Proces zajištení a oceňováni zajistných produktů v v praxi

Prosinec 2014

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Agenda

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Reinsurance Insider

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What is reinsurance….
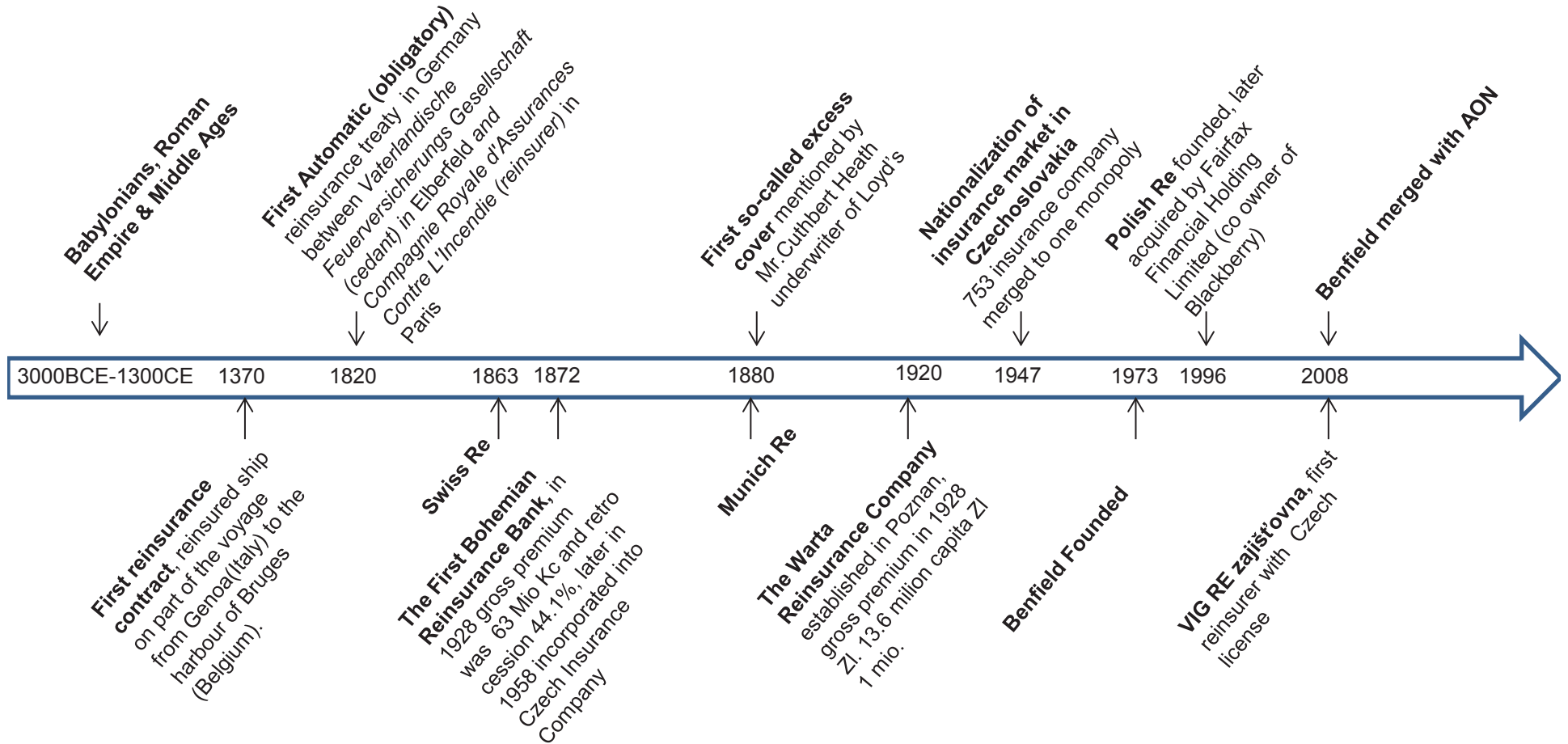
Simply Clever

- Insurance of Insurance companies

Old School

- *"RE-ASSURANCE, as understood by the law of England, may be said to be a contract, which the first insurer enters into, in order to relieve himself from those risks which he has incautiously undertaken, by throwing them upon other underwriters, who are called re-assurers"*
- *Author: Sir James Allan Park in book A System of the Law or Marine insurances; with three chapters on bottomry; on insurances on lives; and on insurances against fire. 1799*

Trendy

- *"Reinsurance is one of the most important risk management tools used by insurers. An insurer can use reinsurance to reduce its insurance risks and the volatility of its financial results, stabilize its solvency, use its available capital more efficiently, improve its ability to withstand disasters, increase its underwriting capacity and draw on the reinsurer's expertise with respect to product development. "*
- *Source: REINSURANCE RISK MANAGEMENT GUIDELINE, Autorité des marchés financiers July 2013, Canadian Regulatory Entity*

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Before…

Timeline (above the arrow, left to right):

- **Babylonians, Roman Empire & Middle Ages**
- **First Automatic (obligatory)** reinsurance treaty in Germany between Vaterlandische Feuerversicherungs Gesellschaft (cedant) in Elberfeld and Compagnie Royale d'Assurances Contre L'Incendie (reinsurer) in Paris
- **First so-called excess cover** mentioned by Mr. Cuthbert Heath underwriter of Loyd's
- **Nationalization of insurance market in Czechoslovakia** 753 insurance company merged to one monopoly
- **Polish Re** founded, later acquired by Fairfax Financial Holding Limited (co owner of Blackberry)
- **Benfield merged with AON**

Timeline axis:

3000BCE-1300CE | 1370 | 1820 | 1863 | 1872 | 1880 | 1920 | 1947 | 1973 | 1996 | 2008

Timeline (below the arrow, left to right):

- **First reinsurance contract**, reinsured ship on part of the voyage from Genoa(Italy) to the harbour of Bruges (Belgium).
- **Swiss Re**
- **The First Bohemian Reinsurance Bank**, in 1928 gross premium was 63 Mio Kc and retro cession 44.1%, later in 1958 incorporated into Czech Insurance Company
- **Munich Re**
- **The Warta Reinsurance Company** established in Poznan, gross premium in 1928 Zl. 13.6 milion capita Zl 1 mio.
- **Benfield Founded**
- **VIG RE zajišťovna**, first reinsurer with Czech license

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Reinsurance Market Concentration

Top Ten Reinsurer
Gross Premium Written (USD mio)

Reinsurer	Gross Premium Written (USD mio)	Loss Ratio	Combined Ratio
Munich Reinsurance Co.	37,251	61.20%	91.20%
Swiss Reinsuranc Co. Ltd.	31,723	53.10%	83.10%
Hannover Rueckversicherung…	18,208	70.70%	96%
Lloyd's	15,785	56%	91%
Berkshire Hathaway Inc.	15,059	N/A	99.90%
SCOR S.E.	12,576	65%	94%
Reinsurance Group of…	8,233	N/A	N/A
China Reinsurance (Group)…	6,708	59%	100%
Korean Reinsurance Co.	5,113	80%	98%
PartnerRe Ltd.	4,712	59%	88%

Global Premium Volumes: insurance, reinsurance & retrocession (USD bn)

	Insurance	Reinsurance	Retro Cession
Non-Life	1,818	9%	14
Life	2,520	2%	8%
Total	4,338	214	27

Source: Mapfre

Market share of top ten reinsurers in **non-life**:50.6% **life :** 90%

More than 200 reinsurance companies worldwide, 1 in Czech Republic, 1 in Poland

The group insurance companies of Berkshire Hathaway and Munich Re, are in top ten insurance ranking, 7th and 1st in terms of revenues

92%* of reinsurance premium is ceded to reinsurers based in Bermuda, France, Germany, Ireland , Japan, UK and US.
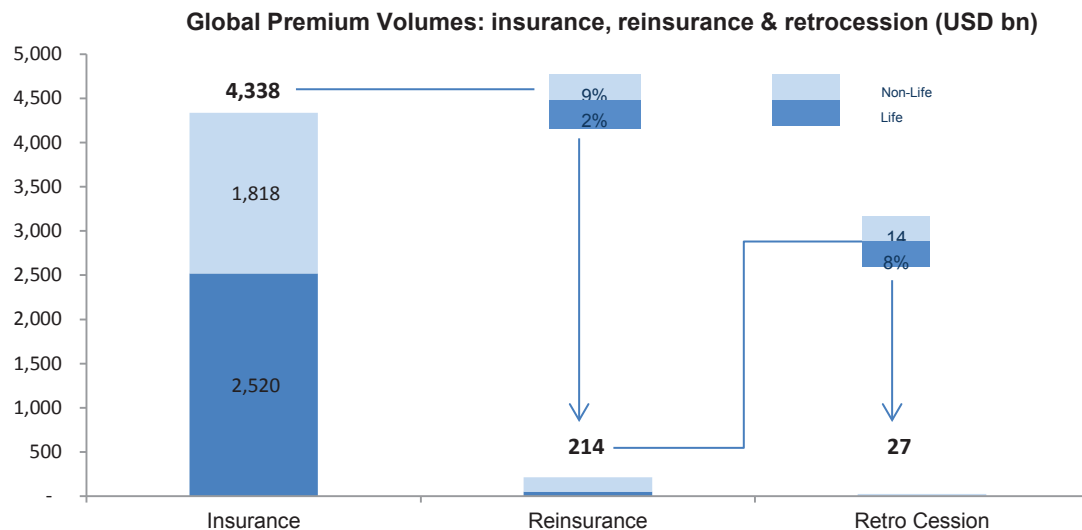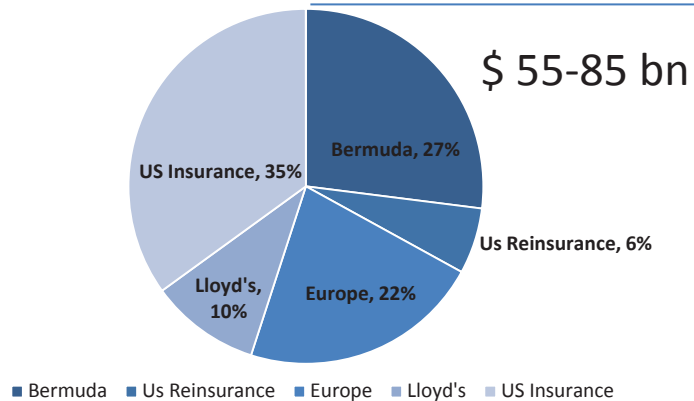
Reinsurance Brokers market is driven by three main players **AON Benfield Willis Marsh & McLennan**

75%* of market share.

*number from 2006

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Reinsurance Market is Global

US Gulf 2005 Huricanes Losses Payments: Katrina, Wilma and Rita

$ 55-85 bn

Bermuda, 27%

Us Reinsurance, 6%

Europe, 22%

Lloyd's, 10%

US Insurance, 35%

■ Bermuda ■ Us Reinsurance ■ Europe ■ Lloyd's ■ US Insurance

Reinsurance market contributes to global risk diversification and efficient geographical capital allocation
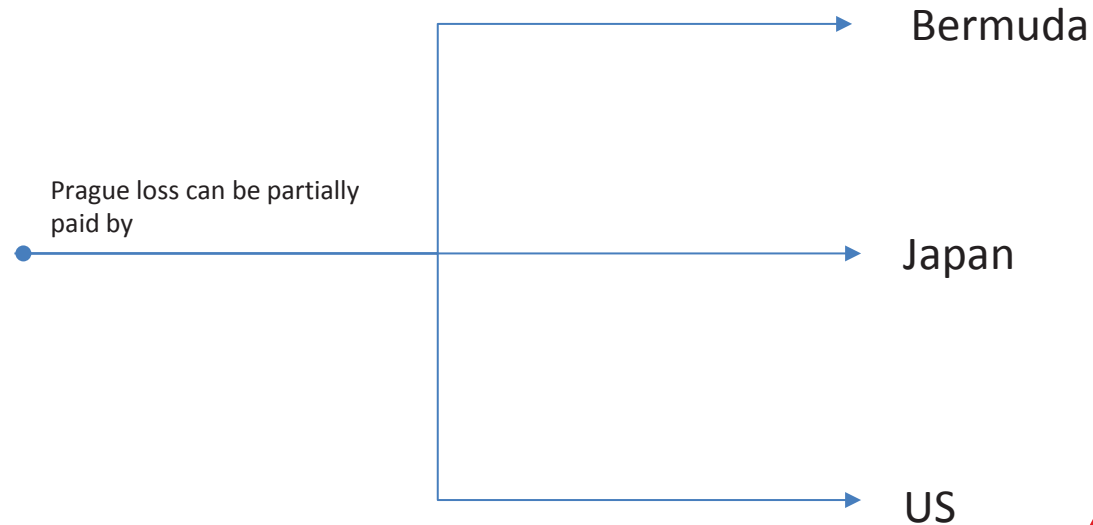
Hurricane Gilbert, 1988
destroyed Jamaica, losses $ 1 bn, 70% insured, only $10 million paid by Jamaican insurance industry

Prague 2013

Prague 2013 Flood, Kafka Museum, Kampa

Prague loss can be partially paid by

Bermuda

Japan

US

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Reinsurance Market Participants

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┌─────────────┐         ┌ ─ ─ ─ ─ ─ ─ ┐         ┌─────────────┐         ┌─────────────┐
│  Insurance  │────────▶│ Reinsurance │────────▶│ Reinsurance │────────▶│    Retro    │
│   Company   │         │   Broker    │         │   Company   │         │ Reinsurer/Ca│
└─────────────┘         └ ─ ─ ─ ─ ─ ─ ┘         └─────────────┘         │ pital Markets│
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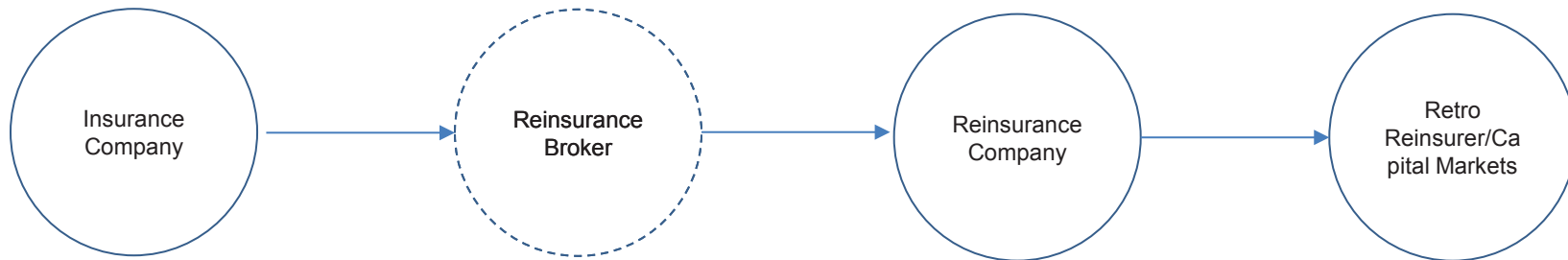
Main function is assessment of cedent risk, structuring, placement and administration of reinsurance treaty

1. **Brokers** negotiate/discuss with client (insurer) and reinsurers, the structure, conditions and the price of the reinsurance treaty- **stand as an opposition to reinsurers during the price negotiation**

2. **Actuaries** analyse, price and optimize reinsurance treaty, work on stochastic models for reinsurance program optimizations, spot market trends etc.

3. **Cat management** run catastrophic models (in-house models or third vendor models) on clients' portfolios, test new models and their versions, made first estimate of cat losses on client portfolio just after the cat event

4. **Model development team (for Aon Benfield it is Impact Forecasting Team)**, works on development of catastrophic models

5. **Client technical management team**, administration of treaties (premium allocation, collection of recoveries etc.)
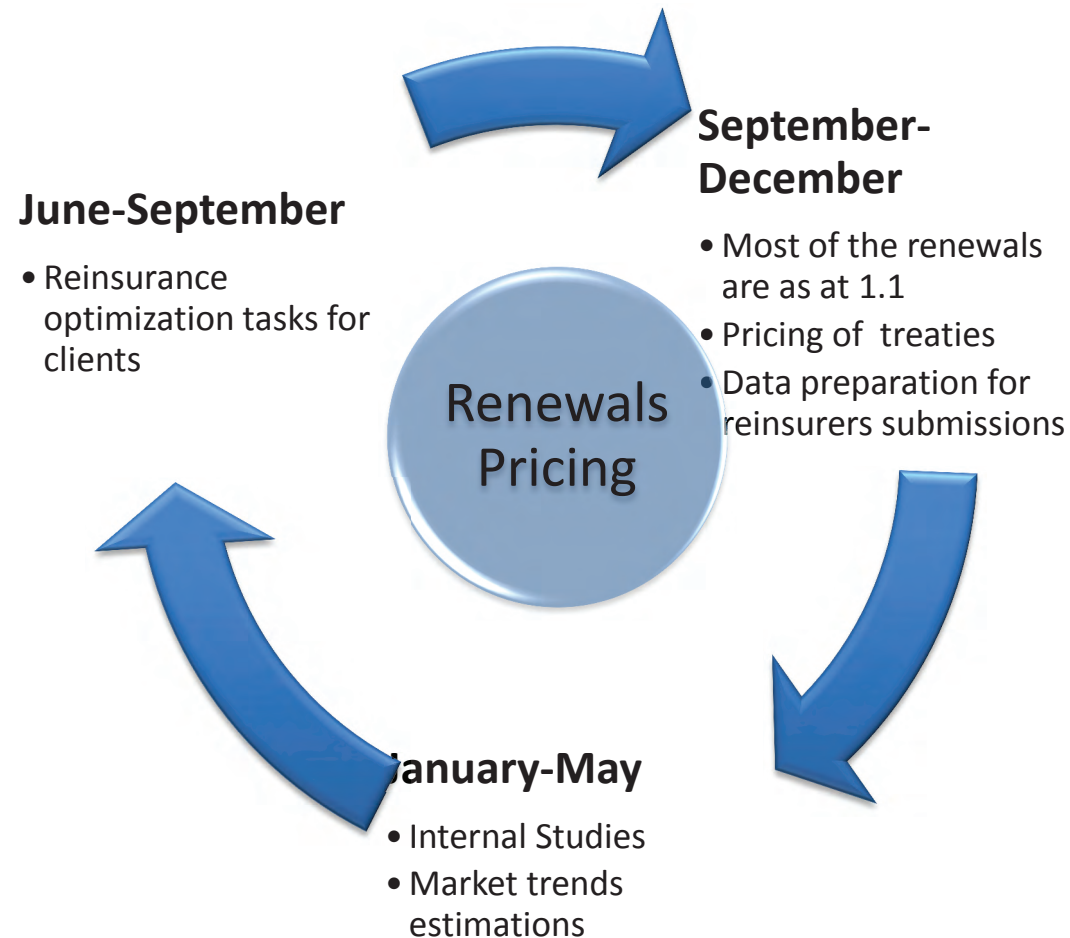
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Renewal Process of the Reinsurance Treaty

Pre renewal period	After treaty is in force

Reinsurance Markets Approached

Reinsurer 1

Reinsurer 2

Reinsurer 3

Insurer-Cedent

Reinsurance Broker

Final Price Agreed

Reinsurance Broker

During the treaty year client technical services process all the necessary cash-flows connected with the treaty

- Treaty details discussed
- Panel of reinsurers
- Data validation
- Technical analyses of the treaty (price, exposure etc.)
- Prepare presentation for reinsurers

- Discussion with underwrites about the price
- Technical argumentation between broker's actuaries and reinsurer's pricing actuaries

- All quoting reinsurer send quotes and shares with which they want to participate (written line in %)
- Client agrees the price and approach the potential slip leader
- To rest of reinsurers who quotes, is offered participation on the treaty with agreed price with the leader and asked what line they want to take
- All reinsurers receive signed line (participation on the treaty) <=100%

Role of an Actuary

June-September

- Reinsurance optimization tasks for clients

September-December

- Most of the renewals are as at 1.1
- Pricing of treaties
- Data preparation for reinsurers submissions

Renewals Pricing

January-May

- Internal Studies
- Market trends estimations

Informational Asymmetries on Reinsurance Market

Broker's Advantage

➤ Experience

-Brokers place hundreds of reinsurance treaties with the most of the reinsurers in the world

➤ Global Overview

-broker can see prices on the market and market trends

➤ Technical Support

-dedicated actuaries to pricing
-knowledge about new products, markets etc.

