Direct Your Learning

11

Aggregate Excess of Loss Treaties

Educational Objectives

After learning the content of this assignment, you should be able to:

- Describe the operation, function, and use of aggregate excess of loss treaties.
- Explain how a retention and limits clause is adapted for use in aggregate excess of loss treaties.
- Explain how aggregate excess of loss treaties are priced.

Outline

Aggregate Excess of Loss Treaties

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OVERVIEW OF AGGREGATE EXCESS OF LOSS TREATIES

Aggregate excess of loss treaties protect a primary insurer from losses occurring during a specified period that exceed a certain dollar amount; they can further protect against such losses that exceed a specified loss ratio, in which case they are also called stop loss treaties. Aggregate excess of loss reinsurance, when responding to catastrophe losses, provides broader stabilization of loss results than catastrophe reinsurance—but it can be more difficult to obtain.

Aggregate excess of loss treaties operate similarly to other types of excess of loss reinsurance, but they are less commonly used, and they function to stabilize a primary insurer's loss results. While aggregate excess of loss treaties can be used for both property and liability loss exposures, many reinsurers only consider writing for property classes of business, such as crop-hail insurance and automobile physical damage.

Operation of Aggregate Excess of Loss Treaties

Aggregate excess of loss treaties cover an accumulation of losses that may arise from a catastrophe or from an unforeseen accumulation of several independent losses over a specified period, usually one year. The retention and limit of an aggregate excess of loss treaty can be stated as either a dollar amount or a loss ratio.

Retention and Limit by Dollar Amount

The fictional example of Barnley Insurance Company (Barnley) illustrates how an aggregate excess of loss treaty that uses a dollar amount retention and limit is applied.

Barnley specializes in general liability insurance for policyholders that have significant product liability loss exposures. Because Barnley was concerned that defective products could cause bodily injury to thousands of consumers—and that even modest individual losses could accumulate to amounts that might be devastating without reinsurance—it established a reinsurance program consisting of a casualty per occurrence excess of loss treaty and a 90% of $5 million xs $10 million aggregate excess of loss treaty.

At the end of the year, Barnley's general liability in-force policies incurred $20 million in losses, $5 million of which was recovered from its casualty per occurrence excess of loss reinsurers, leaving Barnley with a net incurred loss of $15 million. The aggregate excess of loss treaty indemnified Barnley for $4.5 million of this $15 million net incurred loss. The exhibit shows how Barnley's loss recovery was calculated. See the exhibit "Aggregate Excess of Loss Example for Barnley Insurance Company."

Aggregate Excess of Loss Example for Barnley Insurance Company

Gross losses incurred	$20,000,000
Minus recovery from other (inuring) reinsurance	(5,000,000)
Net losses incurred	$15,000,000
Minus aggregate excess of loss retention	(10,000,000)
Loss covered by aggregate excess of loss	$ 5,000,000
Aggregate excess of loss recovery (0.90 × $5,000,000)	$ 4,500,000
Barnley's overall loss:	
Aggregate excess of loss retention	$10,000,000
Net loss after aggregate excess of loss recovery ($5,000,000 – $4,500,000)	500,000
Total overall loss	$10,500,000

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Assuming Barnley had earned premiums of $20 million, the aggregate excess of loss treaty improved the company's loss ratio for its in-force policies from 75 percent ($15 million ÷ $20 million) to 52.5 percent ($10.5 million ÷ $20 million).

Retention and Limit by Loss Ratio

Aggregate excess of loss treaties that state the primary insurer's retention and the reinsurer's limit of liability in terms of a loss ratio are typically used to reinsure property loss exposures. The fictional example of Minter Insurance Company (Minter) illustrates how an aggregate excess of loss treaty that uses a loss ratio retention and limit is applied.

Minter has a portfolio of in-force property policies and extensive catastrophe treaty protection. Even so, Minter's recent market-share growth has reduced its policyholders' surplus, and management does not want to jeopardize projected earnings.

Based on past loss experience, Minter believes that it will have a 70 percent loss ratio but could sustain in excess of a 75 percent loss ratio without significant repercussions from stockholders. Minter purchases an aggregate excess of loss treaty that covers 90 percent of incurred losses in excess of a 75 percent loss ratio up to a 110 percent loss ratio. The exhibit shows how Minter's stop loss treaty would apply to a 100 percent net loss ratio. See the exhibit "Stop Loss Example for Minter Insurance Company."

