# Reinsurance Treaty Structures and Pricing
## June 4th-5th, 2018

**WillisRe**

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# Purpose of Reinsurance

# What are the benefits of reinsurance for cedents?

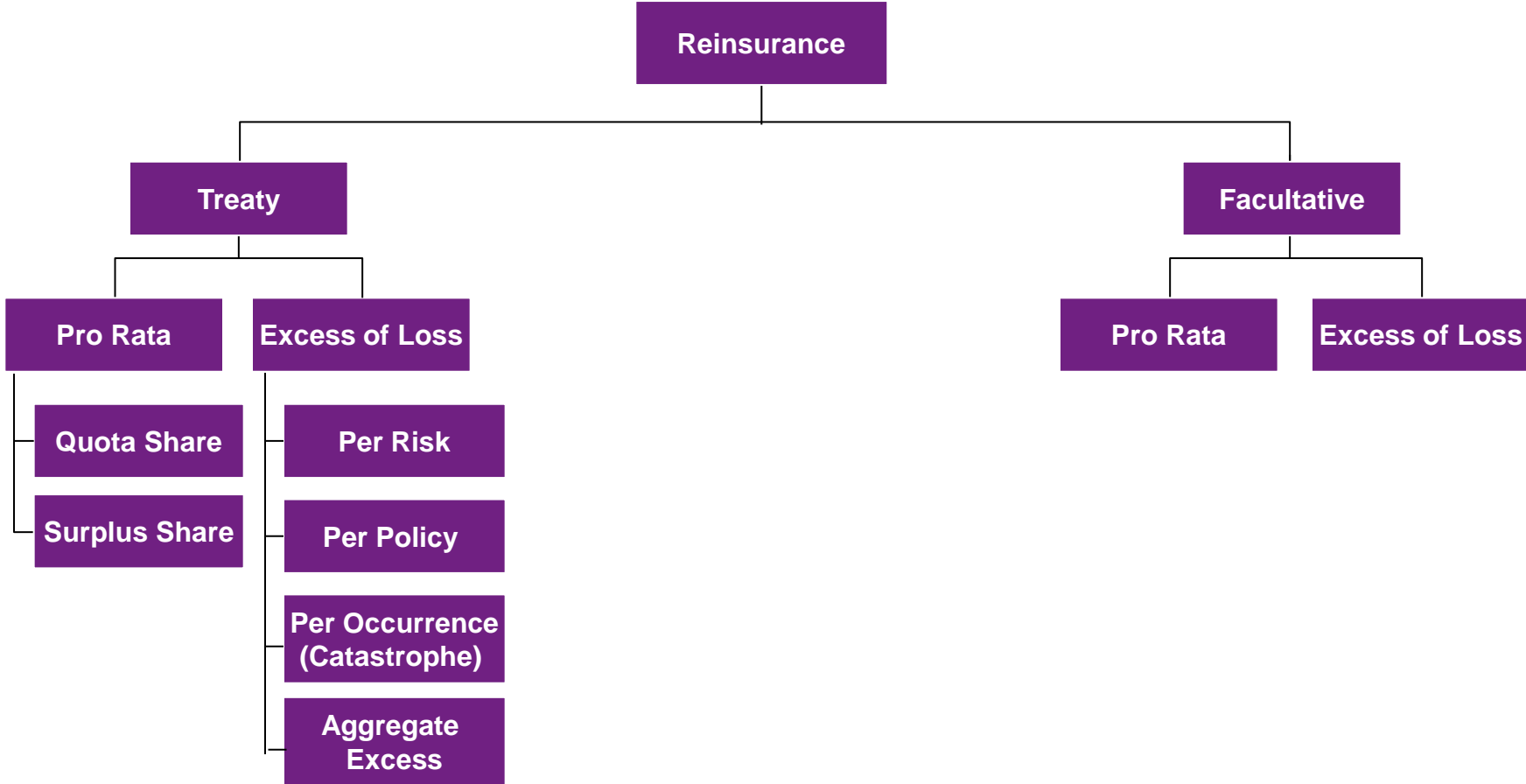| | What reinsurers do | Benefits for cedents |
|---|---|---|
| Risk transfer function | Stabilize financial results by smoothing the impact of unexpected major losses and peak risks | Companies become a more attractive investment proposition and benefit from reduced cost of capital |
| Risk finance function | Offer reinsurance as a cost effective substitute for equity or debt, allowing clients to take advantage of global diversification | Capital freed up, thereby increasing underwriting capacity and enabling growth |
| Information function | Support clients in pricing and managing risk, developing new products and expanding their geographical footprint | Accelerate profitable growth |