➤ Negotiation

-broker's business model is to provide cheaper reinsurance despite of fee paid by reinsurer

➤ High Performance

-reinsurance broker is exposed to competition
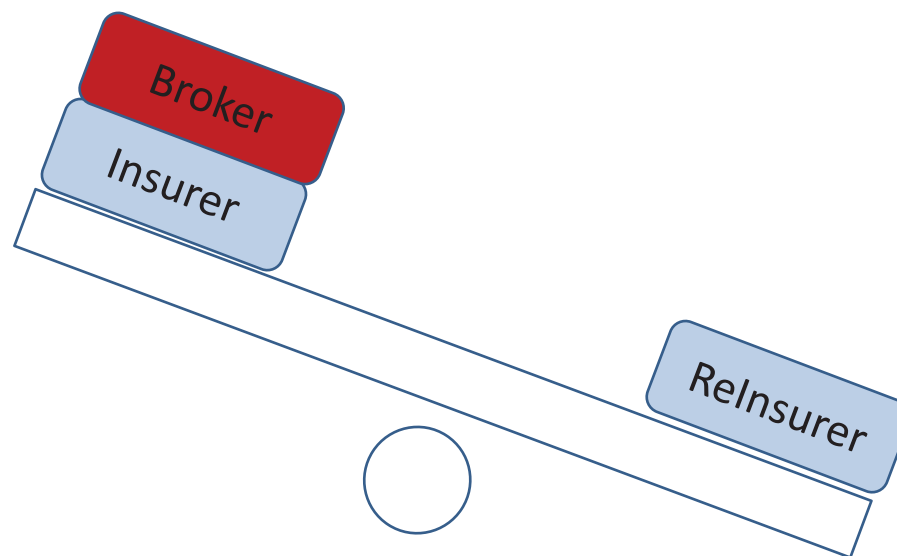
Reinsurer's Advantage

Information advantage is on reinsurer's side, in case of direct negotiation

➤ No Space for Negotiation

-reinsurance manager in the insurance company can only see his/her reinsurance treaty and its conditions and price

➤ Lack of Benchmark

-there are no such a portal as levnezajisteny.cz where you can compare your rates

➤ Lack of Dedicated Technical Support for Insurer

-reinsurer has devoted actuaries for pricing of incoming business

Broker
Insurer
ReInsurer

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Reinsurance Treaty

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Classification of Reinsurance

Obligatory (automatic) Reinsurance	Facultative Reinsurance

Obligatory (automatic) Reinsurance

- **Insurer and the reinsurer are obliged to cede and accept the risk, respectively, once conditions are agreed**
- Each risk underwritten by insurer is automatically covered by the reinsurance treaty
- **Advantages (+)**
  - Do not have to seek reinsurance per each new risk
  - Standard dates of inception and termination of the reinsurance treaty, do not have to coincide with original risks (loss occurring and risk attaching concept)
  - Higher commission than in facultative
- **Disadvantages (-)**
  - Precise definition and description of risks covered, before the inception of the treaty
  - Need to understand to exclusions of the treaty
  - Capacity of the cover is given for the whole treaty year

Facultative Reinsurance

- **Insurer and the reinsurer have the "faculty" or option to cede or accept the risk**
- Facultative reinsurance is usually applied on risks in isolation, named and detailed individually
- **Advantages (+)**
  - Possibility to increase the underwriting capacity above the obligatory reinsurance
  - Allows underwrite risks excluded from obligatory treaty
  - Can reduce the price of automatic treaty
  - Access to reinsurer's know-how on specific types or risk
- **Disadvantages (-)**
  - Dependence on reinsurer's decision to underwrite or not
  - Lack of agility since it is individual and complex transaction
  - Lower commission from reinsurer than in automatic treaty, due the short term relation

Facultative-obligatory treaty is the hybrid where insurer has the possibility to cede a risk and reinsurer has an obligation to accept the risk

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Decision between Obligatory and Facultative Reinsurance

Risk Profile[EUR]

PML Bands		Number of Risk	Average PML	Premium
From	**To**			
0	500,000	33,115	174,009	19,840,536
500,001	1,000,000	7,157	716,716	9,412,636
1,000,001	2,000,000	5,258	1,378,240	9,737,979
2,000,001	3,000,000	2,318	2,411,307	6,026,499
3,000,001	4,000,000	1,327	3,425,731	3,838,770
4,000,001	5,000,000	915	4,445,339	3,263,997
5,000,001	7,500,000	1,269	6,023,954	5,210,542
7,500,001	10,000,000	724	8,755,842	3,757,048
10,000,001	15,000,000	530	11,987,695	3,029,078
15,000,001	20,000,000	213	17,280,938	1,442,475
20,000,001	30,000,000	293	25,207,972	1,734,577
30,000,001	40,000,000	108	33,758,063	812,326
40,000,001	50,000,000	15	44,019,305	659,454
50,000,001	80,000,000	10	62,125,636	1,394,822
80,000,001	100,000,000	2	88,788,568	664,500
100,000,001	125,000,000	3	111,557,792	695,844
125,000,001	Higher	1	172,409,284	1,389,326

Obligatory reinsurance with capacity up to EUR 172 mio

Alternative obligatory reinsurance with capacity up to EUR 88 mio

+

Facultative cover of 4 risks

=

Price estimation of such solution consists from technical analyses of the treaty and crucial is the view of broker, if such a solution is "pleaceable" on the market.

- The decision to cover some risks by the facultative treaty, instead of obligatory treaty, can lead to decrease of the price of obligatory cover.

Classification of Reinsurance

Types of reinsurance	Facultative Treaties	Proportional based on SI or PML	
		Non Proportional	
	Obligatory Treaties	Proportional based on SI or PML	Quota Share
			Surplus
			Other types (obligat.-facult/facult-oblg., open covers)
		Non Proportional	Per risk XL
			Per-event XL
			Aggregate XL/Stop Loss XL
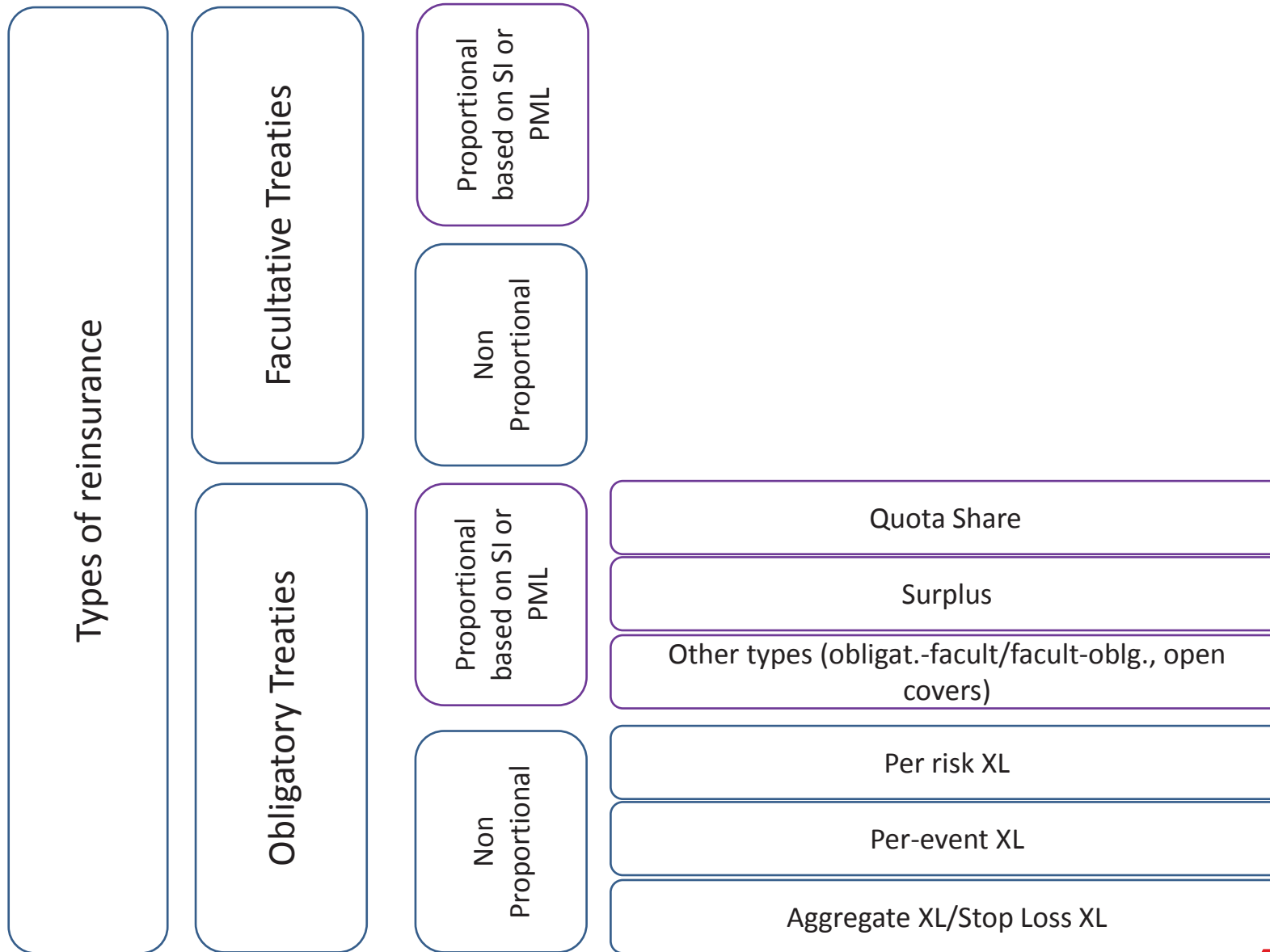
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Proportional Reinsurance

Quota Share

Premium and claims are ceded in the same ratio to reinsurer

Ceded X % up to Limit Y
Retained (100-X) % up to Z
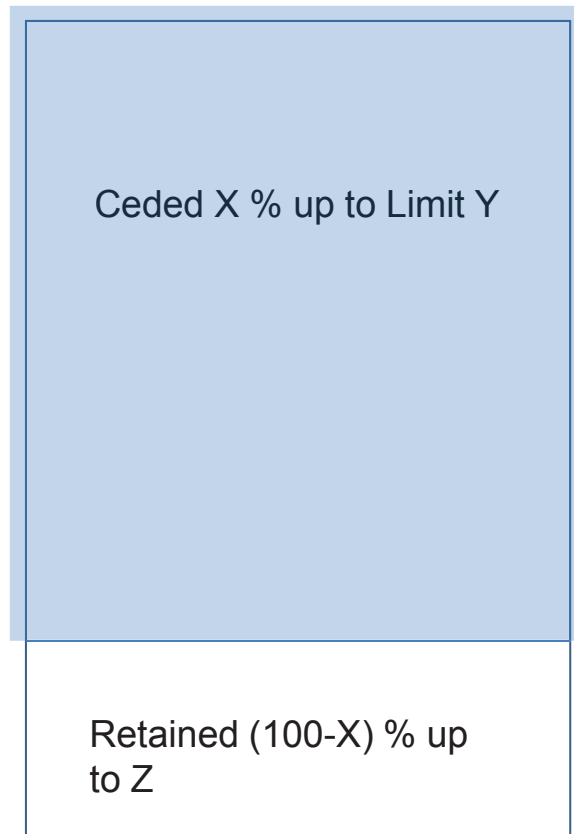
- Absolute limit for quota share is agreed, reinsurer cap potential liability from accepted risk
- Example: **Quota Share 80%, capacity CZK 100 mio,**
  - Maximum retention of insurer CZK 20 mio and maximum ceded amount per claim is CZK 80 mio.
  - All claims and premium on risks below CZK 100 mio is split 20 to 80.
  - Claim on the risk above the capacity is split as follows:

Risk
CZK 150 mio

QS 80/20

33% — 50/150=33% need to be covered by facultative reinsurer

80%

53.6% — 80%*67% ceded to obligatory reinsures

20%

13.4% — Retained on net retention of insurer
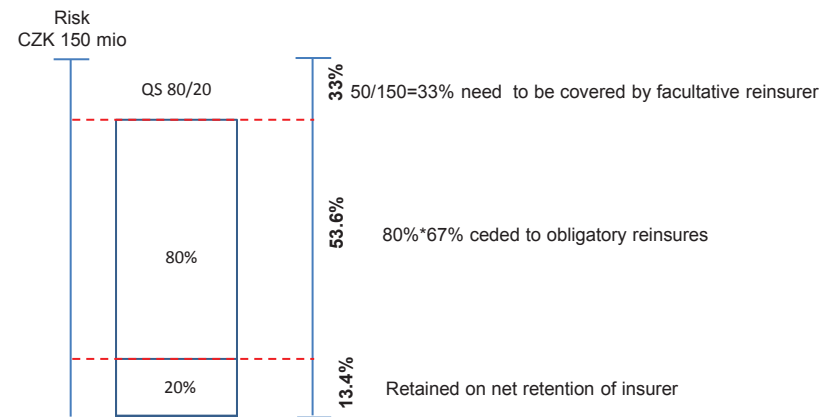
- In case QS covers losses from naturals perils <u>event limit</u> is set up in the treaty, reinsurer's liability from one nat cat event is capped at this amount

- <u>Term limit</u> maximum liability from the treaty for reinsurer

(+) increase the risk capacity (insurer currently offer up to CZK 100 mio, after 50% QS can increase to CZK 200 mio net retention is still CZK 100 mio
(+) administrative simplicity
(-) insurer can potentially cede profitable business to reinsurer
(-) loss ratio remains the same, QS can not change non-profitable year to profitable, only decreases the magnitude of losses on net retention of insurer

Quota share is mostly used by new companies and companies that start new line of business.

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Surplus

The insurer cedes to reinsurer share of the sum insured exceeding its own retention. It is proportional treaty because premium and claims are ceded by the same percentage, on per risk basis.

- Absolute limit ceded to reinsurer is defined by number of retained lines
- Example Surplus:9 lines, retention CZK 10 mio
  - here the underwriting capacity is CZK 100 mio, and maximum liability of reinsurer is CZK 90 mio and maximum retention CZK 10 mio per loss

Ceded lines

Retention (retained line) in sum insured

Risk
CZK 150 mio

CZK 100 mio

CZK 90 mio

CZK 10 mio

33% 50/150=33% need to be covered by facultative reinsurer or retained by insurer

60% 9/10*67% ceded to obligatory reinsures

6.67% 1/10 * 67% Retained on net retention of insurer

- Term limit and event limit can be set up, in the same manner as for QS
- For each single risk the proportion for cession needs to be calculated
- Reinsurer can participate on small losses that happen on big risks

(+) company can control on which risk does not require involvement of reinsurer

(+) insurer retains more homogenous portfolio

(-) administratively expensive

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Cessions to Quota Share and Surplus

Quota Share
Cession: 90%
Limit: 100
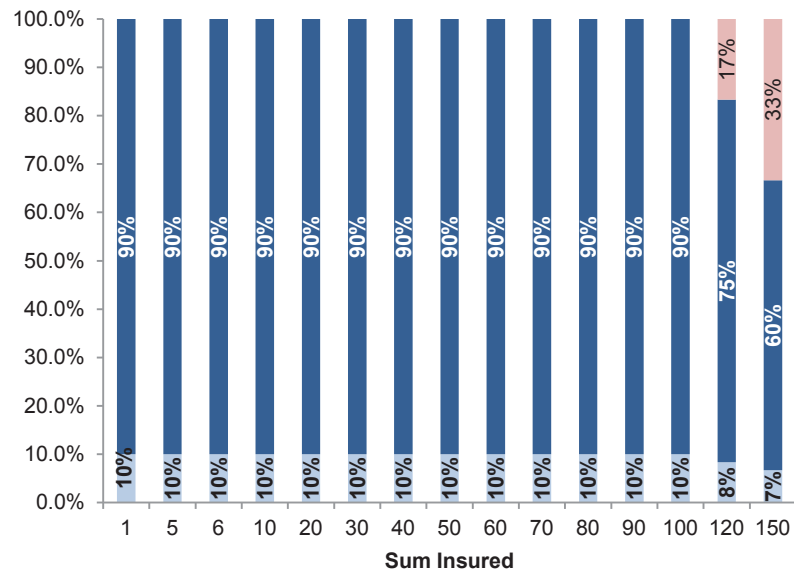
Surplus
Cession: 9 lines
Retention: 10
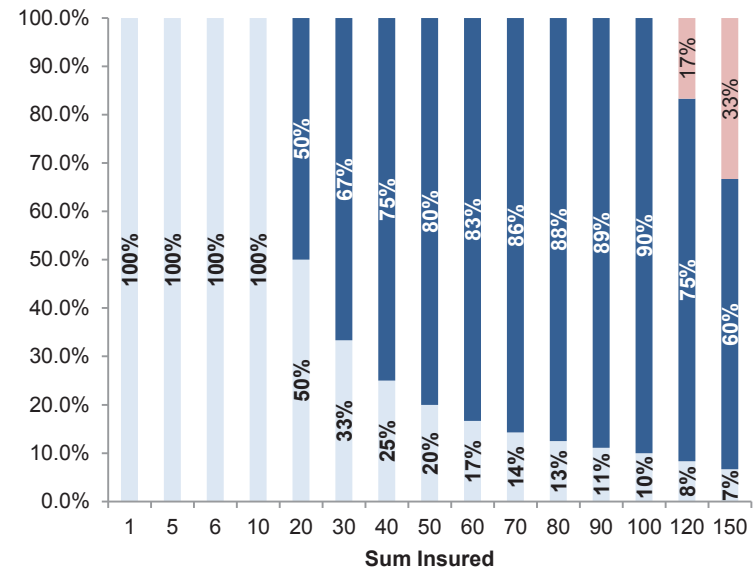
Cash Flow of Proportional Treaties