Stop Loss Example for Minter Insurance Company

	Amounts	Aggregate Excess of Loss Treaty Recovery
Net earned premiums	$20,000,000	
Gross losses incurred	$25,000,000	
Minus recovery from other (inuring) reinsurance	(5,000,000)	
Net losses incurred and net loss ratio	$20,000,000	100%
Minus aggregate excess of loss treaty retention (75% of net earned premiums)	(15,000,000)	75%
Amount exceeding retention	$ 5,000,000	25%
Recovery from treaty (0.90 × $5,000,000)	$ 4,500,000	22.5%
Net loss after stop loss treaty ($20,000,000 – $4,500,000)	$15,500,000	77.5%

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Before applying the aggregate excess of loss treaty, Minter had a loss ratio of 100 percent ($20 million ÷ $20 million). The treaty reduced Minter's loss ratio to 77.5 percent ($15.5 million ÷ $20 million).

Function of Aggregate Excess of Loss Treaties

The function of aggregate excess of loss treaties is to stabilize the primary insurer's loss results. Unlike other types of excess of loss reinsurance that have per risk or per occurrence limits, an aggregate excess of loss treaty has an attachment point and limit that encompass all net losses. Once losses exceed the primary insurer's retention, future losses are indemnified by the reinsurer up to the treaty limit. Therefore, aggregate excess of loss treaties are the most effective type of reinsurance in stabilizing primary insurers' loss ratios. However, the greater the loss stability provided by the aggregate excess of loss treaty, through low retentions and high limits, the more expensive the reinsurance coverage.

Aggregate Excess of Loss Treaties as Part of a Reinsurance Program

The primary insurer usually seeks recovery from aggregate excess of loss treaties after all other reinsurance recoveries. Aggregate excess of loss treaties protect primary insurers from overall adverse loss experience, including the primary insurer's net retentions of otherwise unreinsured and partially reinsured in-force policies.

Aggregate excess of loss treaties are most often used with property insurance, but they can also be used to control adverse loss experience arising from liability insurance. An aggregate excess of loss treaty can be designed to cover all in-force policies that a primary insurer sells, or a subset of in-force policies.

Aggregate excess of loss treaties are less commonly used than other types of excess of loss reinsurance. However, aggregate excess of loss treaties are often used to reinsure crop-hail insurance and to reinsure small insurers for various types of insurance. Crop-hail insurance indemnifies the farmer when hail damages or destroys crops. A primary insurer's crop-hail insurance in-force policies could be extremely profitable one year and have devastating losses the next. A primary insurer's reinsurance program for its crop-hail business may include a quota share treaty; first-, second-, and third- layer surplus share treaties; and an aggregate excess of loss treaty. Such a program is justified because of the significant adverse loss potential.

An aggregate excess of loss treaty limits the effect of underwriting losses on policyholders' surplus. Because of this, a small primary insurer may purchase an aggregate excess of loss treaty to protect its policyholders' surplus and, therefore, its balance sheet position.

Small insurers are not the only ones that use aggregate excess of loss treaties. Some large stock insurers purchase aggregate excess of loss treaties, generally with large retentions, so that unexpected losses do not have an adverse effect on their income statements. This helps to protect the insurers' projected earnings and, therefore, potentially their stock prices.

Reinsurance marketplace dislocations (supply not meeting demand) can create gaps in reinsurance programs. An inadequate catastrophe reinsurance program or unplaced layers of a catastrophe treaty may result in additional retentions for primary insurers and be included in their net retention under the aggregate excess of loss treaty.

RETENTION AND LIMITS CLAUSE ADAPTED FOR AGGREGATE EXCESS OF LOSS TREATIES

Aggregate excess of loss treaties contain many of the same clauses as other excess of loss treaties; however, some of these clauses may not be needed or may be adapted for use in aggregate excess of loss treaties.

Aggregate excess of loss treaty definitions of ultimate net loss and loss occurrence are often similar to the definitions in other excess of loss treaties. One notable difference is that aggregate excess of loss treaties do not define an occurrence when the retention is stated as a loss ratio.