# Why does a company need reinsurance?

| | |
|---|---|
| **Source of Capital** | Reinsurance is an affordable source of financial and statutory capital. Additionally, reinsurance can afford relief from regulatory imposed reductions in policyholders surplus, e.g. acquisition costs. |
| **Aid in Premium Growth** | Similar to being a source of capital, reinsurance can aid in cedent's overall premium growth goals. |
| **Provide Catastrophe Protection** | Protection from the financial consequences of a catastrophic event. |
| **Stabilize Loss Experience** | Aids in financial planning, supports growth, encourages capital investment, by reducing net retained volatility. |
| **Increase Policy Limit Capacity** | Enables the insurer to provide larger limits of insurance without placing undue strain on the insurers financial position. |
| **Enter / Exit Market Segment** | Reinsurer expertise and capital support can aid insurers in entering a new line of business. Equally, reinsurance can be used to help an insurer withdraw from a market segment that is unprofitable, undesirable, or does not fit into the strategic plan. |
| **Knowledge and Expertise** | Reinsurers work with a wide variety of insurers and consequently accumulate a great deal of underwriting expertise. Additionally, intermediaries add value through services such as underwriting advice, financial / loss modeling and rating agency consultation. |

# Basic Forms of Reinsurance

# Typical Reinsurance Solutions



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                          ┌──────────────┐
                          │ Reinsurance  │
                          └──────┬───────┘
              ┌──────────────────┴──────────────────┐
       ┌──────────┐                           ┌──────────────┐
       │  Treaty  │                           │ Facultative  │
       └────┬─────┘                           └──────┬───────┘
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 ┌──────────┐ ┌───────────────┐          ┌──────────┐ ┌───────────────┐
 │ Pro Rata │ │ Excess of Loss│          │ Pro Rata │ │ Excess of Loss│
 └────┬─────┘ └──────┬────────┘          └──────────┘ └───────────────┘