Insurer

Reinsurer

Commissions

Ceded claims

Ceded premium
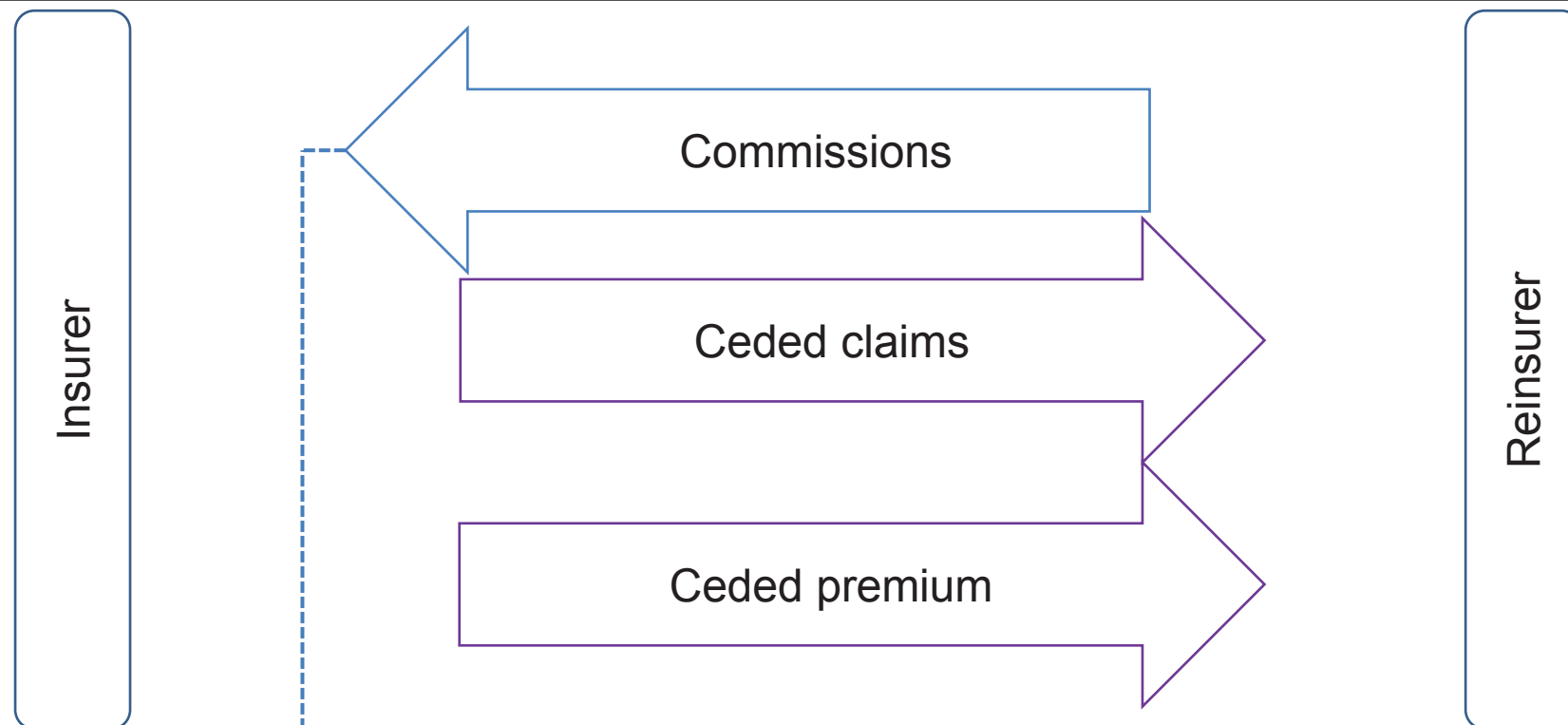
a) Share on the acquisition cost of insurer
b) Profit sharing commission from the treaty

Price of the proportional treaty is determined by the amount of commission paid back to insurer; **higher the commission, lower the price**

Insurer settles the overall balance with its reinsurer(s) once every quarter.
In case of underwriting year basis insurer needs to settle the balance with all previous reinsurer where there are some outstanding transactions for previous underwriting years, especially for losses.
In case of clean cut accounting or portfolio transfer, all outstanding liabilities with unearned premium are transferred, as at expiration of the current reinsurance treaty, to reinsurer of the following reinsurance treaty. So insurer needs to handle only one account.

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Commissions Systems for Proportional Treaties

Fixed Commission: flat percentage from ceded premium
- Example: 30% commission rate, premium ceded CZK 100 mio, commission CZK 30 mio
- **(+)** ceding company can budget its income
- **(-)** does not reward insurer for good results of the treaty, from reinsurer's point of view

• **Sliding-scale commission:** penalizes or rewards insurer on the base of the portfolio quality. Commission is decreased or increased based on the final loss ratio of the reinsurance treaty. Consists of defining the minimum and maximum commission for loss ratio scale.
- Provisional commission: it is fixed at the beginning of the contract and is charged to reinsurer in the periodic reinsurance account, and adjusted at a later stage within the definition of sliding scale
- Commission can never be less or more than is defined in the contract

Example

Commission:

Minimum loss ratio 55% with commission 35%

Maximum loss ratio 70% with commission 27%

Provisional commission: 31%

Premium ceded: 100

Losses incurred: 60

Commission received

Commission $\text{minimum} + (LR_{max} - LR_{actual}) * \frac{(Com_{max} - Com_{min})}{(LRmax - LRmin)} = 32\%$

Sliding-scale commission table

Loss Ratio		Commission
From	To	% rate
0%	55%	35%
55%	56%	34.50%
56%	57%	34.00%
57%	58%	33.50%
58%	59%	33.00%
59%	60%	32.50%
60%	61%	32.00%
61%	62%	31.50%
62%	63%	31.00%
63%	64%	30.50%
64%	65%	30.00%
65%	66%	29.50%
66%	67%	29.00%
67%	68%	28.50%
68%	69%	28.00%
69%	70%	27.50%
70%	Higher	27.00%

Commissions Systems for Proportional Treaties

• **Profit commission:** it is very often used in the combination with fixed commission. It allows to share the profit that arises from reinsurance treaty with the cedent. Agreed percentage of the treaty profit is paid back to insurer.

•Management expenses are considered as a cost for reinsurer, this expenses can include fees to broker, cost of retro cession etc. (5%-10%).

•Loss accumulation is when loss of the treaty is carried forward for the calculation of the treaty profit, loss can be carried forward for limited period of time or until their complete extinction.

•Profit commission can be based on one reinsurance treaty but as well on more of them (e.g. different surpluses for diff. class of business so pc is calculated on combined basis)

> **profit commission % x max(premium ceded-losses ceded-commission- management expenses - carry forward loss of the treaty, 0)**

	Year 1	Year 2	Year 3	
Premium Ceded	100	100	100	
Paid Losses	90	60	60	
Commision 20%	20	20	20	
Reinsurer expenses 5%	5	5	5	
Profit commision	20%	20%	20%	
Losses carry forward	0	-15	0	
Result of profit commision acc.	-15	0	15	(100-90-20-5)
Profit commision	0	0	3	
Result fo the reinsurance treaty (reinsurer point of view)	(10)	20	17	

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Commissions Systems for Proportional Treaties

Loss corridor : ceding company will reassume a portion of the reinsurer's liability if the loss ratio exceeds a certain amount. It is included in the treaty, mainly in the case of adverse results of the treaty before.
Example: Insurer participates by 75% of the layer from 80% to 100% loss ratio, if the reinsurer's loss ratio is 120% or higher

	Before Corridor	After Corridor
Below corridor	80%	80%
Within corridor	20%	5.0%
Above corridor	20%	20%
Total Loss Ratio	120%	105.00%

(25% of 20%)

It is a penalization of an insurer by the participation on the losses from which reinsurer can suffer.

Overriding Commission is a fee or percentage of money which is paid to a party responsible (retro ceding the risks) for placing a retrocession of reinsurance.
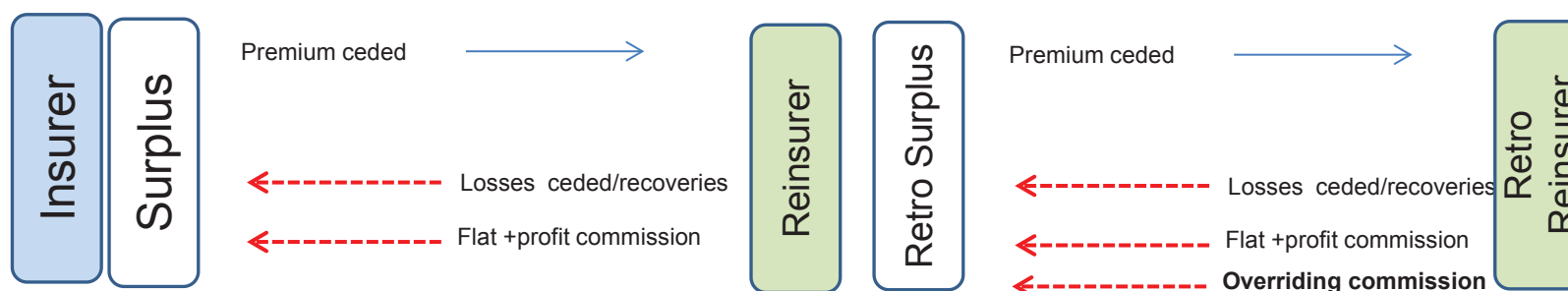
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NON Proportional Reinsurance

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Cash Flow of Non-Proportional Treaty

Insurer

Reinsurer

Recoveries

Up front reinsurance premium

Reinstatement premium

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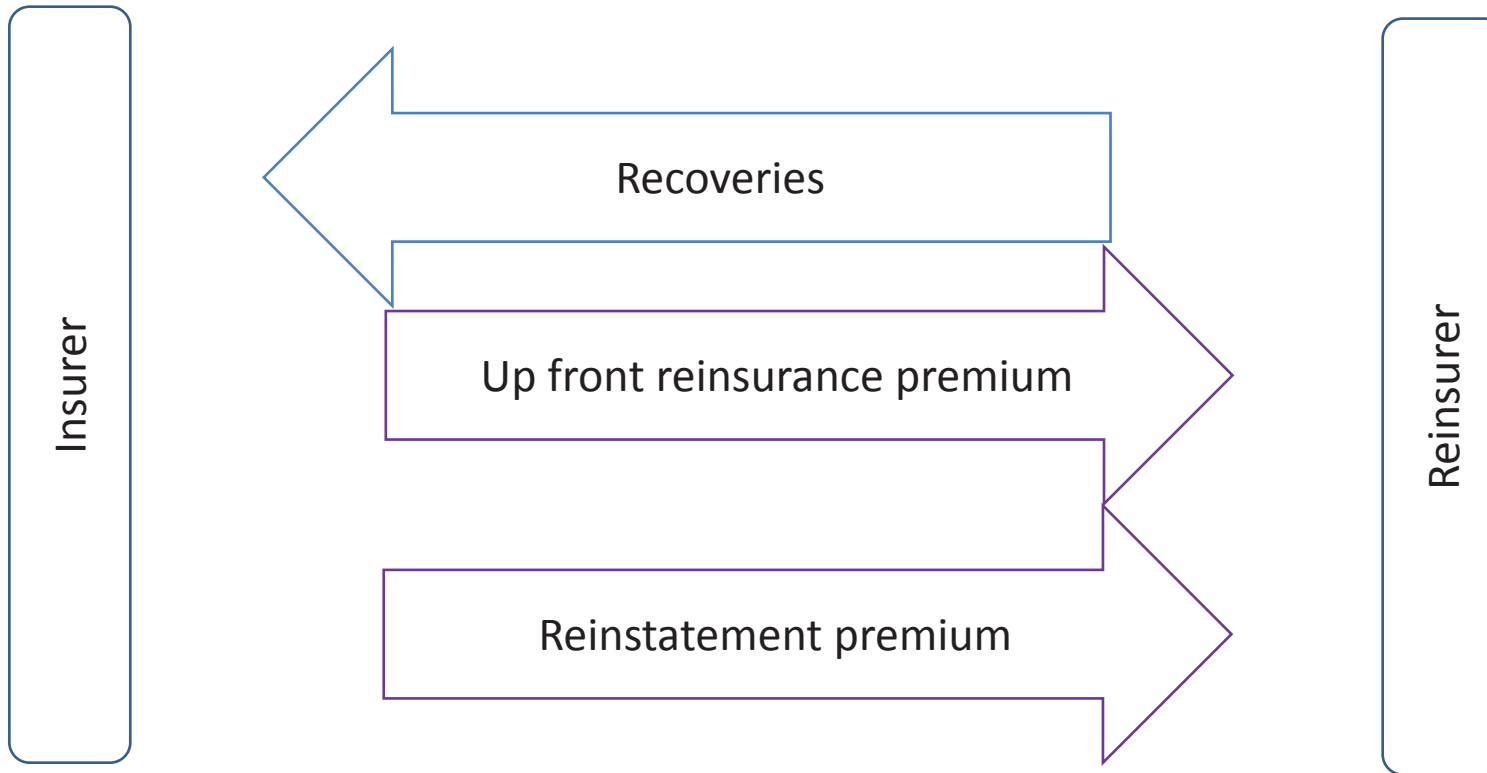
Excess of Loss Contract Specification (XL, XoL)

For non-non proportional reinsurance, liabilities from claims are split between insurer and reinsurer on claim basis, not on sum insured basis, as for proportional treaties. Reinsurer is obliged to pay to insurer the part of the claim which exceed the pre-agreed amount (deductible, attachment) and up to the limit of the cover.

Limit of the cover

Priority

Reinsurer's Liability

Insurer's liability (retention or deductible)
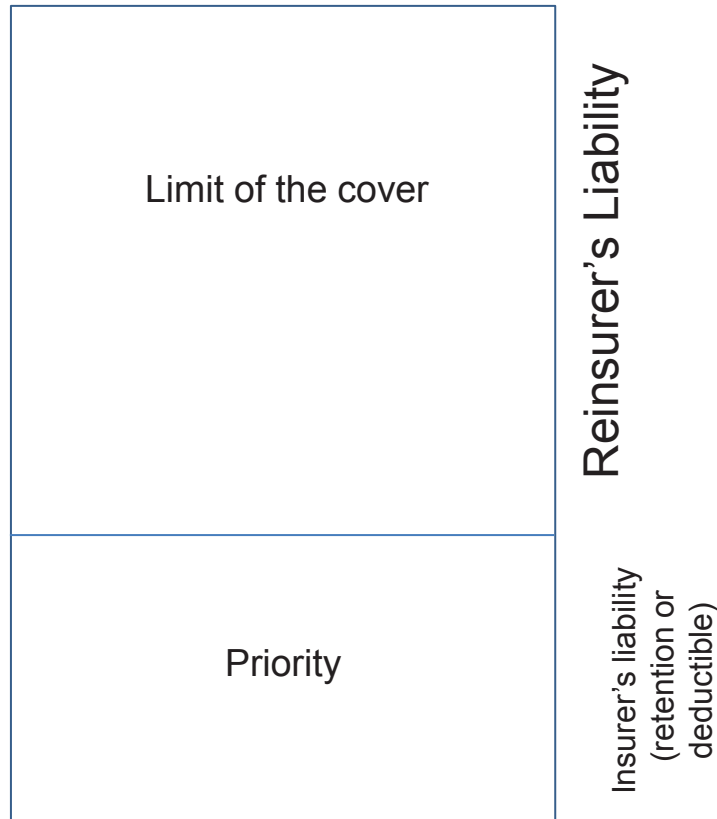
Limits: Deductible and Cover

Price :

1. **Fixed**: is given as % (rate) of the premium exposing the contract (SEPI-subjected estimated premium income)
2. **Variable**: as a % of SEPI but subjected to the excess claim ratio
   - Minimum rate< effective rate< maximum rate
   - Effective rate = recoveries/SEPI multiplied by loading
1. **Flat**: specified in an amount

Minimum and deposit premium: % of the price, which is mostly paid in 4 instalments during the year and readjusted to the price after the end of the year (80%-90% of the rate X SEPI) once exact amount of premium is known.