It is unusual for an aggregate excess of loss treaty to contain a **reinstatement clause** because the treaty's reinsurance limits are high enough to absorb the foreseeable worst-case loss year. Also, treaties that define limits in terms of the loss ratio do not include reinstatement provisions because only one final loss ratio exists for the year. If a reinsurer is unwilling to provide the reinsurance limits that the primary insurer wants, the primary insurer can try to purchase a second layer of aggregate excess of loss reinsurance to cover losses exceeding the first layer.

Reinstatement clause
A reinsurance treaty clause that reinstates the treaty's original per occurrence limit after a loss occurrence for a predetermined premium, subject to a maximum recovery for the contract year.

Aggregate excess of loss treaties typically contain a retention and limits clause. This clause may contain both internal and outside retentions and limits and can apply on a losses occurring or losses incurred basis.

Internal and Outside Retentions and Limits

For an aggregate excess of loss treaty with the retention and limit stated as dollar amounts, the primary insurer would retain a flat dollar amount of aggregate loss during the treaty term. In some cases, an aggregate excess of loss treaty may have two retentions.

The first retention is a lower, or internal, retention. The internal retention is usually a flat dollar amount applied to each loss (similar to a deductible), which the primary insurer retains and applies on a per risk or per occurrence basis. Few of the primary insurer's losses will exceed the internal retention. The internal retention protects the treaty against smaller losses.

The second retention is an aggregate, or outside, retention. The outside retention may be higher than the primary insurer's annual net written premiums. For the treaty to respond, the sum of losses exceeding the internal retention must exceed the outside retention during the treaty term.

The aggregate excess of loss treaty may also have two reinsurance limits. The internal limit applies above the internal retention and is the maximum loss that can be applied to the outside retention. The outside limit is the most that the reinsurer will pay after the primary insurer meets the outside retention. See the exhibit "Sample Retention and Limits Clause With Internal and Outside Retentions."

In the "Sample Retention and Limits Clause" exhibit, the primary insurer has an internal limit of $4 million in excess of an internal retention of $1 million for each loss occurrence, subject to an outside retention of $6 million. The primary insurer would have to experience more than one loss over $1 million to recover under the treaty. One $5 million loss would contribute $4 million toward the outside retention. Another $3 million loss would contribute an additional $2 million to the outside retention. Those two losses would meet

Sample Retention and Limits Clause With Internal and Outside Retentions

No claim shall be made hereunder during any contract year until the Company's subject excess ultimate net loss arising out of loss occurrences commencing during the contract year exceeds $6,000,000 in the aggregate. The Reinsurer shall then be liable for 95 percent of the amount by which the Company's subject excess ultimate net loss for the contract year exceeds $6,000,000 in the aggregate, but the liability of the Reinsurer shall not exceed 95 percent of $10,000,000 in total during any one contract year.

"Subject excess ultimate net loss" as used herein shall mean the amount by which the Company's ultimate net loss arising out of any one loss occurrence exceeds $1,000,000, but said amount shall not exceed $4,000,000 in excess of $1,000,000.

In addition to its initial retention each loss occurrence and its aggregate retention each contract year, the Company shall retain 5 percent of the excess ultimate net loss to which this Contract applies.

