Investments and Financial Analysis of Insurers

Interview preparation summary · IN track

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INT.NI.1.a · Reading an insurer

Calculate loss, expense and combined ratios and the underwriting result for a general insurer, and say why these measures are not used for life insurers.

A general insurer sells short-term cover and reports how well it priced and ran that cover through three ratios, each measured against net earned premium, which is the premium for the part of the year that has actually been covered. The loss ratio is claims incurred (paid plus the change in reserves) divided by earned premium. The expense ratio is acquisition costs such as commission, plus other operating costs, divided by earned premium, although some firms divide by written premium, so say which basis you use. Their sum is the combined ratio, and 100% less the combined ratio is the underwriting margin before investment income. Below 100% the insurer makes an underwriting profit; above it, investments must fill the gap. Strip out catastrophe claims to see the underlying position. Life insurers are not judged this way because their contracts run for decades and profit emerges slowly from margins, so they use other measures. Common mistakes are mixing written and earned premium and treating a ratio as a forecast.

WORKED EXAMPLE: COMBINED RATIO FOR KESTREL COURT GENERAL

Kestrel Court General, an invented insurer, reports net earned premium of 400m, net claims incurred of 252m, acquisition costs of 68m and other operating expenses of 52m (all in GBP, before investment income and tax). Claims include 24m from one storm. Find the loss, expense and combined ratios, the underwriting result and the position without the storm. Convention: both ratios use earned premium.

Answer: The loss ratio is 63.0%, the expense ratio 30.0% and the combined ratio 93.0%, an underwriting profit of 28m. Excluding the storm the combined ratio is 87.0%.

> **Interview tip:** Say the basis out loud (net earned premium) and give the result in both points and money. Then add one sentence on what sits inside the number, such as a storm, before you call it good.

INT.NI.1.b · Reading an insurer

Explain float and investment income and build a return on equity from its underwriting and investment parts, showing why a falling yield matters.

Insurers collect premiums first and pay claims later. The money held in between, together with shareholders' capital, is invested, and the part that belongs to policyholders for now is called float. Investment income is the portfolio yield times the portfolio size, so lines where claims settle slowly, such as liability, build far more float per dollar of premium than motor damage cover. Return on equity, profit after tax divided by shareholders' equity, can be split into an underwriting part and an investment part. Because the portfolio is often several times the premium and well above equity, a small change in yield moves return on equity a long way. That is why a combined ratio above 100% can still earn a profit, and why a fall in yields pushes insurers towards a lower combined ratio to hold the same return. A higher yield from riskier assets is not free, since it adds credit and market risk. Common mistakes are treating float as free money, forgetting tax and assuming today's yield will last.

WORKED EXAMPLE: WHAT A FALLING YIELD DOES TO HALBROOK GENERAL

Halbrook General, an invented insurer, has net earned premium of 600m, a combined ratio of 101.0%, an investment portfolio of 1500m yielding 3.2% and shareholders' equity of 420m. Tax is 25% of profit. Find the return on equity, split it into underwriting and investment parts, then find what happens if the yield falls to 2.2% and what combined ratio would restore the return. Convention: GBP, year-end equity, all investment income earned on the whole portfolio.

Answer: Return on equity is 7.5%, made of 8.6 points from investments and -1.1 from underwriting. A one-point lower yield cuts it to 4.8% and the combined ratio would have to reach 98.5% to restore it.

Interview tip: Lead with the idea (float is invested, so yield matters) and then give the two numbers. Mention tax and your convention, and say the insurer should not simply reach for yield to close the gap.

INT.NI.1.c · Reading an insurer

Judge the quality of an insurer's earnings by separating reserve releases and one-off items from the underlying result and by questioning fast premium growth.

The reported combined ratio mixes two things: the cost of claims from the current year, and any change in estimates for earlier years. If earlier reserves prove too high, the insurer releases some, which lowers claims incurred and flatters the result. The accident-year combined ratio removes that prior-year effect and shows what this year's business cost. A company living on releases can see profit fall when they stop, and repeated releases can also hide that current prices are too low. The opposite, adverse development, strengthens reserves and hurts profit. Premium growth needs the same scrutiny. Growth from rate increases usually helps margin, but growth bought by cutting price or entering unfamiliar lines can lower quality, and new business is earned slowly, so its true loss ratio may take years to show. Interviewers ask this to see whether you look behind a headline ratio. Common mistakes are praising a low combined ratio without asking what is in it, and treating growth as good in itself.

WORKED EXAMPLE: HOW MUCH OF PELHAM FOLD'S PROFIT CAME FROM RESERVE RELEASES

Pelham Fold, an invented insurer, reports net earned premium of 500m (up from 400m) and a combined ratio of 94.0%. Claims include a favourable release of 25m from earlier years' reserves. Find the underwriting profit, the accident-year combined ratio, the share of profit from releases and the effect of a smaller release next year. Convention: GBP, earned premium unchanged, no other change in claims or expenses.

Answer: The reported combined ratio is 94.0% but the accident-year ratio is 99.0%, so about 83% of the underwriting profit came from reserve releases and the underlying margin is thin.

Interview tip: Always ask for the accident-year or ex-release number before praising a combined ratio. Then say what you would check next, such as the size of releases over several years.

INT.NI.2.a · Assets and valuation

Describe how an insurer's assets are matched to its liabilities using duration, and compute the money effect of an interest-rate move on assets and liabilities.

