Dev to Ultimate	2.29	1.15	1.02	1.01	1.00	
	Inverse Incurred Pattern	0.44	0.87	0.98	0.99	1.00	

Exercise Projection (Part 1)

Development Year	12	24	36	48	57
Inverse Incurred Pattern	62%	115%	105%	101%	100%
Inverse Paid Pattern	44%	87%	98%	99%	100%

- Paid pattern is less than the incurred pattern
- This pattern reflects positive run off
- Also have triangulation for premium

Thank you for your attention!

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