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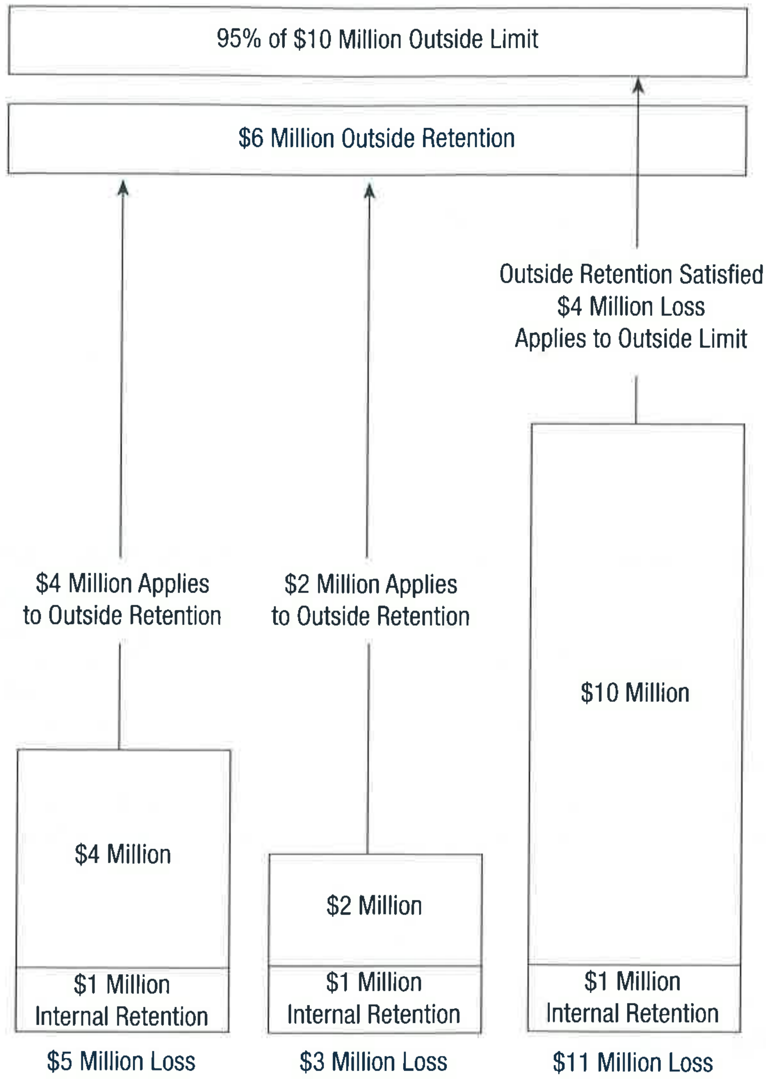
the outside retention of $6 million. The next loss that exceeds $1 million would be recoverable under the aggregate excess of loss treaty. The maximum single loss occurrence that can contribute to the treaty is $5 million because the internal limit is $4 million in excess of $1 million. Therefore, even if the primary insurer had an $11 million loss, only the $4 million in excess of the internal $1 million retention would count toward the outside retention and the outside limit. The exhibit illustrates how the retention and limits clause applies to these losses. See the exhibit "Aggregate Excess of Loss Internal and Outside Retentions and Limits."

In the "Aggregate Excess of Loss" exhibit, the first two losses combined satisfy the $6 million outside retention. The third loss for $11 million is split:

- $1 million internal retention
- 95 percent of $4 million covered by the outside limit
- $6 million, plus 5 percent of $4 million, not reinsured or covered by the treaty

Aggregate Excess of Loss Internal and Outside Retentions and Limits



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Losses Occurring Basis

The retention and limits clause for an aggregate excess of loss treaty can apply to losses on a losses occurring or losses incurred basis. On a losses occurring basis, reinsurance applies to losses that have an occurrence date within the treaty term. Accordingly, the retention and limits clause may indicate these provisions:

- The reinsurance applies to the total of all losses that occur during the treaty term.
- The retention is the greater of a dollar amount or a loss ratio.
- The reinsurance limit is stated as a loss ratio or dollar amount (sometimes the lesser of the two).
- A co-participation provision is included.

The exhibit is an example of a retention and limits clause attaching on a losses occurring basis. Ultimate net loss may be defined in the definitions clause, or elsewhere in the treaty. See the exhibit "Sample Retention and Limits Clause—Losses Occurring Basis."

Sample Retention and Limits Clause—Losses Occurring Basis

During the term of this Contract, the Company shall retain and be liable for an amount of ultimate net loss equal to the greater of $50,000,000 or 80 percent of its net earned premiums for the term of this Contract. The Reinsurer shall then be liable for 95 percent of the amount by which the Company's ultimate net loss exceeds its retention, but the liability of the Reinsurer shall not exceed 95 percent of $10,000,000 as respects the term of this Contract.

In addition to its initial retention, the Company shall retain, net and unreinsured elsewhere, 5 percent of the excess ultimate net loss to which this Contract applies.