```

- Pro Rata
  - Quota Share
  - Surplus Share
- Excess of Loss
  - Per Risk
  - Per Policy
  - Per Occurrence (Catastrophe)
  - Aggregate Excess

# Types of Reinsurance

- Facultative
  - Reinsurance of individual policies submitted to the reinsurer, and the reinsurer can accept or reject any risk submitted
- Why Facultative:
  - Unusual risks
  - Large value risks
  - Restrict liability
  - Reduce accumulation
  - Protect new business

An individual Office Building



- Treaty
  - Reinsurance of multiple policies where a risk falling within the treaty terms are automatically reinsured
- Why Treaty:
  - Simple, automatic and immediate reinsurance protection
  - Enables insurer to give immediate insurance cover to any insured it writes

A book of Homeowners policies

# Types of Reinsurance: Pro Rata

- **Pro Rata**: a type of reinsurance in which the primary insurer and the reinsurer proportionately share the amounts of insurance, policy premiums and losses (including LAE – loss adjustment expense)
  - **Quota Share**
    - Protects a specific account or portfolio of business
    - Shares premium and loss in a fixed proportion for each risk
    - Obligatory
    - Ceding commission is provided to compensate cedents for the expenses they incur to write/service the business (also used to price the RI)
    - Can be applied on a gross account or net account basis
  - **Surplus Share**
    - Retention fixed in dollar amount, called the "line"
    - Premium and loss are shared on each risk in proportion to the retained line as compared to the size of that specific risk (variability in the % ceded)
    - Can be Obligatory or Optional
    - Provides increased capacity to write larger risks
    - Price is determined by level of ceding commission afforded
    - More commonly used in property reinsurance

# Pro Rata Reinsurance: Quota Share

- **Example: 30% Quota Share for all of Insurance Company A's $1M General Liability Policies with a 25% Ceding Commission**
  - The reinsurers will receive 30% of the all the premium Insurance Company A writes for those policies and will also receive 30% of the losses