Reinstatement details specified

Annual aggregate limit or annual aggregate deductible specified

(+) reduction in administration costs, reinsurance premium not calculated on per risk basis but on the cedant's whole portfolio basis

(+) insurer does not cede profitable business to reinsurer, XL works in extreme cases

(-) excess of loss on per risk/per event basis only cover cedant against very large losses

(-) negative cash flow at the beginning of the treaty (one of the function of reinsurance function is to help to start-up underwriting of some class of business, XL not really appropriate)

Excess of Loss Layering

Facultative Reinsurance

3rd Layer

Non working Layer

2nd Layer

Partially working layer

1st Layer

Working Layer

Priority

Net Retention of Insurer

Underwriting capacity

2009   2010   2011   2012

■ 3rd Layer   ■ 2nd Layer   ■ 1st Layer   ■ Net Ratained

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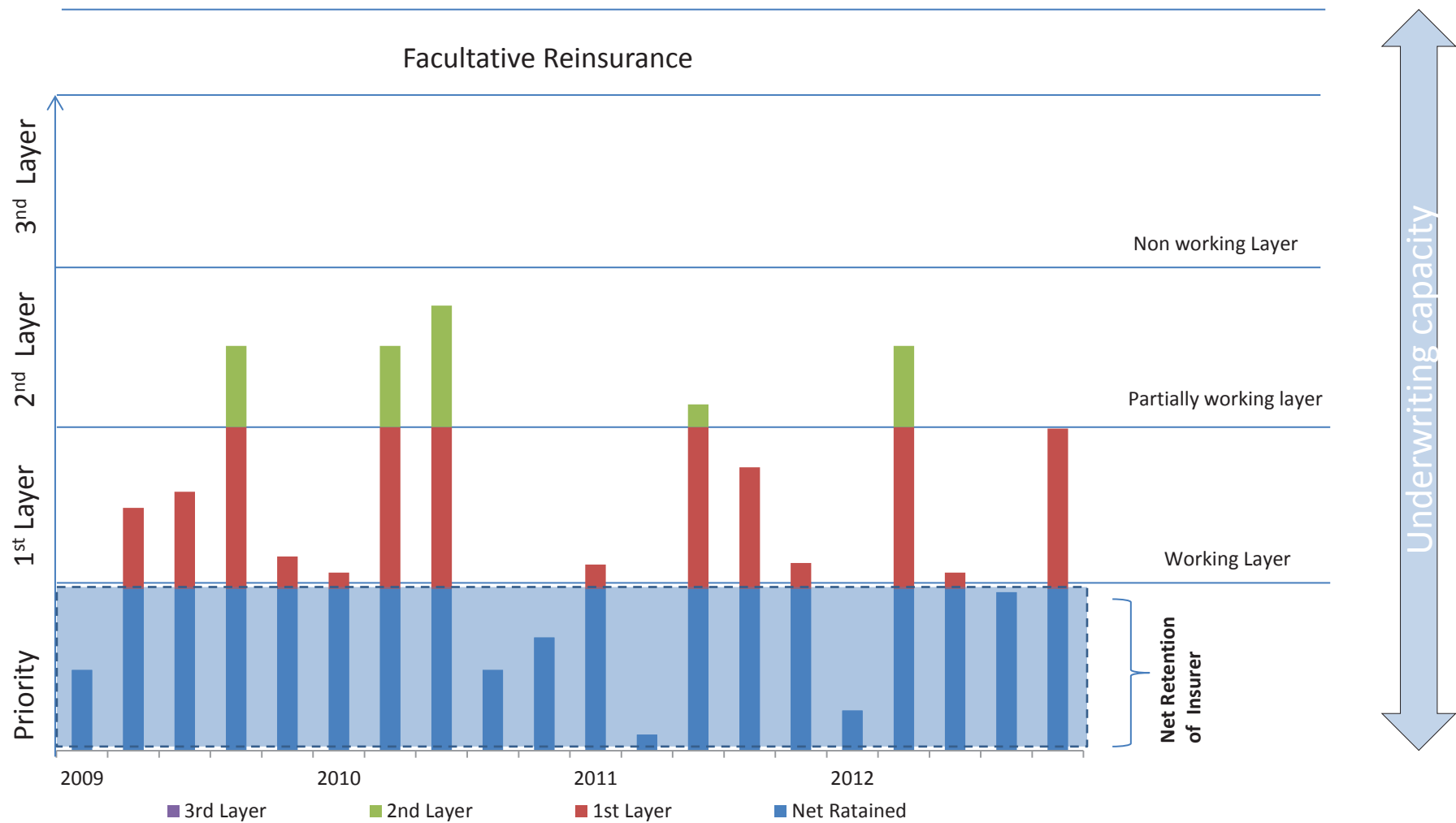
Reinstatements

- Limit of the cover protects insurer against the severity of the claim, the frequency of claims is protected by the reinstatement clause
- In the reinsurance contract, **SLIP**, is specified, how many limits and for what price has insurance company available

  1. Unlimited and free (motor third party liability-MTPL)
  2. Limited and free (MTPL, property per risk)
  3. Limited and paid (property per risk and cat covers)

Reinstatement clause grants the insurer to get/pay for additional cover in case, part or the whole limit was consumed, so the full cover is available for next claim.

MTPL

Layer 1: Five full free reinstatements.

Layer 2: Two full free reinstatements.

Layer 3: Domestic: Two full free reinstatements.

Green Card: Unlimited and free.

Property per risk excess of loss

Article VI

Reinstatements

1st Layer: 1 (one) free and 2 (two) at 100% additional premium representing a maximum liability of the Reinsurer of BGN 4,000,000 in all during the term of this Agreement

2nd Layer: 2 (two) at 100% additional premium representing a maximum liability of the Reinsurer of BGN 14,536,215 in all during the term of this Agreement

3rd Layer: 1 (one) at 100% additional premium representing a maximum liability of the Reinsurer of BGN 26,309,190 in all during the term of this Agreement

4th Layer: 1 (one) at 100% additional premium representing a maximum liability of the Reinsurer of BGN 40,000,000 in all during the term of this Agreement

5th Layer: 1 (one) at 100% additional premium representing a maximum liability of the Reinsurer of BGN 138,000,000 in all during the term of this Agreement

Maximum capacity of the layer is= (1+number of reinstatement) x Limit

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Reinstatement Premium

In case of paid reinstatement, except of initial premium specified in the contract with the rate (up-front or base premium), additional reinstatement premium is paid during the year

Pro rata capita

$$\text{reinstatement premium} = \frac{\text{Claim's recoveries from XL}}{\text{Limit}} \times \text{Premium for Layer} \times \% \text{ Reinstatement}$$

Double pro rata/pro rata temporis

$$\text{reinstatement premium} = \frac{\text{Claim's recoveries from XL}}{\text{Limit}} \times \frac{\text{Number of days to expire}}{365} \times \text{Premium for Layer} \times \% \text{ Reinstatement}$$

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Excess of loss : premium cash flow

Contract Details
Excess of loss 100 xs 100, 2 full reinstatement for 100%
Rate 2%
Minimum and deposit premium 85%.
SEPI: 200

Reinstatement premium

Pro rata → **50/100 x 100% x 2% x 200 x 85%**

Double Pro rata → **50/100 x 100% x 2% x 200 x 274/365 x 85%**

Premium is adjusted to 2% reinsurance rate

Final premium income is 220

85% x 2% x 200 x 1/4

85% x 2% x 200 x 1/4

85% x 2% x 200 x 1/4

85% x 2% x 100 x 1/4

Beginning of the year

Loss 150, 1 April

End of the year   **31/03**

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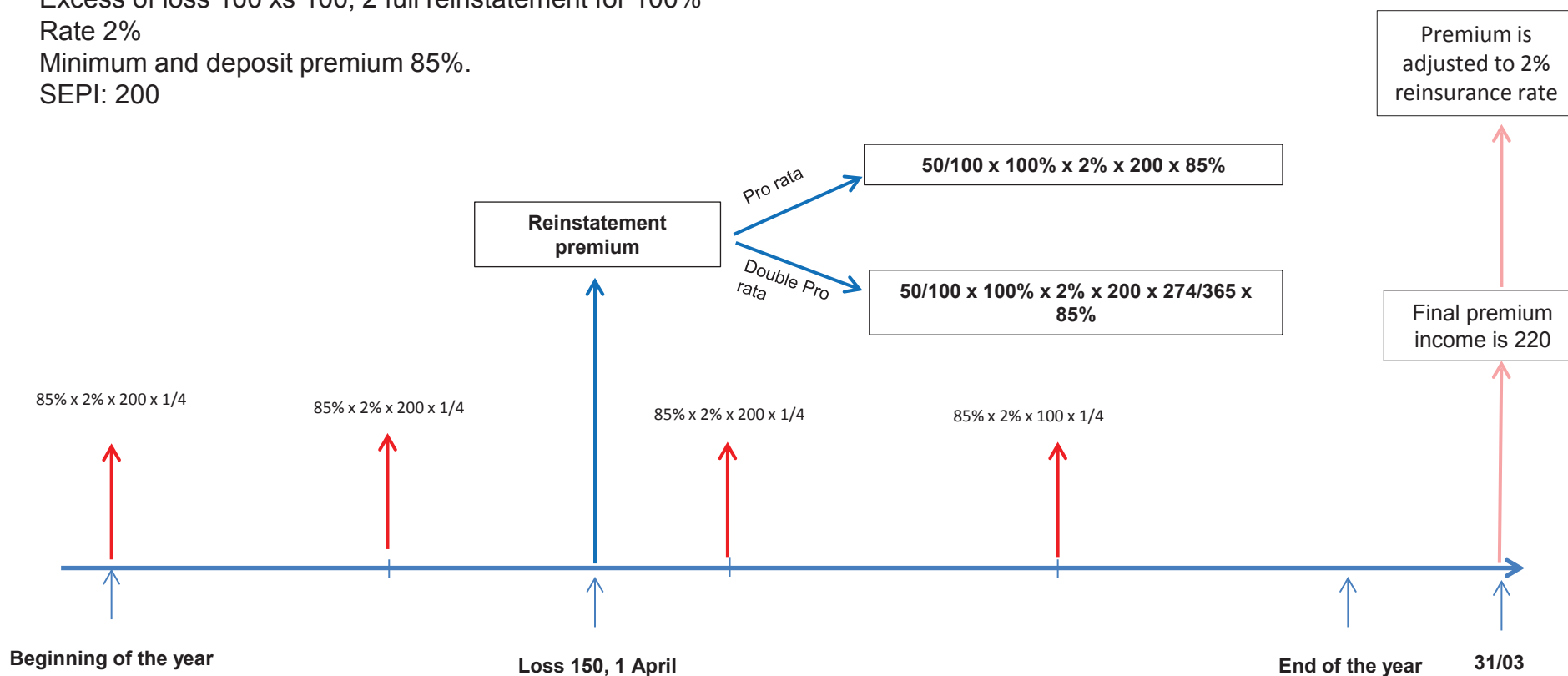
Reinstatements and impact on XL price

Price

Unlimited and free

Risk premium needs to cover unlimited frequency of losses

Limited and free

Risk premium needs to cover limited frequency of losses

Limited and paid

Risk premium needs to cover only first loss to the layer, next are paid by reinstatement premium

Number and price of reinstatements are important factors in pricing of non proportional treaty

Excess of loss per risk & per event

Per risk Excess of Loss

Recoveries   Net retained

XL Layer

1st claim | 2nd claim | 3rd claim | 4th claim | 5th claim

Per Event Excess of Loss

Recoveries   Net retained

XL Layer

1 event

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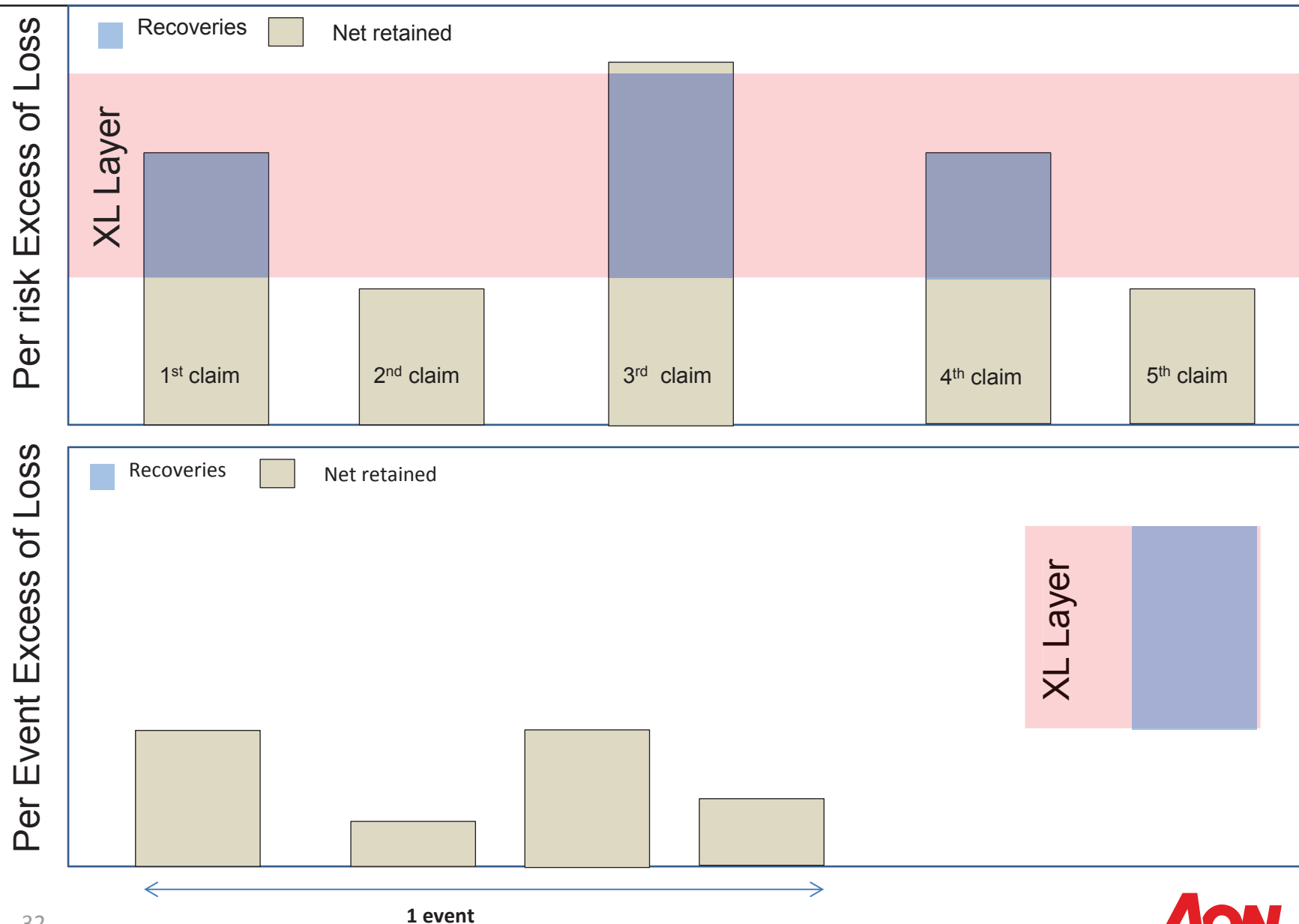
Why events matters?

9/11/2001 Attacks

2 reinsurance limits, 2 retentions

1 reinsurance limit

Source:www.everystockphoto.com

2 insurance limits

1 insurance limit

2 Events
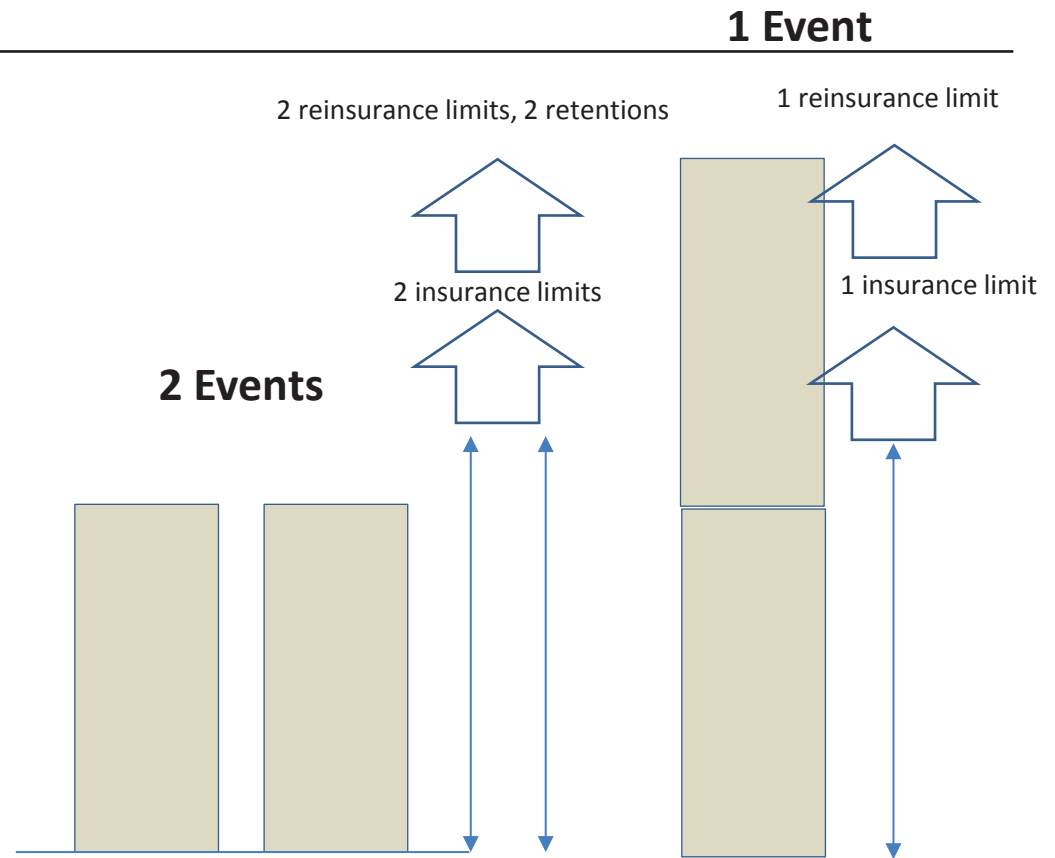
"…..SCOR and its retrocessionnaires will assume, to the extent of their respective commitments, their share in the indemnification obligations relating to the World Trade Center claim. The additional costs resulting from the full coverage **of two distinct events** are estimated to 39 million euros after tax and retrocession…"

Source:www.scors.com, **Press Release,** 13 November 2009

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Stop Loss & Aggregate Cover

Stop Loss Cover

Recoveries | Net retained

Year

XL Layer

Limit and deductible are defined as an overall loss ratio for covered business

E.g. insurer wants to be covered above loss ratio 90% up to 120%, final loss ratio is 100% so reinsurer needs to pay 10%

Aggregate Cover

Recoveries | Net retained

Year

XL Layer

Limit and deductible are defined in monetary values

Variation on Aggregate Covers

Recoveries | Net retained

Year

Franchise

XL Layer
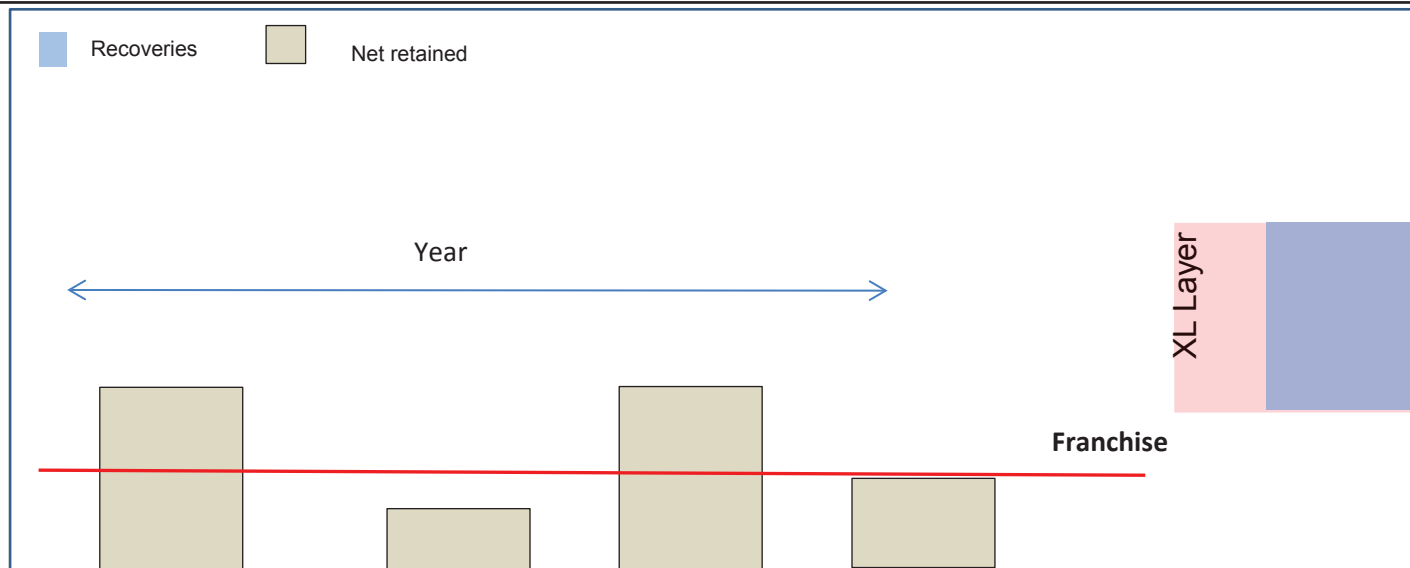
Only losses excess of franchise are aggregated, they are aggregated from ground up.