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Losses Incurred Basis

The retention and limits clause on a losses incurred basis is the same as a losses occurring basis regarding retention, limit, and co-participation provision. The difference is in the coverage of reserve changes and the effect of settling prior years' claims during the treaty term. If a reserve for an outstanding loss is changed, the change affects incurred losses for the current year even though the actual loss occurred several years prior. See the exhibit "Sample Retention and Limits Clause—Losses Incurred Basis."

Incurred but not reported (IBNR) reserves
A reserve established for losses that reasonably can be assumed to have been incurred but not yet reported.

Reserves usually include **incurred but not reported (IBNR) reserves**. The reinsurer entering into a treaty that applies on a losses incurred basis should ascertain whether the IBNR reserves are adequate. If they are not, the primary

Sample Retention and Limits Clause—Losses Incurred Basis

No claim shall be made under this Contract for any accident year unless and until the Company shall have first incurred an amount of ultimate net loss on business covered during the accident year in excess of the greater of $10,000,000 or 80 percent of its net earned premium for the accident year. The Reinsurer shall then be liable for 95 percent of the amount by which the Company's ultimate net loss exceeds its retention, but the liability of the Reinsurer shall not exceed 95 percent of the lesser of $2,000,000 or 15 percent of the Company's net earned premium for the accident year under consideration.

In addition to its initial retention, the Company shall retain, net and unreinsured elsewhere, 5 percent of the excess ultimate net loss to which this Contract applies.

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insurer may increase its IBNR reserves to reflect the reserve inadequacy and try to pass along that deficiency to the reinsurer.

The losses incurred basis is used much less frequently than the losses occurring basis because of unfavorable accounting treatment under Financial Accounting Standards Board Statement No. 113 (FAS 113). Because incurred losses include prior years' reserves, FAS 113 treats a losses incurred basis treaty as a retroactive reinsurance agreement, which subjects it to a less-favorable accounting treatment. Typically, retroactive reinsurance agreements are only used to help stabilize policyholders' surplus or to terminate the liabilities associated with specific types of insurance so that a merger or acquisition can proceed without these unwanted liabilities.

AGGREGATE EXCESS OF LOSS TREATY PRICING

Aggregate excess of loss reinsurance is always purchased on a treaty basis because it is designed to apply to a large number of loss exposures.

The method of pricing aggregate excess of loss treaties is similar to other types of excess of loss reinsurance. Reinsurers develop a price by estimating the amount of losses that will fall between the primary insurer's retention and the reinsurance limit.

However, as aggregate excess of loss treaties respond to large losses and significant loss accumulations, which are generally infrequent, the primary insurer's historical loss data typically has only limited usefulness in pricing. Therefore, reinsurers must use statistical techniques to determine expected losses enabling them to set retentions and limits.

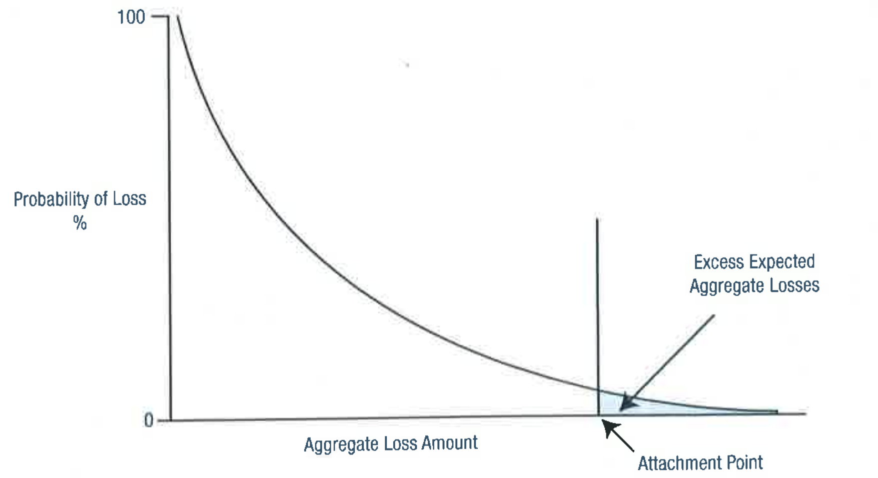
Expected Losses

Actuaries use historical loss data and theoretical distributions to project expected losses. Although an in-depth discussion of theoretical distributions can be useful, an overview of this topic can provide sufficient insight into how actuaries price aggregate excess of loss treaties.