    - The reinsurers will pay 25% of all the premium they receive back to Insurance Company A in Ceding Commission
  - Insurance Company A will keep 70% of the all the premium and 70% of all the losses
- Loss Example: Insurance Company A receives a $750K liability loss:
  - Reinsurers will pay: $225K
  - Insurance Company A will pay: $525K

## 30% Quota Share Example

$1M

30% Ceded to the Reinsurers
25% Ceding Commission

70% Retained by the Insurance Company

# Pro Rata Reinsurance: Surplus Relief

- One primary function of Quota Share reinsurance is Surplus Relief.  Through Quota Share reinsurance, Insurance Company's can manage their leverage (premium : surplus ratio) by ceding premium to reinsurers.

*Leverage Example: Insurance Company A buys a 25% quota share to manage their leverage*

|  | Surplus | Written Premium | Premium to Surplus Ratio |
|---|---|---|---|
| Gross | 50M | 200M | 4:1 |
| *Ceded* |  | *50M* |  |
| **Net** | **50M** | **150M** | **3:1** |

- Quota Share reinsurance can also provide a surplus benefit to insurance companies through ceding commission

*Ceding Commission Example: Insurance Company A buys a 25% quota share with a 25% ceding commission*

|  | Surplus | Unearned Premium Reserve | Ceding Commission |
|---|---|---|---|
| Gross | 50M | 50M |  |
| *Ceded* |  | *12.5M* | *3.125M* |
| **Net** | **53.125M** | **38.5M** |  |

Notes:  Unearned Premium reserve = Written Premium less Earned Premium (premium earned to a point in time).

# Pro Rata Reinsurance: Surplus Share Treaty

- **Example: 500K Surplus Lines Quota Share with 3 lines, 2M of Capacity**
  - For a 2M risk, reinsurers would receive 75% of the premium and losses
    - 500K line divided by the risk limit equals the amount of quota share protection reinsurers will provide
      - 1.5M would be the maximum amount of capacity that reinsurers would provide (3 Lines (500K xs 3))
  - For a 1M risk, reinsurers would receive 50% of the premium and 50% of the losses

## 3-Line Surplus with a line of $500K

$2M
$1M

25% Retained by the Insurance Company

75% Ceded to Reinsurers

$2M
$1M

50% Ceded to Reinsurers

50% Retained by the Insurance Company

$2M Risk
$500K / $2M = 25%