Recoveries | Net retained

Franchise

XL Layer
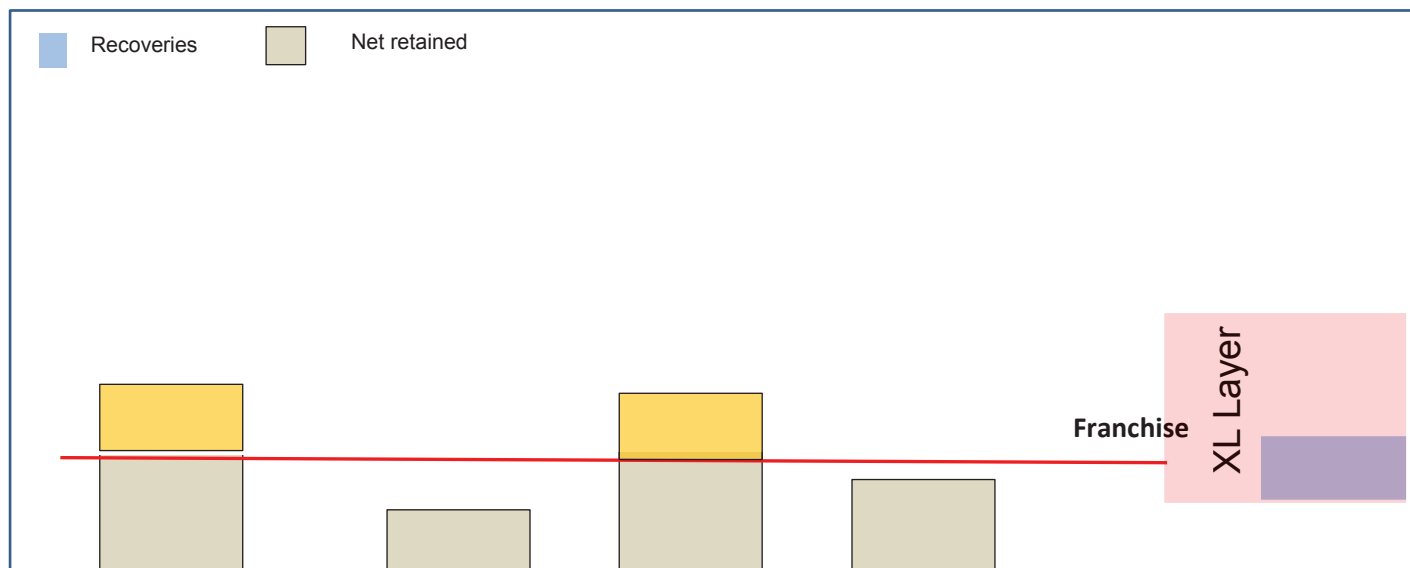
Only part of the losses excess of franchise are aggregated.

Annual Aggregate Deductible (AAD) & Annual Aggregate Cover (AAL)

Annual Aggregate Deductible (AAD)

Deducted from the total losses ceded to reinsurer (E.g. AAD EUR 1 mio; first 1 mio of recoveries from XL are retained on net retention of insurer)

Type of Treaty	Per Risk Excess of Loss Contract
	Losses occurring during basis. Ultimate Net Loss each and every loss each and every Risk
Limit	For 100%:
	EUR 12,000,000
	AAD (Annual Aggregate Deductible) EUR I 12,000,000 applies
Retention	For 100%:
	EUR 8,000,000

Annual Aggregate Limit (AAL)

Cover is limited to this amount, it is equivalent of free and limited reinstatements.

The purpose of introduction different features like AAD, franchise or different prices for reinstatements, is to find the right balance between the price of the contract and its function and interaction with the goals of cedant.

Time Basis of the Contract

- Underwriting Year Basis (Risk Attaching During-RAD or policies incepting during-PID)
- Occurrence Year Basis (Loss Occurring During)
- Claims Made Basis

2010	2011	2012	2013

Original Policy

April 1, 2010

March 31, 2011

Loss, February 28, 2011

1st Loss Advice, July 15, 2012

Time Basis of the Contract

- <u>**Underwriting Year Basis (Risk Attaching During-RAD or policies incepting during-PID)**</u>
- Occurrence Year Basis (Loss Occurring During)
- Claims Made Basis

Covered by the reinsurance contract
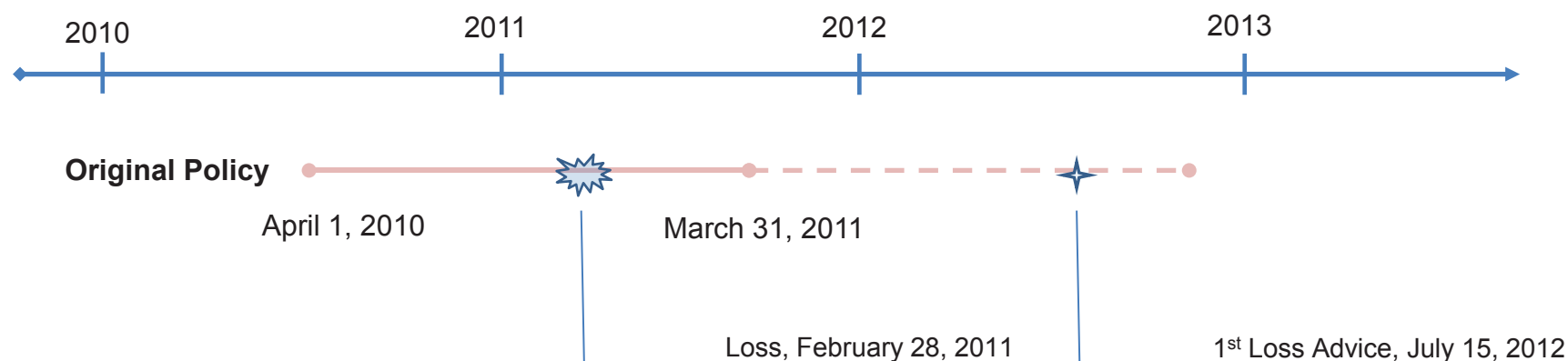
Period	This Contract shall apply to risks attaching during the 12 months period: Effective from: 1 January 2013 Expiring on: 31 December 2013
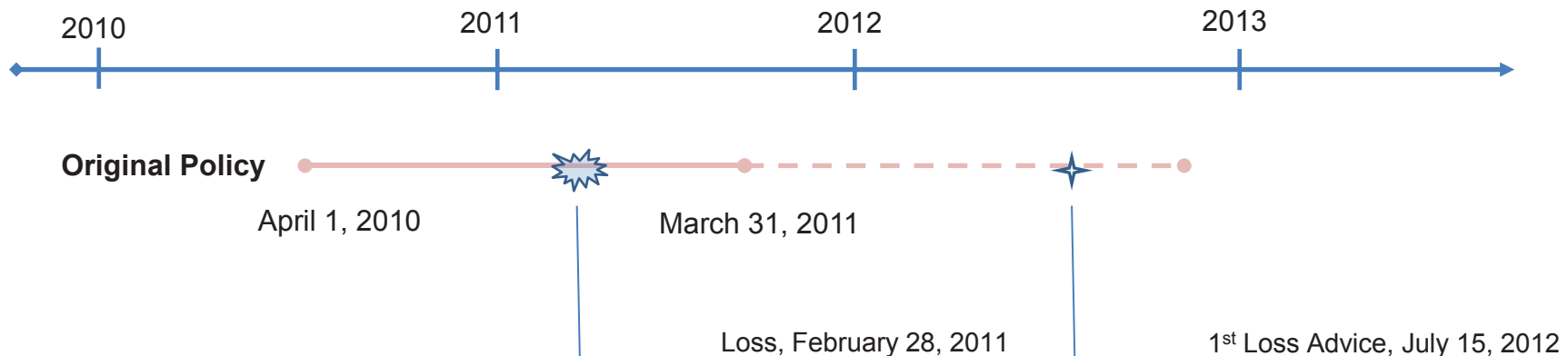
2010

2010   2011   2012   2013

Original Policy

April 1, 2010   March 31, 2011

Loss, February 28, 2011   1st Loss Advice, July 15, 2012

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Time Basis of the Contract

- Underwriting Year Basis (Risk Attaching During-RAD or policies incepting during-PID)
- **Occurrence Year Basis (Loss Occurring During)**
- Claims Made Basis

Period

This contract will apply to losses occurring during the following period:

January 1, 2014 (00:00 hrs.) through December 31, 2014 (24:00 hrs.)

Subject to local time at insured property.

Covered by the reinsurance contract

2011
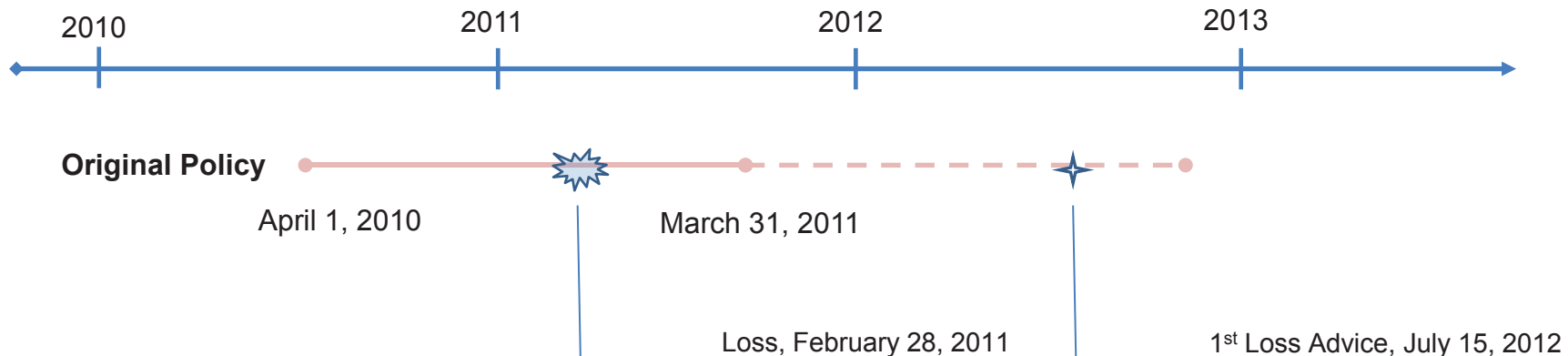
2010   2011   2012   2013

Original Policy

April 1, 2010   March 31, 2011

Loss, February 28, 2011   1st Loss Advice, July 15, 2012

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Time Basis of the Contract

- Underwriting Year Basis (Risk Attaching During-RAD or policies incepting during-PID)
- Occurrence Year Basis (Loss Occurring During)
- <u>Claims Made Basis</u>

Covered by the reinsurance contract

2012

| 2010 | 2011 | 2012 | 2013 |

Original Policy

April 1, 2010   March 31, 2011

Loss, February 28, 2011   1st Loss Advice, July 15, 2012
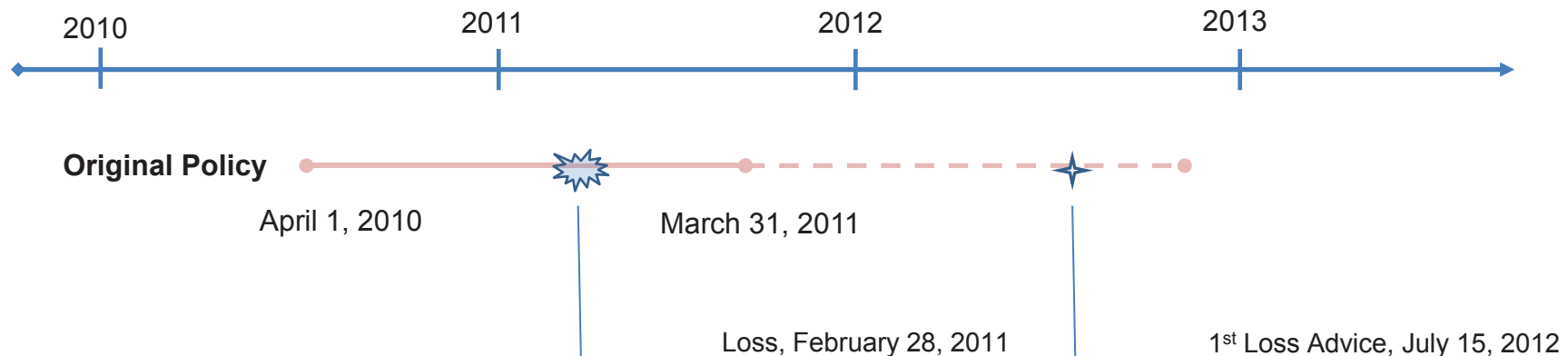
Some Important Underwriting and Claims Clauses in Reinsurance Agreements

Because of the wide variety of reinsurance needs, many reinsurance agreements have customized clauses drafted specifically for that reinsurance relationship

Stability/Index Clause
Used for long tail business (MTPL) mostly due the long period between loss occurrence and final settlement. It spreads the impact of inflation equitable between the cedant and reinsurer, refer as *Full Index Clause* and *Severe Index Clause*

Hour Clause
Used for catastrophic covers which limits the time period during which can be claim included to the aggregation to be subjected to cover. The time period is measured in consecutive hours and used mostly in property business for flood, earthquake or windstorm. E.g. 72 consecutive hours regards windstorm or earthquake, 504 consecutive hours regards flood.
The reinsured may choose the date and time when any such period of consecutive hours commences.

Interlocking clauses
Sharing a loss which involves two or more reinsurance treaty, so the cedant does not retain two or more deductibles from one loss.

Notification Clause, War Exclusion Clause, Downgrade Clause….

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Pricing

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Methods for Reinsurance Pricing of Excess of Loss

1. Experience Analyses (Burning Cost, "as if " calculation)

2. Exposure Rating

3. Frequency Severity Model

4. Market Benchmarking

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Pricing of Proportional versus Non-Proportional

- ➢ Pricing of non proportional reinsurance focus on estimation of the probabilistic distribution of recoveries from excess of loss contract which leads to the estimation of the **price**
- ➢ Price of excess of loss consists from :

Risk premium
+ Safety margin-loss volatility
+ Reinsurer's expense
+ Reinsurer's profit
+Capital Loading
Technical Price
+/-Soft Factors (market trends, reinsurer's panel…)
= Market Rate

- ➢ The price of the proportional treaty is specified by the commission paid back by the reinsurer
- ➢ Pricing focuses on the determination of expected loss ratio and consequently **combine ratio** (paid losses by reinsurer + commission to insurer) of the treaty
- ➢ The philosophy of proportional treaties pricing is similar to pricing of excess of loss

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Data Used for Pricing

- Premium development

- Number of policies development

- Large losses, losses in excess of threshold (at least 50% of priority)/Triangulations

- Risk Profiles (Snapshot basis or underwriting year basis)

- Information about reinsurance structures historically

- In case of proportional treaties pricing, loss profiles (losses grouped according to SI/PML) for previous year needed (e.g. surplus pricing)

- Large Risks/Facultative Risk

- Historical loss ratios

Experience Rating

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Experience Rating (Burning cost)

- Experience analysis focuses on the restatement of all statistics to renewal year context "AS IF" statistics, from economical and portfolio point of view

- Premium re-evaluation
  Premium should be adjusted to current insurance tariff level
  Index for re-evaluation: tariff index

- Claims re-evaluation
  Losses should be re-evaluated according to
  - ➤ Market factors (economical inflation+ social or legal inflation)
  - ➤ Change in the underwriting (do not underwrite some type of risk)
  - ➤ Reserving policies (this is applied in MTPL adjustments for IBNeR)
  Index for re-evaluation: inflation (superimposed inflation for MTPL, CPI, wage index, construction index etc.)

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Short Tail and Long Tail Business

Short Tail Business (all types of property business)

- Inflation is driven by economic factors CPI, wage index, construction index
- Losses are developed in short period of time (1-3 year)
- Possibility to work with last status of losses

Long Tail Business (MTPL, General Third Party Liability)

- Inflation depends on legal environment, social changes
- Due to the long period between loss occurrence and final settlement FIC and SIC have big impact on the price
- Adjustments on RBNS cause changes in incurred claims (paid amount+reserve)
- It is necessary to work with triangulated claims and use techniques to handle IBNR

Experience Rating/Burning Cost –Short Tail

Main Steps
1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)
2. Projection of premium to renewal year
3. Projection of losses to renewal year
4. Calculated recoveries per claim and cumulate them by year

2.

	Premium
2000	100,000
2001	112,000
2002	125,440
2003	140,493
2004	157,352
2005	176,234
2006	197,382
2007	221,068
2008	247,596
2009	277,308
2010	310,585
2011	347,855
2012	389,598
2013	436,349
2014	488,711

	Premium Adjusted to Rate 2015
	180,094
	193,948
	208,867
	224,933
	242,236
	260,870
	280,937
	302,547
	325,820
	350,883
	377,874
	406,941
	438,244
	471,955
	508,260

3.

