Reinsurance and Risk Transfer

Interview preparation summary · IN track

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INT.NR.1.a · Treaties

Explain why an insurer buys reinsurance, and work out how a quota share or surplus treaty shares premium, claims and ceding commission.

Reinsurance is insurance bought by an insurer, called the cedant, from a reinsurer. It does four jobs: it reduces the swings in results, it protects capital by passing risk on, it gives capacity to write larger risks than the cedant's own capital would allow, and it can bring in a reinsurer's expertise. In a proportional treaty the reinsurer takes an agreed share of the premium and of every claim. In a quota share the share is the same on every policy, for example 30%. In a surplus treaty the cedant keeps a line of its own on each risk and cedes the rest in proportion to the sum insured, so big risks are ceded more heavily than small ones. The reinsurer pays a ceding commission towards the cedant's acquisition and administration costs, and the gap between that commission and the cedant's real cost ratio decides who gains. Interviewers ask this because proportional cover looks simple but only shares the result. The usual mistake is to think a quota share improves the loss ratio. It shares the same loss ratio, and it changes the profit only through the commission.

WORKED EXAMPLE: A 30% QUOTA SHARE AT THORNWICK MUTUAL

Thornwick Mutual, an invented insurer, writes 80m of commercial property premium with a loss ratio of 68% and expenses of 30% of premium. It buys a 30% quota share and the reinsurer pays a ceding commission of 28% of ceded premium. All figures are in dollars, for one year, ignoring tax and investment income. Find each party's result and the cedant's net combined ratio.

Answer: The reinsurer takes 24m of premium, pays 16.32m of claims and 6.72m of commission, and earns 0.96m. The cedant's result falls from 1.6m to 0.64m and its combined ratio moves from 98% to 98.9%.

> **Interview tip:** Say what is shared (premium, claims, commission), then compare the commission with the cedant's own cost ratio. Mention that the benefit of a quota share is capital and capacity, not a better loss ratio.

INT.NR.1.b · Treaties

Describe excess of loss and stop loss cover, and calculate the recovery and the reinstatement premium for a given loss.

In a non-proportional treaty the reinsurer pays only when a loss is above an agreed retention, and only up to a limit. A layer written as 4m xs 1m covers the part of a loss between 1m and 5m: the cedant keeps the first 1m, the reinsurer pays up to 4m, and the cedant keeps anything above 5m unless a higher layer is bought. Per-risk excess of loss applies to the loss on one risk. Catastrophe excess of loss applies to the total from one event, such as a storm. Stop loss pays when the cedant's loss ratio for a period goes above a chosen level, up to a cap. The premium is not a share of the original premium. It is priced on the expected loss to the layer, and often quoted as a rate on line, the premium divided by the limit. Each recovery uses up limit, and a reinstatement restores it, usually for an extra premium in proportion to the amount used. Candidates often confuse retention with limit or forget that reinstatement premium is a real cost.

WORKED EXAMPLE: A 4M XS 1M PER-RISK LAYER AT TILLERTON INSURANCE

Tillerton Insurance, an invented property insurer, buys a per-risk excess of loss of 4m xs 1m for a premium of 0.6m. It has one reinstatement at 100% of the premium, pro rata to the amount of limit used and ignoring time. In one year there are two losses, each to a single risk: 2.5m and then 7m. All figures are in dollars. Find the recoveries, the reinstatement premium and Tillerton's net cost.

Answer: The reinsurer pays 1.5m and 4m, 5.5m in all. Reinstatement premium is 0.6m, so Tillerton's net cost of the two losses is 4.6m plus the original 0.6m premium.

> **Interview tip:** Always say where the layer starts and ends, then say that reinstatement premium is a second cost of using the cover. A loss above the top of the layer comes back to the cedant.

INT.NR.1.c · Treaties

Compare facultative and treaty reinsurance, and choose a structure that fits a stated objective such as capital relief, capacity or protection from large losses.

Facultative reinsurance is arranged for one risk at a time. The cedant shows the reinsurer the details, the reinsurer may accept or decline, and the terms are negotiated for that risk. It suits very large, unusual or specially excluded risks. Treaty reinsurance covers a whole class automatically under agreed terms, so the reinsurer accepts every risk inside the wording and relies on the cedant's underwriting. Treaty is faster and cheaper to run, while facultative lets the reinsurer select. The right structure depends on the objective. To free capital across a growing book, a quota share is the usual tool because premium and claims move in proportion. To add capacity for large risks, a surplus treaty and then facultative on the excess is typical. To stop single large losses hurting earnings while keeping most of the premium, a per-risk excess of loss. To protect against an event hitting many policies, catastrophe cover. A common error is to name a quota share as the answer to every question, when it gives away profitable premium to fix a tail problem.

WORKED EXAMPLE: ONE LARGE RISK AT PINEMARSH COMMERCIAL

Pinemarsh Commercial, an invented insurer, has a surplus treaty with a retention of 5m and three lines of capacity, so the treaty accepts 15m. It is offered a factory with a sum insured of 40m at a rate of 0.8%, a premium of 320k. The treaty pays a ceding commission of 30% and a facultative reinsurer pays 25%. Find the split of the risk and premium, and who pays for a 10m loss.

Answer: The insurer keeps 12.5% of the risk, the treaty takes 37.5% and the facultative reinsurer 50.0%. A 10m loss costs the insurer 1.25m.

Interview tip: Say that treaty comes first because it is automatic and that facultative fills the gap. Then mention the new counterparty and the time taken to negotiate each facultative certificate.