$1M Risk
$500K / $1M = 50%
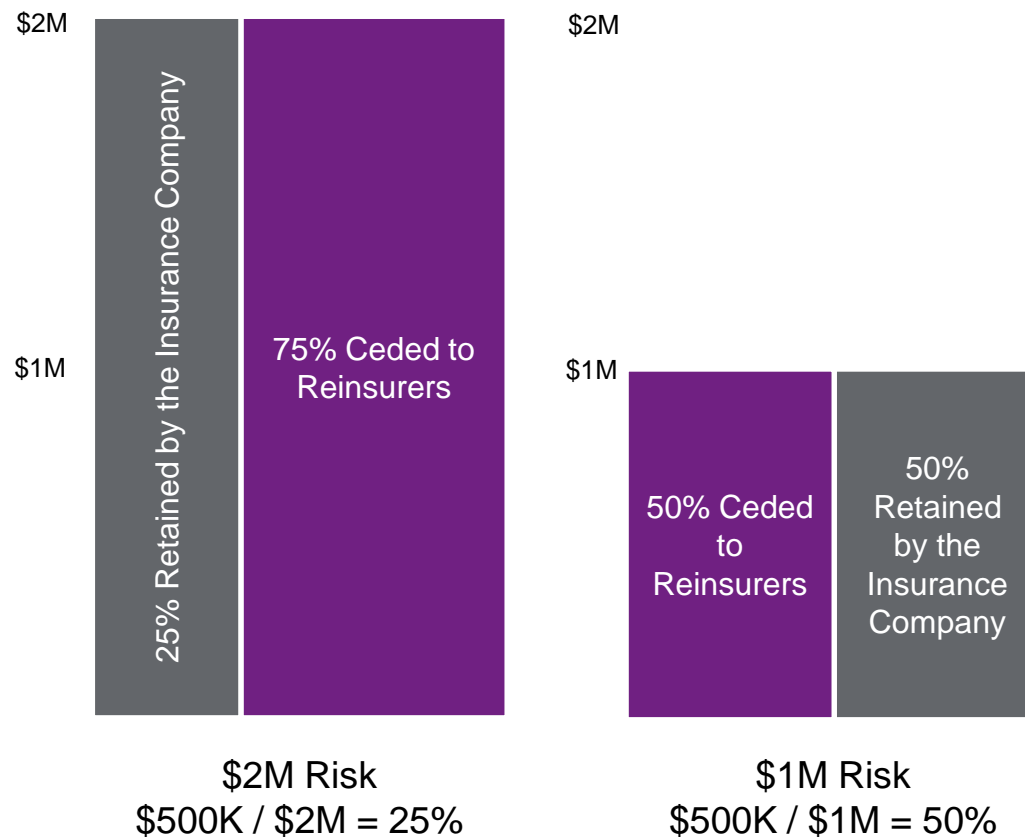
# Why Does a Company Buy Proportional Reinsurance?

| Functions of Reinsurance | Quota Share | Surplus Share |
|---|---|---|
| Source of Capital | Yes | Yes |
| Aid in Premium Growth | Yes | Yes |
| Provide Catastrophe Protection | No, but… | No, but… |
| Stabilize Loss Experience | No | Yes |
| Increase Policy Limit Capacity | No | Yes |
| Enter / Exit Market Segment | Yes | No |
| Knowledge and Expertise | Yes | Yes |

# Types of Reinsurance: Excess of Loss

- **Excess of Loss**:  a type of reinsurance in which the primary insurer is indemnified for losses that exceed a specified dollar amount (retention)
  - Per Risk Excess of Loss
    - Applies separately to each loss occurring to each risk
  - Per Policy Excess of Loss
    - Covers the aggregated losses on a per policy basis that exceed the attachment point for a policy year
  - Per Occurrence Excess of Loss (catastrophe excess of loss)
    - Applies the attachment point and reinsurance limit to the total losses arising from a single event affecting one or more of the primary insurer's policies
  - Aggregate Excess of Loss
    - Applies the attachment point and reinsurance limit to the total losses

# Excess of Loss: Property Per Risk

- **Example: $500K xs $500K Property Per Risk with 2 reinstatements and 2X occurrence limit**
  - The reinsurers will pay the insurance company for losses that are excess of 500K up to a limit of $500K
    - Example: in the case of a 750K fire loss, the reinsurer will pay the insurance company 250K. The insurance company will have a net loss of $500K
  - Reinstatements: in this example the total amount of coverage available for the year is 1.5M (500K x 3)
    - The first reinstatement is free and the second, if triggered, would result in the insurance company paying the full the premium to the reinsurer again
  - Occurrence Limit: restricts coverage in the event of a large occurrence event (i.e. Tornado)
    - In this example the maximum amount of coverage available for a single occurrence is 1M

## Property Per Risk Example

$1M

1st Property Per Risk
$500K xs $500K