Individual Loses	Claim 1	Claim 2	Claim 3
2000	500	600	-
2001	275	500	100
2002	300	..	..
2003	250	..	..
2004	300	..	..
2005	450	..	..
2006	250	..	..
2007	245	..	..
2008	215	..	..
2009	856	..	..
2010	..	..	..
2011	..	..	..
2012	..	..	..
2013	..	..	..
2014	..	..	..

Individual Loses Inflated to 2015	Claim 1	Claim 2	Claim 3
2000	900	1,081	-
2001	476	866	173
2002	500	..	..
2003	400	..	..
2004	462	..	..
2005	666	..	..
2006	356	..	..
2007	335	..	..
2008	283	..	..
2009	1,083	..	..
2010	..	..	..
2011	..	..	..
2012	..	..	..
2013	..	..	..
2014	..	..	..

4.

Treaty Liability	Claim 1	Claim 2	Claim 3
2000	400	500	-
2001	-	366	-
2002	-	..	..
2003	-	..	..
2004	-	..	..
2005	166	..	..
2006	-	..	..
2007	-	..	..
2008	-	..	..
2009	500	..	..
2010	..	..	..
2011	..	..	..
2012	..	..	..
2013	..	..	..
2014	..	..	..

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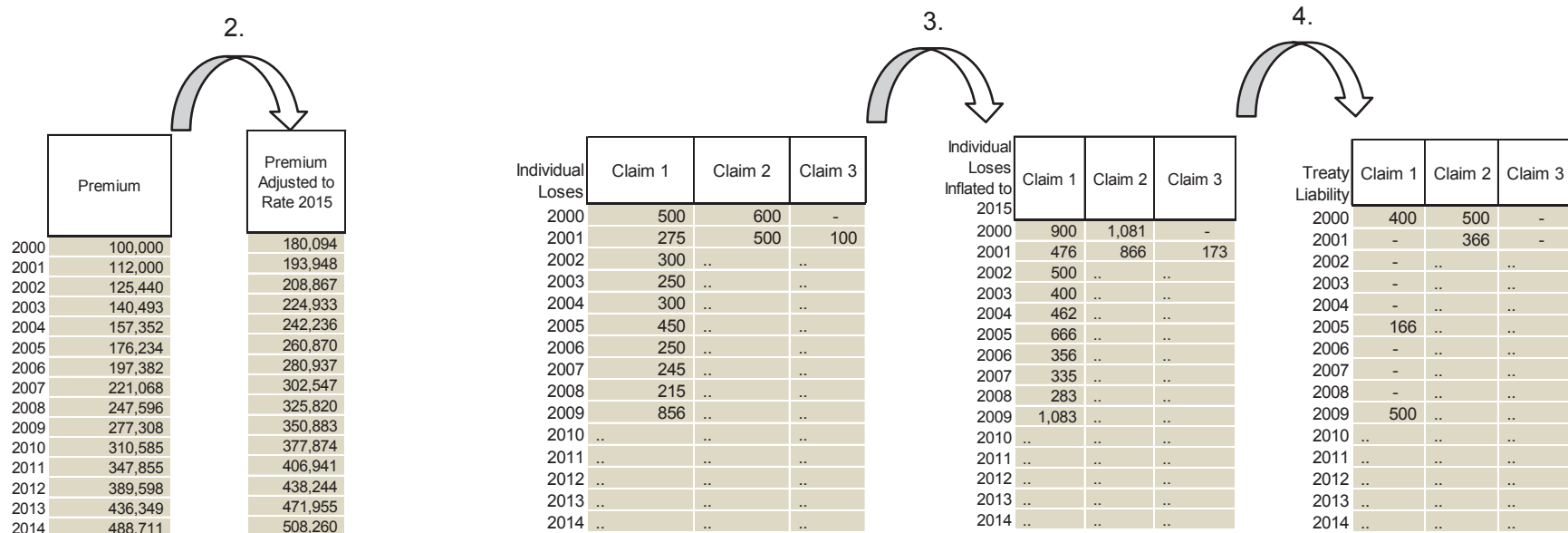
Experience Rating/Burning Cost –Short Tail

Main Steps

1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)
2. Projection of premium to renewal year
3. Projection of losses to renewal year
4. Calculated recoveries per claim and cumulate them by year
5. Calculate rates per year
6. Average technical rate calculated

	Total Reinsure Liabilities	Premium Adjusted to Rate 2015	Rate
2000	400	180,094	0.2%
2001	-	193,948	-
2002	-	208,867	-
2003	-	224,933	-
2004	-	242,236	-
2005	166	260,870	..
2006	-	280,937	..
2007	-	302,547	..
2008	-	325,820	..
2009	500	350,883	..
2010	..	377,874	..
2011	..	406,941	..
2012	..	438,244	..
2013	..	471,955	..
2014	..	508,260	..
	Average	1.50%	
	Standard Deviation	2.30%	

➢ Pure rate = Average [losses to the layer/ Premium]

➢ Risk margin and reinsurer's cost loadings need to be added

$$\text{Loaded Rate} = \frac{(\text{Pure Rate} + \text{Volatility Loading} * \text{Volatility})}{(1 - \text{Reinsurer Costs and Profit})}$$

What should be the loading?

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Loadings in Reinsurance

- Each reinsurer has its own view on loadings, needed to accept XL contract

- Depends on the strategy, market, capital needed to cover the treaty etc.

- **Ways to estimate market loadings (by broker/client)**

  ➢ Estimation from similar contracts on the market (possibility for MTPL, CAT)

  ➢ Market implied loadings from the last year (relation between the last year pure rate and the market price)

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Experience Rating – Long Tail

Main Steps

1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)

2. Projection of losses to renewal year (occurrence year or development year method)

Step 2

Experience Rating – Long Tail

Main Steps

1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)

2. Projection of losses to renewal year (occurrence year or development year method)

3. Losses adjusted for IBNeR, on per loss basis (adjustment for under reserving or over reserving)

Step 3

Experience Rating – Long Tail

Main Steps

1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)
2. Projection of losses to renewal year (occurrence year or development year method)
3. Losses adjusted for IBNeR, on per loss basis (adjustment for under reserving or over reserving)
4. Application of the layer
5. Aggregation of losses on per treaty year basis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2000	0	0	0	76,124	63,506	51,354	39,653	28,386	5,620	10,203	0	31,679	31,679	42,565	42,565
2001	0	0	0	0	0	0	0	0	49,120	25,952	13,312	0	0	0	
2002	0	369,801	399,164	396,363	477,031	438,105	537,451	526,642	1,298,302	1,334,224	1,470,520	1,441,020	1,430,266		
2003	0	0	14,356	65,229	210,623	33,216	0	0	0	0	0	0			
2004	0	0	0	0	0	0	0	0	0	0					
2005	0	0	105,292	97,008	265,675	310,538	294,083	476,628	507,875	507,875					
2006	0	84,587	249,347	223,038	326,214	294,260	310,972	440,267	440,267						
2007	0	221,876	744,044	1,099,853	885,694	674,646	929,943	929,943							
2008	0	232,116	216,782	250,250	298,719	288,506	288,506								
2009	0	0	186,439	332,169	312,055	306,194									
2010	0	82,854	81,922	72,199	72,199										
2011	0	0	0	0											
2012	0	0	0												
2013	0	0													
2014	0														

?

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Experience Rating – Long Tail

Main Steps

1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)
2. Projection of losses to renewal year (occurrence year or development year method)
3. Losses adjusted for IBNeR, on per loss basis (adjustment for under reserving or over reserving)
4. Application of the layer
5. Aggregation of losses on per treaty year basis
6. Development to ultimate (chain ladder, B-F ..)

Step 6

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Ultimate
2000	0	0	0	76,124	63,506	51,354	39,653	28,386	5,620	10,203	0	31,679	31,679	42,565	42,565	
2001	0	0	0	0	0	0	0	0	49,120	25,952	13,312	0	0	0		42,565
2002	0	369,801	399,164	396,363	477,031	438,105	537,451	526,642	1,298,302	1,334,224	1,470,520	1,441,020	1,430,266			490,944
2003	0	0	14,356	65,229	210,623	33,216	0	0	0	0	0	0				476,755
2004	0	0	0	0	0	0	0	0	0	0	0					476,755
2005	0	0	105,292	97,008	265,675	310,538	294,083	476,628	507,875	507,875						169,292
2006	0	84,587	249,347	223,038	326,214	294,260	310,972	440,267	440,267							316,047
2007	0	221,876	744,044	1,099,853	885,694	674,646	929,943	929,943								626,028
2008	0	232,116	216,782	250,250	298,719	288,506	288,506									552,905
2009	0	0	186,439	332,169	312,055	306,194										508,214
2010	0	82,854	81,922	72,199	72,199											222,300
2011	0	0	0	0												126,131
2012	0	0	0													94,598
2013	0	0														18,050
2014	0															0

Experience Rating – Long Tail

Main Steps

1. Understand of covered risk by the treaty and its functionality (reinstatement, AAD etc.)
2. Projection of losses to renewal year (occurrence year or development year method)
3. Losses adjusted for IBNeR, on per loss basis (adjustment for under reserving or over reserving)
4. Application of the layer
5. Aggregation of losses on per treaty year basis
6. Development to ultimate (chain ladder, B-F ..)
7. Adjustment for exposure
8. Calculated average loss
9. **Average technical rate calculated**

Ultimate	Vehicles	Ultimate Adjuste to Exposure
42,565	3,085,701	104,871
490,944	3,924,352	951,089
476,755	4,445,372	815,352
476,755	5,217,020	694,754
169,292	6,709,466	191,825
316,047	7,079,810	339,382
626,028	7,095,573	670,755
552,905	8,161,852	515,015
508,214	8,541,653	452,338
222,300	8,252,642	204,788
126,131	8,120,199	118,090
94,598	8,574,688	83,873
18,050	7,972,699	17,212
0	7,602,522	0
avg '00-'14		396,873
avg '05-'14		328,803
avg '08-'14		294,582

No index clause and discount benefit applied

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Experience Rating Pros and Cons

Pros

Easy to implement and calculate

Easy to see changes because of assumption used

Excel based calculation

Easy to discuss with reinsurers, brokers and reinsurer's pricing actuaries

Cons

Possible to use only for working layer

Very sensitive for input parameters
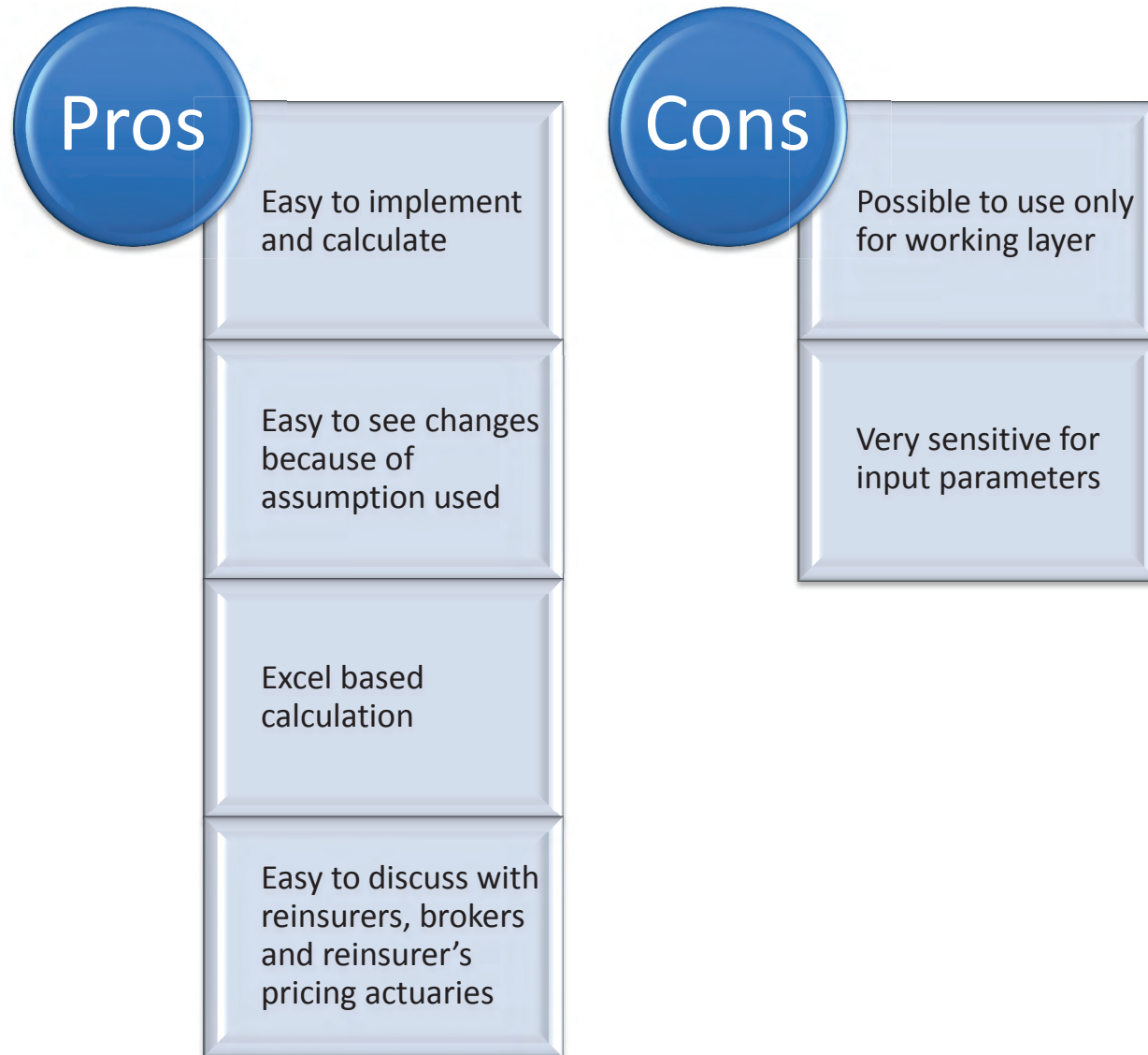
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Exposure Rating

Empower Results®

Exposure Rating

This method combines

➤ Exposure of insurance company, represented by <u>risk profile</u>

➤ Market distribution of losses in the relation to sum insured/PML-<u>damage ratio</u>

> This method is used for the pricing of layer with limited or no loss experience and it's validated on lower layers with some experience or even on artificial layers with lower attachments.

Exposure Rating

We consider an individual risk of insurance portfolio I. Under the assumption of Collective Risk Model, risk i has total claims

$S_i = \sum_{n=1}^{N_i} X_{in}$, where N_i is number of claims, independent claim sizes X_{i1}, X_{i2} ... with distribution function $F_{X_i}(x_i) = P(X_{in} \leq x)$

So unlimited excess of loss cover with retention *a* pays

$$R = \sum_{i=1}^{I} \sum_{n=1}^{N_i} \max(X_{in} - a, 0)$$

So the price of such a layer is expected value of recoveries from the layer

$$E(R) = \sum_{i=1}^{I} E(N_i)E(\max(X_i - a, 0))$$

$$= \sum_{i=1}^{I} \frac{E(N_i)E(\max(X_i - a, 0))}{E(N_i)E(X_i)} E(S_i)$$

$$= \sum_{i=1}^{I} (1 - r_i(a)) E(S_i)$$

Where $r_i(a) := \frac{E(\min(X_i, a))}{E(X_i)}$, which we call loss elimination function.

Exposure curve

Sum insured of the risk i: SI_i

Cumulative density function of so called loss degrees: $G_{Y_i}(y_i)$ $where$ $Y_i = \frac{X_i}{SI_i}$

Reinsurance policy attachment/deductible: a

Normalized attachment: $a' := \frac{a}{SI_i}$

Limited expected value: $L(a') := E[\min(Y, a')] = \int_0^{a'} \left(1 - G_{Y_i}(y_i)\right) dy_i$

Using notation above loss elimination function can be expressed as

$$r_i(a) = \frac{E(\min(X_i,a))\frac{1}{SI}}{E(X_i)\frac{1}{SI}}$$

$$= \frac{E(\min(Y_i,a'))}{E(Y_i)}$$

$$= \frac{L(a')}{L(1)} = \frac{\int_0^{a'}(1-G(y_i))dy_i}{E[Y_i]} \; for \; 0 \le a_N \le 1, and \; r(a_N) := 1 \; for \; a_N \ge 1$$

$\frac{L(a')}{L(1)}$ expresses the ratio of expected loss bellow some normalized attachment a'.

The curve representing the function $r_i(a')$, for $0 \le a' \le 1$, is **called exposure curve**.

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Exposure Rating

We consider an individual risk of insurance portfolio I. Under the assumption of Collective Risk Model, risk i has total claims $S_i = \sum_{n=1}^{N_i} X_{in}$, where N_i is number of claims, independent claim sizes X_{i1}, X_{i2} ... with distribution function $F_{X_i}(x_i) = P(X_{in} \le x)$

So unlimited excess of loss cover with retention a pays

$$R = \sum_{i=1}^{I} \sum_{n=1}^{N_i} \max(X_{in} - a, 0)$$

So the price of such a layer is expected value of recoveries from the layer

$$E(R) = \sum_{i=1}^{I} E(N_i) E(\max(X_i - a, 0))$$

$$= \sum_{i=1}^{I} \frac{E(N_i) E(\max(X_i - a, 0))}{E(N_i) E(X_i)} E(S_i)$$

$$= \sum_{i=1}^{I} (1 - r_i(a)) E(S_i)$$

Where $r_i(a) := \frac{E(\min(X_i, a))}{E(X_i)}$, which we call loss elimination function.

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Exposure Rating with Risk Profile

Exposure rating is done on the whole risk profile of the company.