Insurers invest to meet claims and benefits that fall due in the future, so the central idea is asset-liability matching: choose assets whose value moves in step with the liabilities. Duration measures how much a bond's price changes when yields change; a duration of 4 means a price fall of about 4% for a one-point rise in yields (a first-order estimate for a parallel shift). Short-tail lines such as motor damage need liquid, short assets. Long-tail liability claims, annuities and pensions need longer assets. Portfolio duration is the value-weighted average of the holdings. What matters is the money mismatch, asset value times asset duration against liability value times liability duration, not the two durations alone. Whether a mismatch hurts also depends on accounting: if reserves are not discounted, a rise in rates cuts the reported value of the assets with no offset, whereas an economic view discounts both sides. Common mistakes are comparing durations without weighting by size, ignoring liquidity and forgetting that practice varies by regime.

WORKED EXAMPLE: MATCHING LONG-TAIL RESERVES AT STONELEIGH LIABILITY

Stoneleigh Liability, an invented insurer, has claims reserves of 800m with an average duration of 4.0 years, backed by a bond portfolio of 900m with a duration of 2.5 years. Yields rise by one percentage point. Estimate the change in the value of the bonds and of the liabilities (discounted), say what happens to the surplus, and find the asset duration that would match. Convention: GBP, parallel shift, first-order duration approximation, no convexity.

Answer: A one-point rise in yields cuts the bonds by 22.5m and the discounted liabilities by 32.0m, a net economic gain of 9.5m. Matching would need an asset duration of about 3.56 years.

Interview tip: Multiply duration by value on both sides before comparing. Then say the answer depends on whether liabilities are discounted in the accounts, and mention liquidity as a limit on going long.

INT.NI.2.b · Assets and valuation

Stress an insurer's investment portfolio for interest-rate, credit-spread and equity shocks and express the loss as a share of capital.

An insurer's portfolio carries several risks that do not move together. Interest-rate risk is the change in bond values when yields move, estimated as duration times the yield change times value. Credit risk has two forms: default, where the expected annual loss is the probability of default times the loss given default, and spread widening, where bond prices fall because investors demand more yield, estimated by spread duration times the spread move. Equity and property holdings add market risk. A stress test applies assumed shocks to each part, sums the losses and compares the total with capital, the cushion that absorbs losses. The answer depends on the accounting: assets held at market value show losses immediately, while those held at amortised cost may not, and practice varies. Higher yields on riskier assets look attractive but raise the stress loss. Interviewers ask this to see whether you link investment choices to solvency. Common mistakes are adding shocks that cannot happen together without saying so, and ignoring liabilities that may move the other way.

WORKED EXAMPLE: A STRESS TEST ON DUNMERE ASSURANCE'S PORTFOLIO

Dunmere Assurance, an invented insurer, holds government bonds of 900m (duration 5.0), corporate bonds of 800m (duration and spread duration 4.0), equities of 200m and cash, in a total portfolio of 2,000m. Capital is 500m. Apply a one-point rise in yields, a one-point widening of corporate spreads and a 20% fall in equities. Find each loss and the total as a share of capital, and the expected annual default loss on the corporates if the default probability is 0.5% and loss given default is 60%. Convention: GBP, first-order estimates, all shocks at once as a severe scenario.

Answer: The combined shock costs 149m, or 29.8% of capital, with interest rates the largest part. Expected default losses on the corporates are only 2.4m a year.

> **Interview tip:** Give the loss in money and as a share of capital, name the biggest driver, and say the scenario is severe and simultaneous. Offer to repeat it with liabilities included.

INT.NI.2.c · Assets and valuation

Value an insurer using price to book and return on equity, and say what to check when one insurer buys another.

Insurers are usually valued against their book value, the equity on the balance sheet, because capital is the raw material of the business. The logic is that a company earning more than its cost of equity deserves to trade above book and one earning less deserves to trade below. A common simplified formula is justified price to book = (return on equity less growth) divided by (cost of equity less growth). For life insurers, embedded value adds the present value of profits from policies already in force to adjusted net assets, and valuation is often expressed against it. When one insurer buys another, the price is set against book and justified value. The buyer must then ask whether the premium over justified value can be covered by cost savings, better pricing or cheaper capital, and whether the target's reserves are adequate, since a reserve shortfall comes straight out of book value. Hedge all figures: assumptions for growth and cost of equity are judgements. Common mistakes are quoting price to book without return on equity and ignoring reserve risk in a deal.

WORKED EXAMPLE: WHAT IS RAVENSWORTH UNDERWRITING WORTH AGAINST BOOK

Ravensworth Underwriting, an invented insurer, has book value of 800m, a sustainable return on equity of 12%, a cost of equity of 10% and long-run growth of 3%. Find the justified price to book and value, the value if return on equity is only 8%, the return on equity implied by a price of 1.25 times book, and the return on equity a buyer needs to justify paying 1.5 times book. Convention: GBP, simplified formula, assumptions stated.

Answer: The justified price to book is 1.29 times, or about 1,029m; at an 8% return it would fall to 0.71 times. Paying 1.5 times book needs a 13.5% return or synergies worth about 171m.

> **Interview tip:** Always tie price to book to return on equity and cost of equity. Say the formula is a simplification, state your growth assumption, and finish with the reserve check.

Summary of the Charta interview-preparation topic. Companies and figures in the examples are invented. Draft content, not yet expert reviewed.