Actuaries, based on their experience and judgment, select a theoretical distribution that appears to model the known data. They then extrapolate the "tail" of the theoretical distribution to estimate the probability of extremely large aggregate losses.

The exhibit illustrates an expected loss distribution for aggregate losses. Each aggregate loss amount on the horizontal axis has a probability of occurrence between 0 percent and 100 percent, as shown by the line in the exhibit. Generally, the attachment point is set at a level so that there is a low probability that aggregate losses will exceed it. Excess expected aggregate losses are represented by the shaded area (the tail), which indicates the amount the reinsurer needs to price. See the exhibit "Expected Loss Distribution of Aggregate Losses."

Expected Loss Distribution of Aggregate Losses



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After the reinsurer has an estimate of the distribution of aggregate losses, it can determine the retentions and limits.

Setting Retentions

As with other excess of loss treaties, establishing a useful and affordable attachment point for an aggregate excess of loss treaty depends on analyzing relevant loss and expense data. Past loss and expense data should be adjusted to reflect current dollars, rate changes, and changes in the underlying reinsurance program. Also, such data should be corrected to reflect the types of insurance included in the primary insurer's current in-force portfolio.

Once a loss and expense history is developed, the primary insurer and reinsurer can evaluate the level at which the attachment point may be set. The primary insurer usually prefers a low attachment point provided that the reinsurance premium is not too high. The reinsurer usually prefers an attachment point that does not guarantee the primary insurer a profit under the aggregate excess of loss treaty. Because a primary insurer's overall profitability includes its investment income in addition to operating profit, the reinsurer will likely want to consider the primary insurer's net investment income and overall operating results.

Hypothetical loss and expense data that may be used to set the primary insurer's retention are shown in the exhibit. See the exhibit "Aggregate Excess of Loss Retention Information."

Aggregate Excess of Loss Retention Information

Year	Earned Premium	Incurred Loss	Loss Ratio	Expense Ratio	Combined Ratio
1	$42,954,657	$26,301,136	61.23%	36.34%	97.57%
2	45,485,144	30,847,927	67.82	36.12	103.94
3	48,672,925	30,980,364	63.65	35.83	99.48
4	54,118,958	32,141,274	59.39	35.21	94.60
5	54,792,787	34,508,001	62.98	34.57	97.55
6	57,051,653	35,126,916	61.57	34.11	95.68
7	62,169,431	40,857,466	65.72	33.87	99.59
8	64,739,027	41,808,446	64.58	33.68	98.26
9	68,292,615	48,727,055	71.35	34.01	105.36
10	69,895,336	43,649,427	62.45	33.75	96.20
11 (est.)	71,992,197	44,275,080	61.50	33.57	95.07
Averages	$58,196,818	$37,201,909	63.92%	34.64%	98.48%

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With this information, the aggregate excess of loss treaty reinsurer can evaluate various possible attachment points that it can offer to the primary insurer. These attachment points will typically be high enough for the primary insurer to have a significant stake in efficiently handling the claims that do occur.

Setting Limits

One way to set aggregate excess of loss treaty limits is for the primary insurer to purchase the highest limits it is willing to or can afford. Catastrophe models can provide information for determining the worst-case loss, and that information may be used to set a limit. Internal and outside limits may depend on the primary insurer's risk tolerance, its confidence in the probability that the reinsurance limits will not be exceeded, and its ability to absorb the net loss if the outside limit is exceeded. However, as with setting retentions, the ultimate factor in choosing limits is often the price.

SUMMARY

Aggregate excess of loss treaties protect a primary insurer from losses occurring during a specified period that exceed either a certain dollar amount or specified loss ratio. They operate similarly to other types of excess of loss treaties; function to stabilize the primary insurer's loss results; and can be used for both property and liability loss exposures, although many reinsurers only consider writing for property classes of business.

A retention and limits clause may be adapted for use in an aggregate excess of loss treaty to include internal and outside retentions and limits and to specify whether the treaty applies on a losses occurring or losses incurred basis.

Aggregate excess of loss treaty pricing involves estimating the losses that will fall between the primary insurer's retention and the reinsurance limit. Actuaries use theoretical distributions to estimate aggregate losses because primary insurer historical data is often insufficient.