INT.NR.2.a · Structuring and markets

Build a property catastrophe programme in layers, and work out what each layer pays and the insurer's net cost for a given event.

A catastrophe programme is a stack of excess of loss layers placed above a retention, which is the part of an event the insurer keeps. The retention is set by what earnings and capital can absorb. Lower layers are hit more often and are priced close to their expected losses, while upper layers are rarely hit and cost less per dollar of cover. Splitting the cover lets the insurer buy each layer from reinsurers with different appetite and gives a clear picture of where cover ends. The top of the programme is chosen from catastrophe model output, the insurer's capital and its appetite for rare events, often described by a return period such as one year in two hundred. An event loss is allocated to the layers from the bottom up, and each layer pays only the part falling inside it. Losses above the top come back to the insurer. Interviewers look for this arithmetic, for the idea that reinstatement premium adds to the cost of a big event, and for the point that the retention is a decision, not a default.

WORKED EXAMPLE: A THREE-LAYER PROGRAMME AT BEXMOOR HOME

Bexmoor Home, an invented household insurer, has a catastrophe programme with a retention of 10m and three layers: 20m xs 10m at a rate on line of 12%, 30m xs 30m at 6% and 50m xs 60m at 3%. Each layer has one reinstatement at 100%, pro rata to the amount used. A storm causes a total insured loss of 75m. All figures are in dollars. Find what each layer pays, the reinstatement premium and the net cost.

Answer: The layers pay 20m, 30m and 15m. Bexmoor keeps 10m and pays 4.65m of reinstatement premium, a net cost of 14.65m.

Interview tip: Walk up the layers from the bottom, then state the net figure including reinstatement premium. Say what happens above the top, and that the retention is a choice about how much volatility the insurer can bear.

INT.NR.2.b · Structuring and markets

Compare a catastrophe bond with traditional reinsurance, and assess counterparty risk on reinsurance recoverables.

Alternative capital brings investors, such as pension and investment funds, into reinsurance. In a catastrophe bond the insurer, or sponsor, pays a coupon, and investors can lose some or all of their principal if a defined event occurs. The proceeds are normally held as collateral in a trust, so the sponsor does not depend on an investor's promise to pay. Terms often run for several years. The payout can follow the sponsor's own losses, an industry index or a physical trigger such as wind speed, and the last two bring basis risk: the payout may not match the sponsor's loss. Pricing is often discussed as a multiple of expected loss, the spread divided by the probability-weighted loss of principal. Traditional reinsurance carries counterparty risk, the

chance the reinsurer cannot pay, and it can be highest just after a major event when many reinsurers are hit together. Cedants manage it with ratings, limits per reinsurer, collateral, letters of credit and spreading cessions. Interviewers like candidates who weigh these trade-offs instead of calling one form better.

WORKED EXAMPLE: A BOND OR A LAYER FOR LARKHILL PROPERTY

Larkhill Property, an invented insurer, can buy 50m of top-layer catastrophe cover either from a reinsurer at a rate on line of 6.0% or as a catastrophe bond paying a spread of 6.5% on the principal. Modelling gives a 2.0% annual probability that the layer is attached, with an average loss of 60% of principal if attached. Assume a reinsurer, if the layer is hit, would owe the full 50m, with a 2% chance of failing to pay after a major event and a 40% loss given failure. All figures are invented and in dollars.

Answer: The bond costs 3.25m and the reinsurance 3m, so the extra 0.25m buys collateral, multi-year cover and diversification. The reinsurer's credit shortfall in a full loss is 0.4m.

> **Interview tip:** Compare price, credit risk, term and basis risk in that order. Do not say that one form of cover is simply better.

INT.NR.2.c · Structuring and markets

Price a layer by burning cost, express it as a rate on line and check it with the payback period.

Burning cost is the simplest way to price an excess of loss layer. Take the large losses of past years, restate them to today's cost level and exposure, and apply the layer to each: the layer loss is the part of the loss between the retention and the top, capped at the limit. Add the layer losses over the years studied and divide by the number of years to get an annual burning cost, often shown as a percentage of the subject premium. The reinsurer then loads for expenses, brokerage, margin and the cost of capital, often by dividing the burning cost by a target loss ratio. Dividing the resulting premium by the limit gives the rate on line, and its inverse is the payback period, the number of years of premium that equals one full loss. Burning cost needs care. A short history can miss rare losses or contain one large loss that dominates, which is why modelling and exposure rating are used for remote layers. Common mistakes are using losses that have not been trended and treating rate on line as a probability of loss.

WORKED EXAMPLE: A 10M XS 10M LAYER AT WEXCOMBE INSURANCE

Wexcombe Insurance, an invented liability insurer, studies 20 years of losses above 10m, already restated to current cost levels. The six losses are 11.2m, 12.5m, 16m, 10.4m, 21m, 13.8m. Subject premium is 80m. A reinsurer needs a loss ratio of 65% on the layer 10m xs 10m. All figures are in dollars. Find the burning cost, the premium, the rate on line and the payback, and test how sensitive the answer is to the largest loss.

Answer: Burning cost is 1.195m a year, the indicated premium is 1.838m, the rate on line is 18.4% and the payback is 5.4 years. The price rests heavily on one 21m loss.

> **Interview tip:** Say the sequence: restate the losses, apply the layer, average, load, then divide by the limit. Close with how thin the data is and what you would use to cross-check.