Risk Profile[EUR]

PML Bands		Number of Risk	Average PML	Premium
From	To			
0	500,000	33,115	174,009	19,840,536
500,001	1,000,000	7,157	716,716	9,412,636
1,000,001	2,000,000	5,258	1,378,240	9,737,979
2,000,001	3,000,000	2,318	2,411,307	6,026,499
3,000,001	4,000,000	1,327	3,425,731	3,838,770
4,000,001	5,000,000	915	4,445,339	3,263,997
5,000,001	7,500,000	1,269	6,023,954	5,210,542
7,500,001	10,000,000	724	8,755,842	3,757,048
10,000,001	15,000,000	530	11,987,695	3,029,078
15,000,001	20,000,000	213	17,280,938	1,442,475
20,000,001	30,000,000	293	25,207,972	1,734,577
30,000,001	40,000,000	108	33,758,063	812,326
40,000,001	50,000,000	15	44,019,305	659,454
50,000,001	80,000,000	10	62,125,636	1,394,822
80,000,001	100,000,000	2	88,788,568	664,500
100,000,001	125,000,000	3	111,557,792	695,844
125,000,001	Higher	1	172,409,284	1,389,326

Exposure curves

➢ On the reinsurance market Swiss re curves are used as a standard approach

Other curves
- Lloyds
- Salzmann (1960 INA Homeowners data)
- ReinsurerCurves (Swiss Re, Munich Re, etc)
- Ludwig (1984-1988 Homeowners and Small Commercial data)
- ISO's PSOLD (Recent Commercial data)

Swiss Re curves are defined by the Y parameters from 0 to 15
- Increasing parameter implies more concave curve and so the lower probability of total loss
- According to the type of risk the right curve should be chosen

Limitation of exposure curves is that these curves were estimated on the market portfolios, so do not have to be accurate and give reasonable results on analysed portfolio.
Two ways to check
1. Validate on loss profile of the company
2. Validation on working layers (amount of losses to the layer implied by the curve)
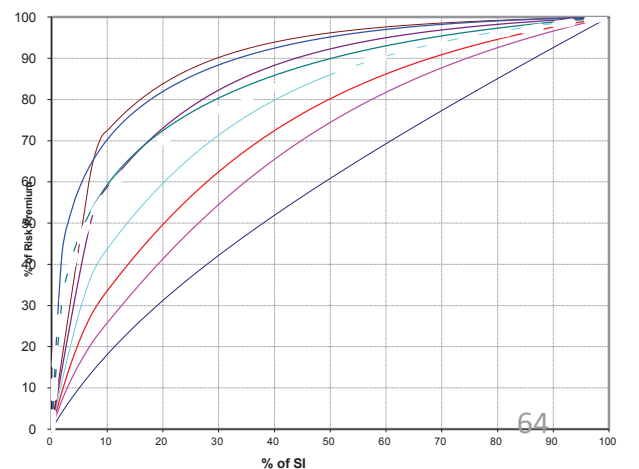
Example: Frequency and Severity implied by Exposure curve

Risk profile:

Band From	Band To	Average SI	Premium	Gross LR	Losses
75,000	150,00	102,172	231,018	30%	69,305
...	...	...	...	...	...

Large loss threshold: **50,000**

- For every band in risk profiles *i* calculate
  1. Expected average loss per band $E(AL_i)$ as a mean of severity distribution function applied for given band, i.e. E(X) x Avg. SI
     - *For example, average loss from exposure curve is estimated as 3.21% of SI, so 102,172 x 3.21% = 3,281 average loss for given band*
  2. Total expected losses per band $E(TL_i)$ as Gross LR x Premium in given band
     - *In this example band 231,018 x 30% = 69,305*
  3. Expected number of losses per band is then total expected losses divided by average loss per band $n_i = \frac{E(TL_i)}{E(AL_i)}$

     - $n_i = \frac{E(TL_i)}{E(AL_i)} = \frac{69,305}{3,281} = 21,12$ – average frequency
  4. Frequency of large losses excess threshold is derived from severity distribution function applied for given band: $n_i \cdot P(X>threshold)$
     - *$n_i' = 21,12$ x $P(X>50,000) = 21.12$x $0.0129 = 0.273$*
- Total frequency of large losses excess threshold is then total frequency of large losses for all bands in risk profile $N = \sum_{i=1}^{M} n_i'$

Monte Carlo Simulation

1. Draw a random number from frequency distribution implied by risk profile and Exposure curve

2. For every loss draw a random number to allocate it stochastically to band (premium or number of policies can be used as a weight)

3. For each loss allocated to band draw a random number from severity distribution in given band implied by exposure curve and risk profile

4. Save result and repeat simulation

	No. of Losses (Poison, Neg. Bin)				
	Band 1	Band 2	Band 3	...	Band M
	Loss 1		Loss 2		

1	Loss1		Loss 2		
2		Loss3		Loss4	Loss 5
...	...	...	...	...	...
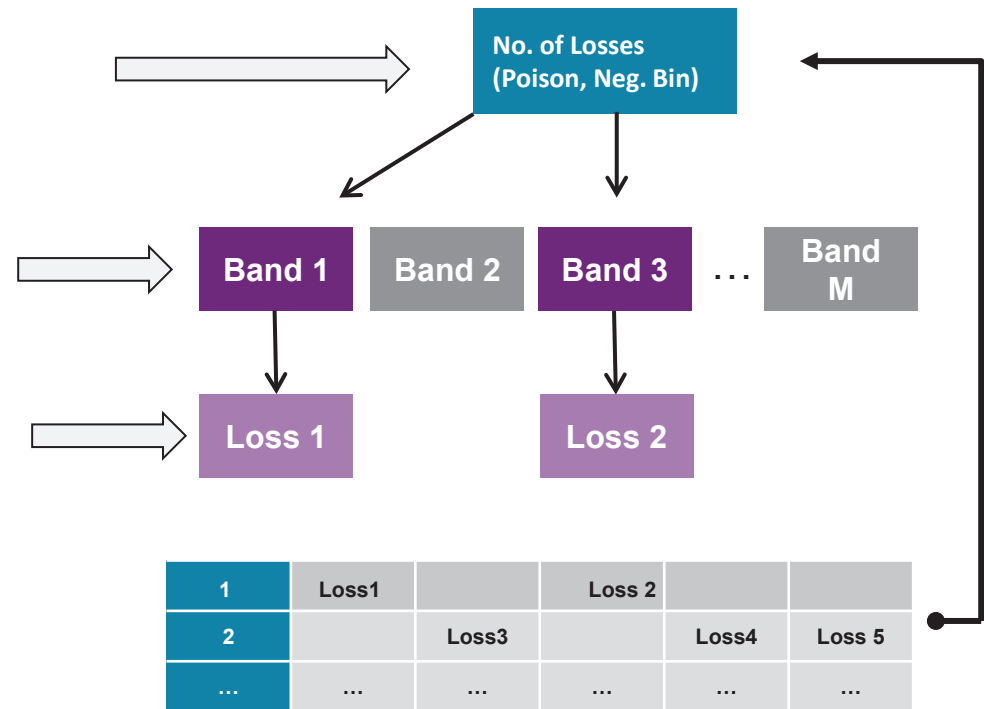
Frequency Severity Rating

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Frequency Severity Rating

- ➢ By the frequency severity rating method, we mean practise of developing a stochastic model of the insurance portfolio, on which is applied desired reinsurance structure
- ➢ It is the mixture between experience rating and exposure
- ➢ Key inputs and assumptions can be from the <u>cedant's portfolio</u> or from the <u>market data</u>
  - ▪ Typical example is frequency of large losses excess of modelling threshold in MTPL modelling or payment pattern of large losses took from the market

- ➢ Simulation can be done
  - ▪ Excel spreadsheet with some addins
  - ▪ Specialized tool for DFA (dynamical financial analyses) (Remetrica, Igloo…)

- ➢ Extremely useful is to build model for pricing and use this model subsequently for the evaluation of reinsurance structure and its optimization
- ➢ Stochastic models are extremely useful when complicated reinsurance structures are applied with different clauses, so we can evaluate each claim and its impact to reinsurance
- ➢ Retrocession and possible accumulation from correlated risks can be captured via stochastic models
- ➢ For the reinsurers, stochastic model is inevitable, because their pricing can be based on the **Risk Based Capital** method, the new treaty contribution to its capital requirement (e.g. TVaR of the whole portfolio and TVaR of the new treaty priced)

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Key Components of Standard Property Model
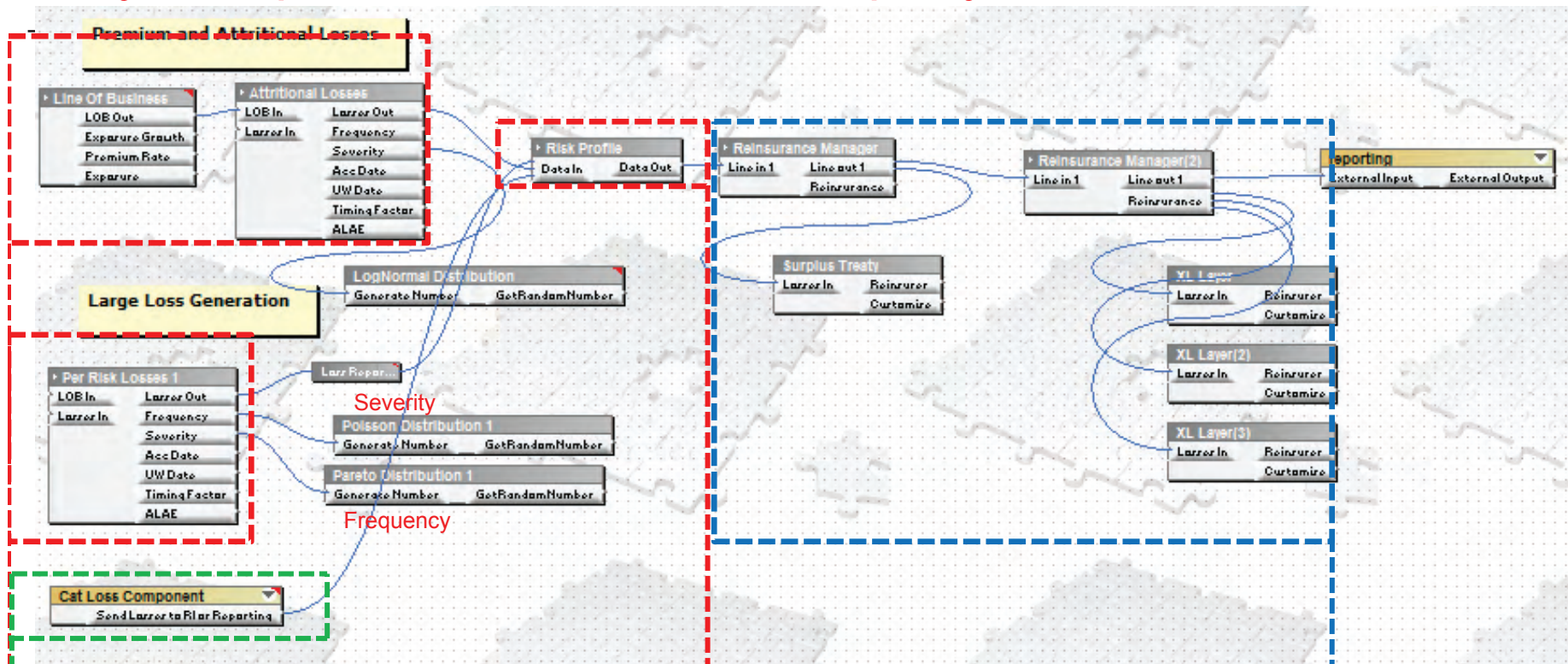
Loss generation is mostly split into
- Attrition losses (small losses)
- Large Losses (losses excess threshold)

Risk Profile
- Possibility to directly generate losses from risk profile via the exposure curve
- Possibility to assign SI to losses, in case of surplus is modelled

Catastrophic Losses
Generated from outputs from Cat models provider (Impact Forecasting- AB,RMS,…)

Reinsurance Structure
- Possibility to apply different structures and see the impact on key metrics

Market Peers Comparison

Market Comparison

- ➢ Market comparison can serve as a good reasonability check of technical pricing (burning cost, exposure, DFA)
- ➢ Brokers have possibility to see prices on the market
- ➢ It works very well for
  - ▪ MTPL (possibility to use Generalized non-linear Quasi likelihood approach*)
  - ▪ Cat XL

MTPL XXX Peers: Rate XS Deductible Company for Rating
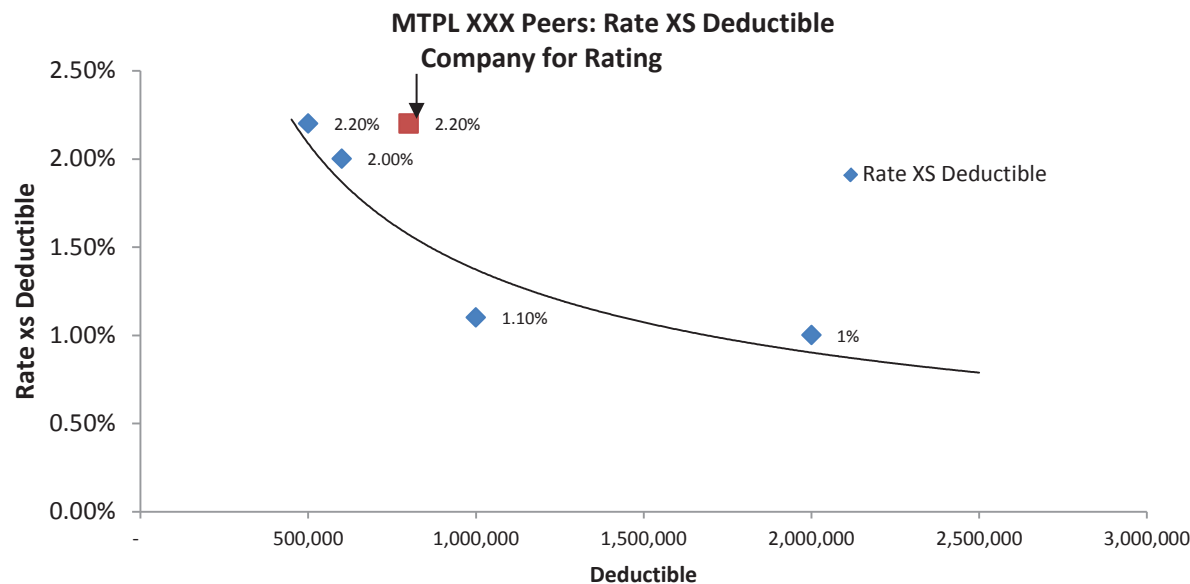
*Benchmark Rates for Excess of Loss Reinsurance Program, Verlaak, Hurlimann, Beirlant, 2005

Final Price Estimation

	Burning Cost	Exposure Rating	DFA	Flat Rate
Non working Layer (3rd Layer)	NO	NO	YES	YES
Partially working layer (2nd Layer)	NO	YES	YES	NO
Working Layer (1st Layer)	YES	YES	YES	NO

Legend: 3rd Layer · 2nd Layer · 1st Layer · Net Ratained

X-axis: 2009 2010 2011 2012

Y-axis (left): 3rd Layer / 2nd Layer / 1st Layer / Priority
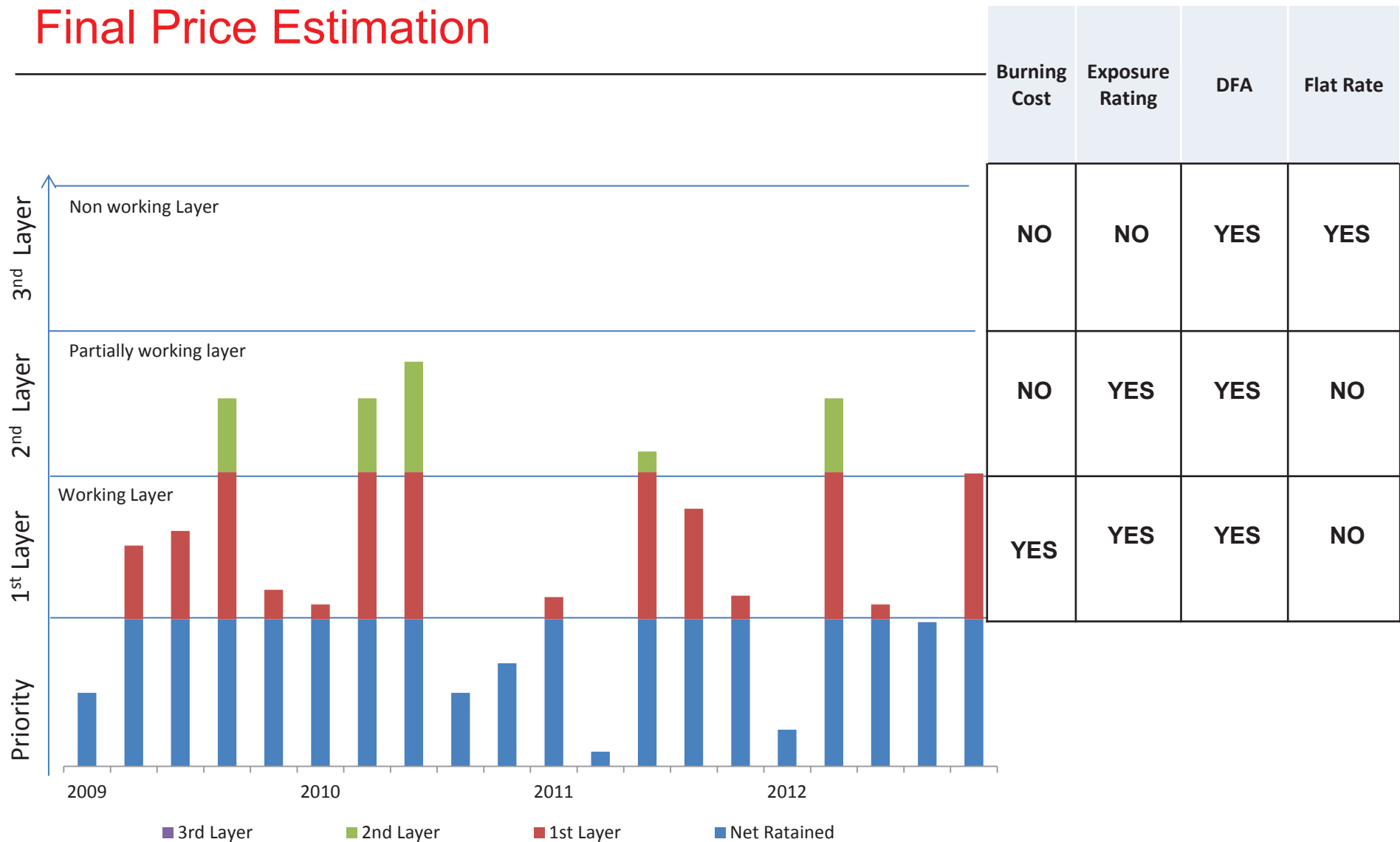
➢ First working layers are usually priced on the burning cost basis purely
➢ Top layers are very often only for capacity purposes and are charged by flat market rate

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Why my quotes differs from reinsurer quotations?