2 Reinstatements: 1 Free & 1 @ 100%
2X Occurrence Limit

$500K

Insurance Company Retention
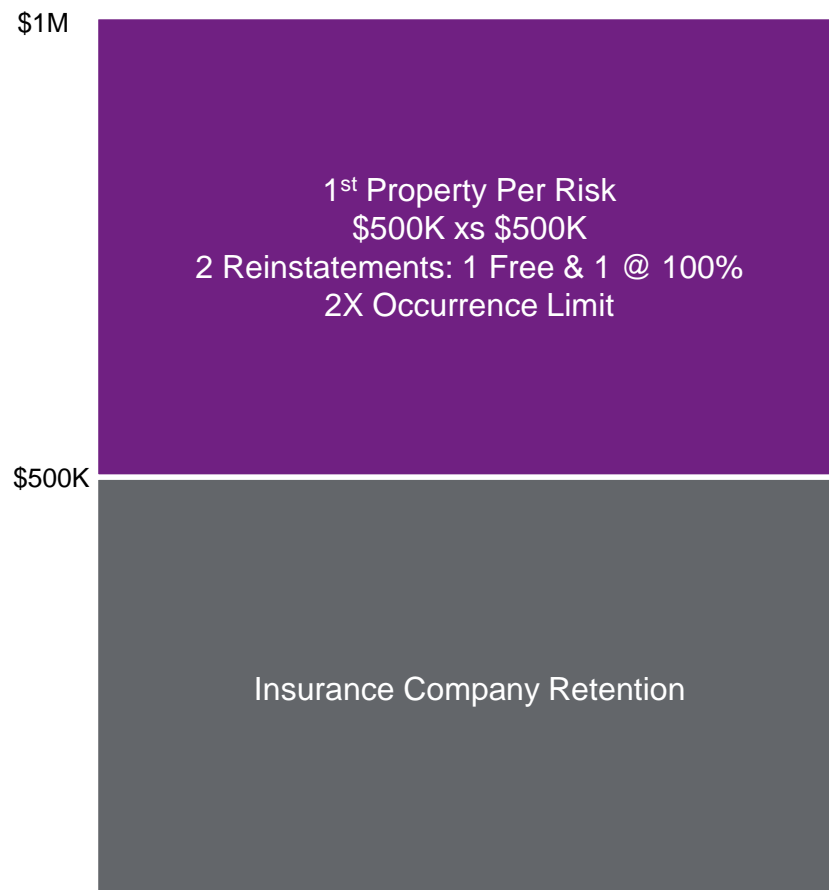
# Excess of Loss: Property Catastrophe Excess of Loss

- **Example: 3 Layer Property Catastrophe Excess of Loss Program**
  - The amount of ground up limit available in this example is $200M
    - If there was a $200M hurricane, the reinsurers will pay the insurance company $175M
    - The insurance company would have a net loss of $25M
  - Catastrophe Excess of Loss programs typically include a reinstatement which is automatically triggered in the event of a loss
    - Typically reinstatements in catastrophe programs are on a "pro rata to amount 100% of time" basis
      - Reinstatements can also be on a "pro rata as to time and amount" basis but this is less common
  - Cat models are typically used to structure and price a catastrophe excess of loss program
    - Rate on Line: Deposit premium / Layer Limit

## Property Cat XOL Example

| | |
|---|---|
| $200M | |
| | 3rd Layers $100M xs $100M Reinstatements: 1 @ 100 |
| $100M | |
| | 2nd Layer $50M xs $50M Reinstatements: 1 @ 100 |
| $50M | |
| | 1st Layer $25M xs $25M Reinstatements: 1 @ 100 |
| $25M | |
| | Insurance Company Retention |
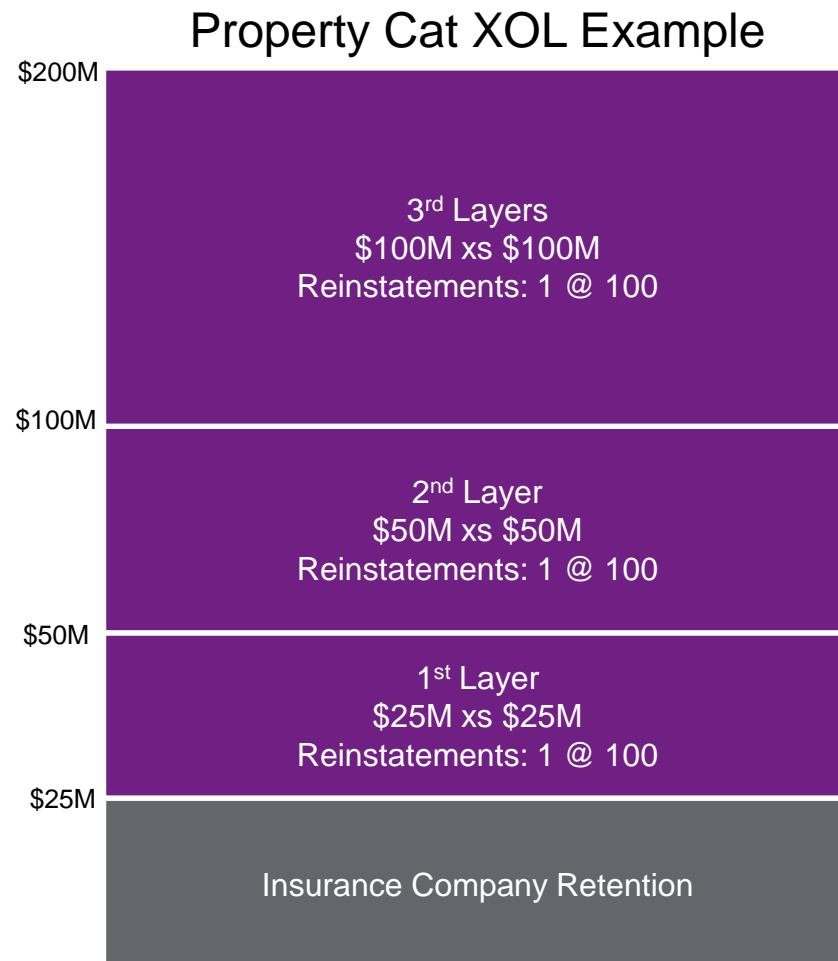
# Excess of Loss: Aggregate Excess of Loss

- **Example: $3M xs $1M in the aggregate with a $1M franchise deductible**
  - Franchise Deductible is a dollar threshold where if the loss is less than the deductible then the loss does not apply. If the loss is over the deductible amount then the full loss would apply to the structure
    - Example 1M franchise deductible:
      - If a company has a 400K loss then $0 will apply to the structure
      - If a company has a 1.1M loss then $1.1M will apply to the structure
  - In an aggregate excess of loss program, all the events that are above the applicable franchise are added together and then applied to the structure:
    - Example: Insurance Company A has 3 losses:
      - 500K Tornado
      - 2M Hurricane
      - 1.5M Winter Storm
    - In this example 3.5M would be applied to the structure so the reinsurer would pay the insurance company 2.5M