➢ Different assumptions (superimposed inflation, discount rate)

➢ Lead underwriter have different subjective assessment of the risk

➢ Market cycles hard and soft market

➢ Strategic/commercial purposes in pricing

➢ Underwriter/pricing actuary did not consider some information from local market

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Reinsurance Structures and New Trends

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Typical Structures for Property & MTPL

Property

Surplus/QS/XL

Property Non Cat

XL

Catastrophic Reinsurance

Stop Loss/Aggregates

Aggregates

MTPL

Excess of Loss

MTPL

E.g, 1st Layer CZK 10 mio xs CZK 10 mi, 10 free reinstatement

2nd Layer CZK 30 mio xs CZK 20 mio, 10 free reinstatements

3rd Layer unlimited xs CZK 50 mio, unlimited and free reinstatements
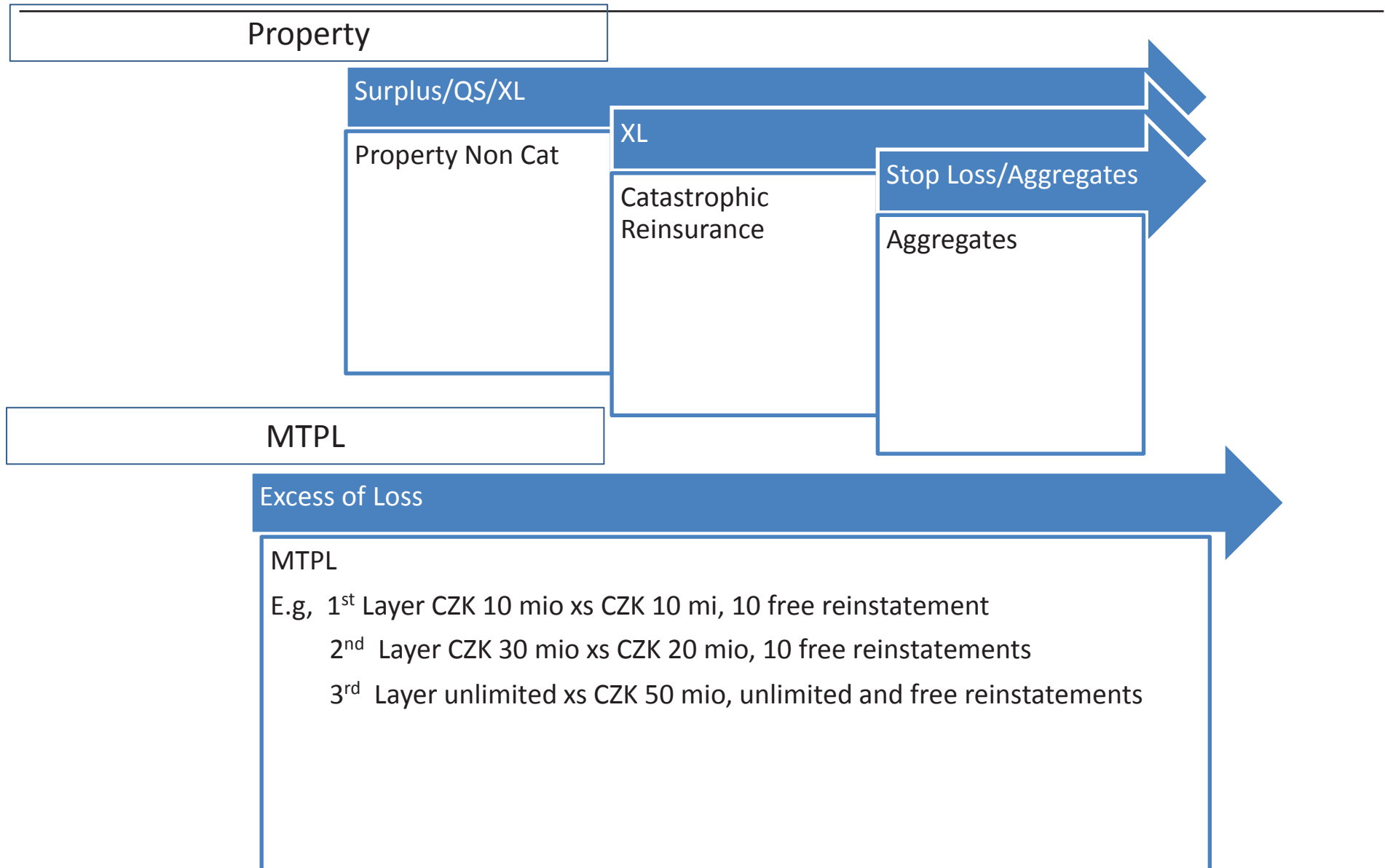
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Reinsurance Structuring Property
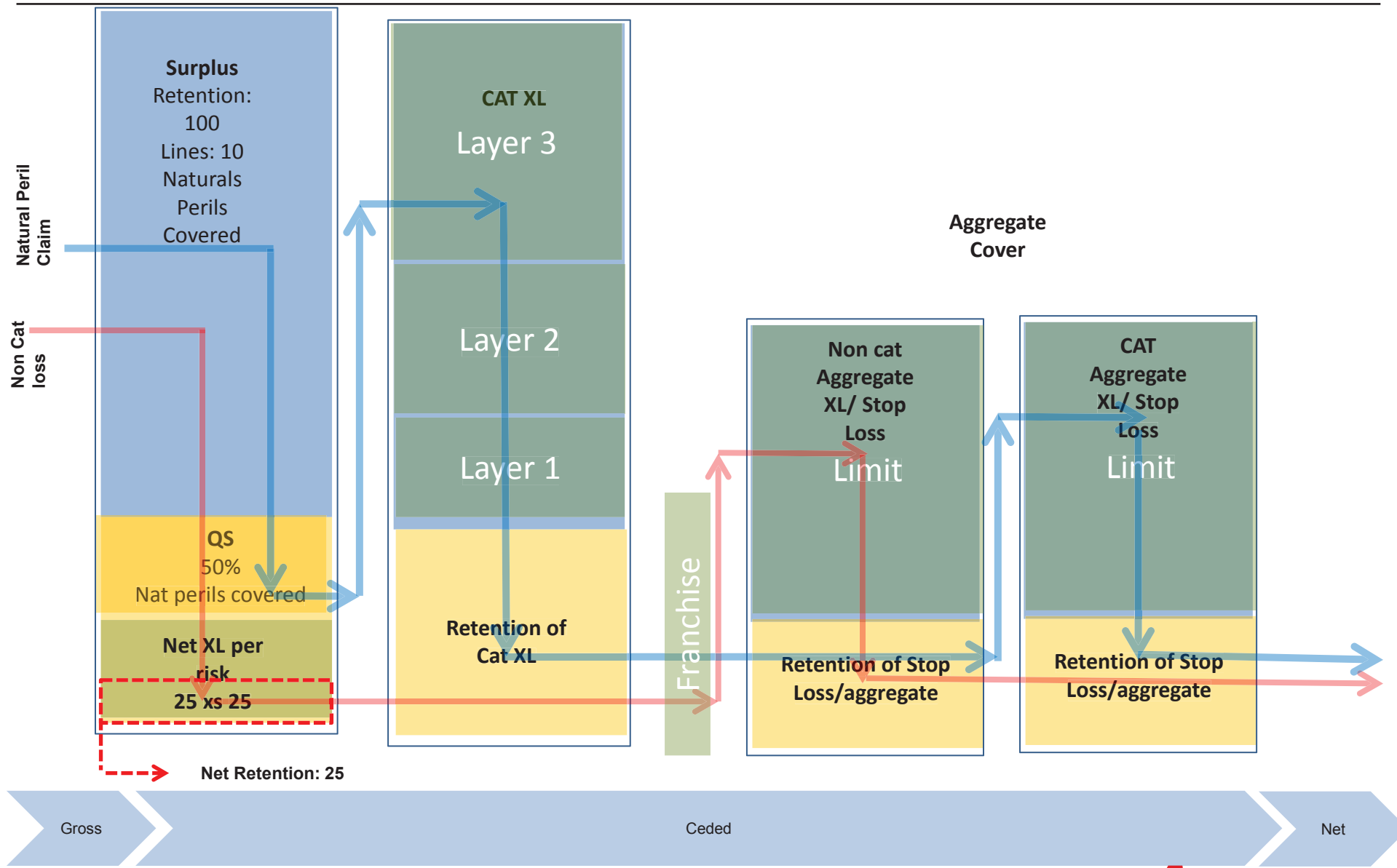
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Reinsurance Structuring "Gross XL Structure"

Property	MTPL	Property CAT	GTPL
Property Excess of Loss	**MTPL Excess of Loss**	**Cat XL Excess of Loss**	**GTPL XL Excess of Loss**
Layer 3	Layer 3	Layer 3	Layer 2
Layer 2	Layer 2	Layer 2	Layer 1
Layer 1	Layer 1	Layer 1	
Retention of Property XL	**Retention of MTPL XL**	**Retention of CAT XL**	**Retention of GTPL XL**

Multi Line Aggregate XL/ Stop Loss

Limit

Retention of Stop Loss/aggregate

➡ Net Retention

Reinstatement Premium (Reinstatement Premium Protection RPP)

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Reinsurance Structure Optimization

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Measuring the efficiency of reinsurance

> **Some key considerations for assessing the efficiency of reinsurance programmes**
>
> **1. Cost of reinsurance (premiums – Recoveries and commission paid on average)** : it is on average the amount paid on average to get the reinsurance cover
>
> **2. Volatility transferred** : it is the reduction of the volatility of the result of the insurer thanks to the reinsurance cover
>
> **3. Value created**: Value is created when the return on capital is higher than the cost of capital
>
> **4. Ceded Return on Equity** : it is the profitability that the insurer would have on the business ceded to the reinsurer

Risk transfer at a cost below
the internal CoC creates value

Value

Results

Return on Capital

Capital

Allocation of Capital

Risks

Reinsurance /
Risk Transfer
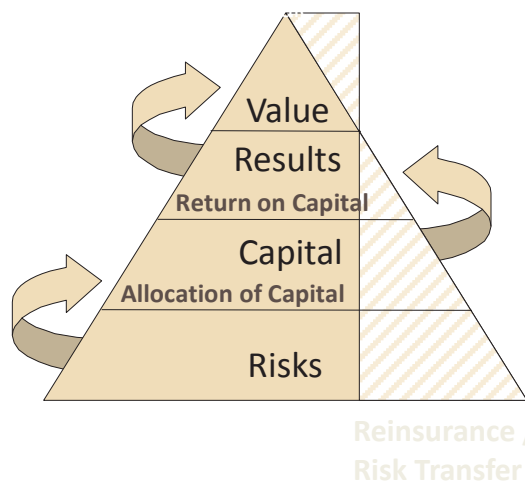
4. How much value created?

3. Cost of ceded RoE?

2. How much capital released?

1. How much volatility transferred?

Value created = CoC * (Gross Required Capital – Net Required Capital) – Cost of Reinsurance
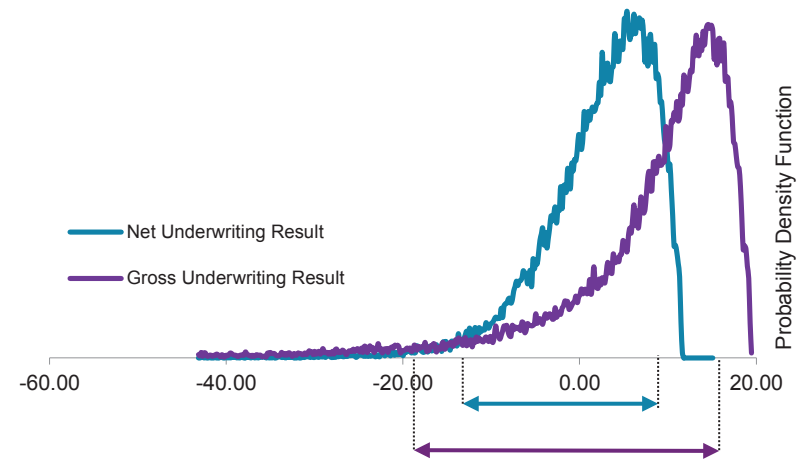
Cost of Capital   **Capital Savings**

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Key Reinsurance Metrics to Look at…

1. Reinsurance result - mean

| Expected Recovery from Reinsurers | − | Reinsurance Premium | = | Technical RI result (Insurer's cost) |

2. Volatility of Net UW Result

Net Underwriting Result
Gross Underwriting Result

Probability Density Function

-60.00   -40.00   -20.00   0.00   20.00

3. Tail Risk

Net Underwriting Result
Gross Underwriting Result

-45.00   -35.00   -25.00   -15.00   -5.00
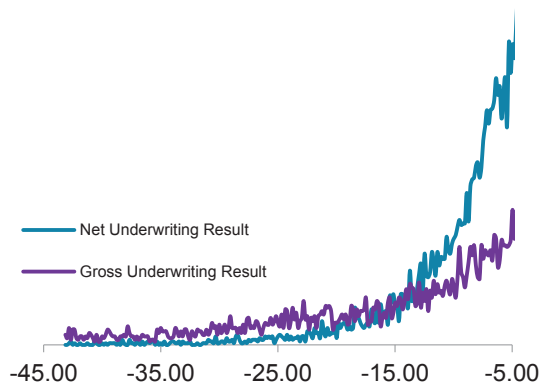
4. Ceded ROE (Return On Equity)

$$\text{Ceded ROE} = \frac{\text{Mean cost of reinsurance}}{\text{Decrease of capital due to reinsurance}}$$

Introducing the concept of Ceded RoE

- Ceded ROE = $\dfrac{\text{Mean cost of reinsurance}}{(\text{Decrease of capital due to reinsurance})}$

  - Where:

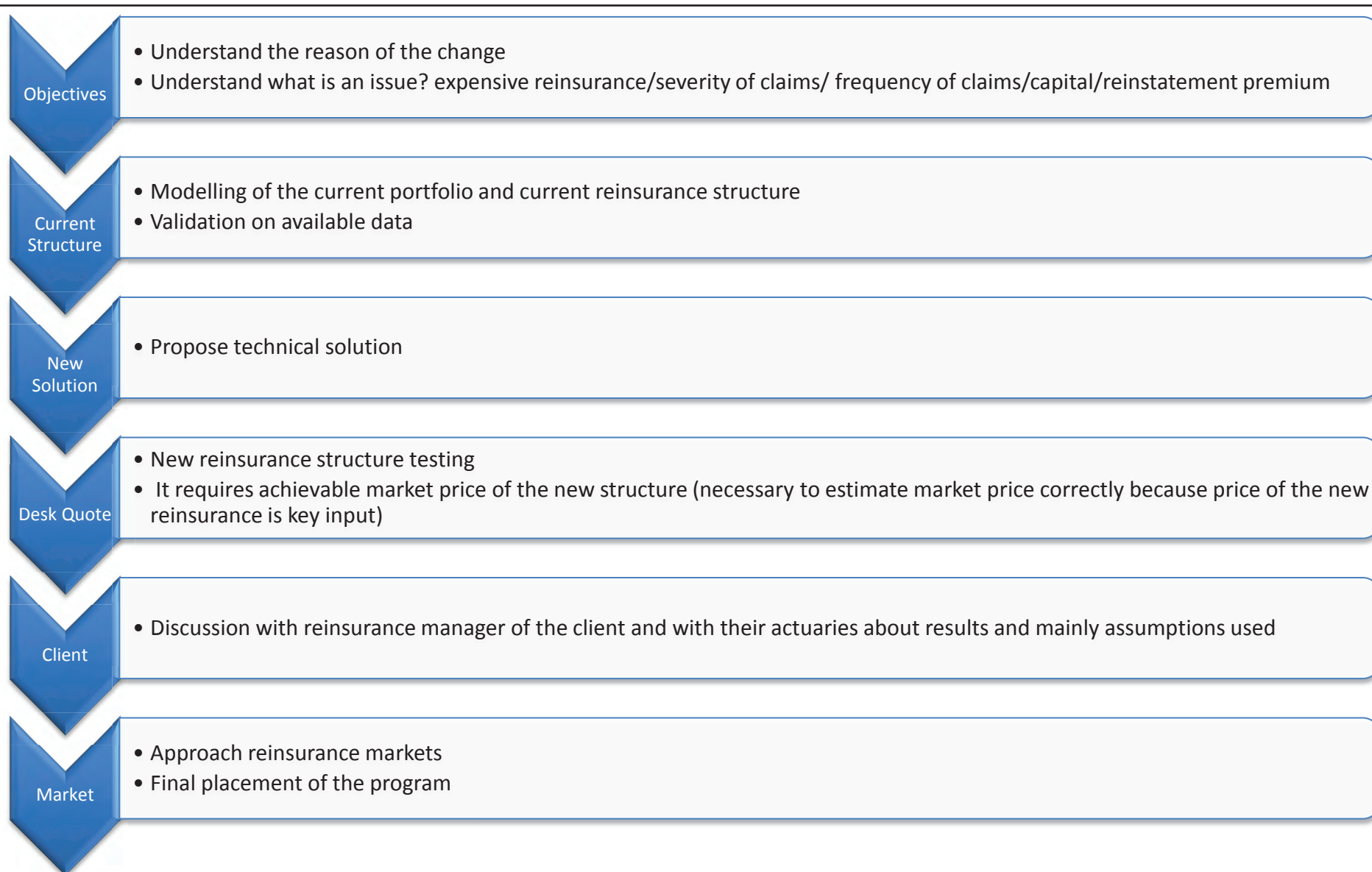   - Mean cost of reinsurance = Reinsurance premium + Mean reinstatement premiums – mean of commissions – mean recoveries
    - Capital in this case is defined as how much capital is needed so that the company has 99,5% chance to pay for the claims (other definitions are possible)

- The ceded RoE represents the profitability that the insurer would have on the business that is ceded to the reinsurer. The lower this rate is the better it is to reinsure.

- Ideal measurement for comparing alternative Reinsurance strategies

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Key Steps in Reinsurance Optimization

Objectives
- Understand the reason of the change
- Understand what is an issue? expensive reinsurance/severity of claims/ frequency of claims/capital/reinstatement premium

Current Structure
- Modelling of the current portfolio and current reinsurance structure
- Validation on available data

New Solution
- Propose technical solution

Desk Quote
- New reinsurance structure testing
- It requires achievable market price of the new structure (necessary to estimate market price correctly because price of the new reinsurance is key input)

Client
- Discussion with reinsurance manager of the client and with their actuaries about results and mainly assumptions used

Market
- Approach reinsurance markets
- Final placement of the program

Questions?

?

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Ďakujem pekne za pozornosť!

Pekného Mikuláša prajem!

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Gilbert note: REINSURANCE and International Financial Markets, Group of Thirty Wahsington DC 2006, p. 11

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