## Aggregate XOL Example

$3M

Aggregate Excess of Loss
$3M xs $1M
Franchise Deductible: $1M

$1M

Insurance Company Retention

# Structuring an XOL Program:  Setting a Retention

- Historical Experience
  - Looking at a company's historical experience and identifying a level where losses occur with less frequency
    - If a retention is set around a level where a company has a lot of historical frequency then the reinsurance pricing will be inefficient and result in dollar trading
    - Insurance Company's do not want to pay a reinsurance margin in exchange for loss recoveries they expect to pay anyway
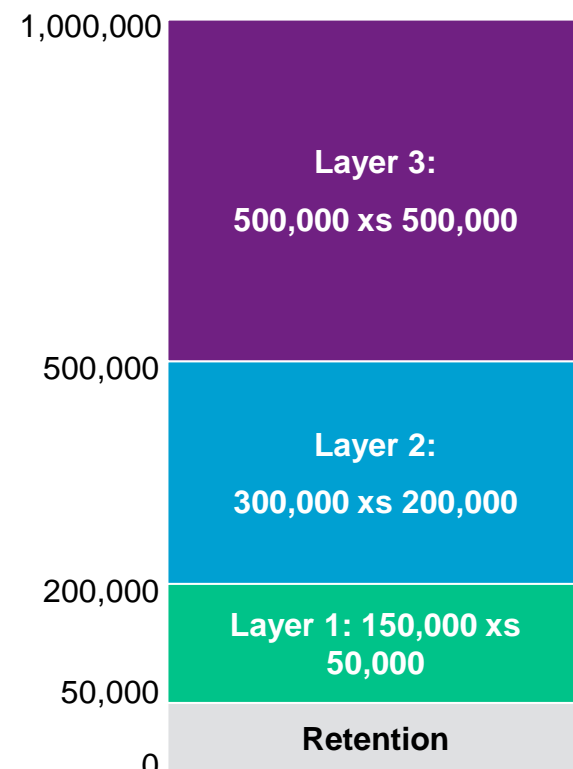
- Financial Strength
  - Another common way to set / analyze retention levels is a % of surplus or % premium
    - If a company exposes a large amount of surplus to a single event (i.e. 20% of surplus) then one loss could financially impair the company

# Structuring an XOL Program: Layering

**An excess of loss treaty is often structured in layers**

**Each layer will attract reinsurers depending on their underwriting policy, which is driven by their appetite for *risk vs. return***

**Layer 3**
- The top (or third) layer operates in excess of the second layer
- The top layer is much further from the ground and has the lowest chance of a loss – however, it carries a smaller premium in relation to the liability assumed

**Layer 2**
- The second layer will operate in excess of the first layer, and therefore the second layer's retention will equal the sum of the first layer's retention plus the limit (size) of the first layer

**Layer 1**
- The bottom (or first) layer gives protection immediately in excess of the reinsured's chosen retention
- Closest to the ground and has the highest chance of a loss – however, it carries a high premium relative to the amount of liability assumed

| Value | Layer |
|---|---|
| 1,000,000 | **Layer 3:** 500,000 xs 500,000 |
| 500,000 | **Layer 2:** 300,000 xs 200,000 |
| 200,000 | **Layer 1:** 150,000 xs 50,000 |
| 50,000 | **Retention** |
| 0 | |

Each layer operates on the same principle – i.e. liability only commences in excess of the layer's retention

# Why Does a Company Buy XOL Reinsurance?

| Functions of Reinsurance | Per Risk Excess | Cat XOL |
|---|---|---|
| Source of Capital | No | No, but… |
| Aid in Premium Growth | No | No |
| Provide Catastrophe Protection | No | Yes |
| Stabilize Loss Experience | Yes | Yes |
| Increase Policy Limit Capacity | Yes | No |
| Enter / Exit Market Segment | No | No |
| Knowledge and Expertise | No | No |

# Pricing Reinsurance Programs

In it's simplest form, all reinsurance pricing is made up of two components or variables:

1. Expected Loss
2. Reinsurers' load for Expenses, Volatility, and Profit Margin

- **Experience Rating** – uses the insurance company's actual experience to develop an expected loss to a reinsurance contract
  - Typically used for "working" layers where there is enough loss experience to conduct a credible analysis
- **Exposure Analysis** – uses the insurance company's actual exposure to identify the portion of the underlying premium that is available to fund losses
  - Typically used for "capacity" layers where the is not enough historical experience to conduct a credible analysis
- **Cat Modeling** – uses the insurance company's actual exposure, as of a certain date, to estimate the expected loss to a reinsurance layer
  - Typically used for reinsurance treaties that have modeled catastrophe exposure

# Sample Experience Analysis

**Ground Up Property Loss Ratio Analysis**

**HO/FO Prop L&ALAE Ratio (000's)**

| Accident Year (1) | Subject Premium (2) | On-Level Factor (3) | On-Level Premium (4)=(2)*(3) | **Paid Loss** Reported L&ALAE (5) | Trended L&ALAE (6) | LDF (7) | Selected L&ALAE (8) | Loss Cost (9)=(8)/(4) | **Incurred Loss** Reported L&ALAE (10) | Trended L&ALAE (11) | LDF (12) | Selected L&ALAE (13) | Loss Cost (14)=(13)/(4) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2007 | 118,887 | 2.295 | 272,799 | 91,543 | 128,598 | 1.000 | 128,599 | 47.1% | 91,543 | 128,598 | 1.000 | 128,596 | 47.1% |
| 2008 | 167,063 | 2.192 | 366,155 | 94,860 | 129,376 | 1.000 | 129,378 | 35.3% | 94,860 | 129,376 | 1.000 | 129,377 | 35.3% |
| 2009 | 189,197 | 2.069 | 391,426 | 106,097 | 140,488 | 1.000 | 140,496 | 35.9% | 106,102 | 140,495 | 1.000 | 140,479 | 35.9% |
| 2010 | 211,388 | 1.898 | 401,236 | 120,253 | 154,595 | 1.000 | 154,627 | 38.5% | 120,253 | 154,595 | 1.000 | 154,581 | 38.5% |
| 2011 | 219,644 | 1.667 | 366,189 | 136,190 | 169,983 | 1.001 | 170,208 | 46.5% | 136,200 | 169,996 | 1.000 | 169,960 | 46.4% |
| 2012 | 226,315 | 1.501 | 339,743 | 127,216 | 154,158 | 1.002 | 154,520 | 45.5% | 127,560 | 154,575 | 1.000 | 154,603 | 45.5% |
| 2013 | 227,622 | 1.423 | 323,809 | 140,684 | 165,512 | 1.003 | 166,060 | 51.3% | 140,790 | 165,638 | 1.001 | 165,800 | 51.2% |
| 2014 | 256,513 | 1.400 | 359,100 | 133,215 | 152,161 | 1.005 | 152,971 | 42.6% | 133,987 | 153,042 | 1.002 | 153,286 | 42.7% |
| 2015 | 290,614 | 1.369 | 397,929 | 210,431 | 233,358 | 1.009 | 235,543 | 59.2% | 211,927 | 235,017 | 1.001 | 235,163 | 59.1% |
| 2016 | 326,763 | 1.308 | 427,458 | 205,412 | 221,157 | 1.030 | 227,395 | 53.2% | 211,780 | 228,013 | 0.997 | 227,348 | 53.2% |
| 2017 | 352,234 | 1.181 | 416,074 | 168,715 | 176,357 | 1.290 | 223,759 | 53.8% | 207,022 | 216,399 | 1.033 | 223,195 | 53.6% |
| Total | 2,586,239 | | 4,061,918 | 1,534,615 | 1,825,743 | | 1,883,557 | 46.4% | 1,582,023 | 1,875,744 | | 1,882,387 | 46.3% |
| 2016 - 2007 | 2,234,005 | | 3,645,844 | 1,365,900 | 1,649,387 | | 1,659,799 | 45.5% | 1,375,001 | 1,659,345 | | 1,659,192 | 45.5% |
| 2016 - 2012 | 1,327,827 | | 1,848,039 | 816,957 | 926,346 | | 936,490 | 50.7% | 826,044 | 936,285 | | 936,200 | 50.7% |

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