CHARTA LEARNING · LESSON NOTES

Stress Testing

FRM Part I

1 A story: the calm sea

- Risk measures lean on recent history
- Recent history can be calm
- A calm sample hides storms
- Stress test: what if the storm comes?

IN THE LESSON

- Imagine a ship's captain who plans a voyage by studying the last two years of weather reports.
- Those two years were calm, with gentle winds and flat water.
- On that evidence, the captain decides the lifeboats are a waste of space and packs extra cargo instead.
- Nothing was wrong with the arithmetic.
- The problem is the evidence: it contains no storms.
- Banks are in the same position.
- Their risk measures are built from recent history, and recent history is often kind.
- A careful captain would also ask a different question: if a storm of the kind we have read about in old logbooks hit us tomorrow, would the ship survive?
- That question is stress testing.

2 What VaR cannot tell you

- Stress test: loss from a named extreme but plausible event
- VaR: silent on losses beyond its cutoff
- Calm samples understate rare events
- Stress tests look forward, not back

IN THE LESSON

- Stress testing asks what a portfolio or a whole institution would lose if a specified extreme but plausible event occurred.
- Why is it needed when we already have value at risk and expected shortfall?
- Because both rest on recent data and on a chosen confidence level.
- Value at risk, or V a R, names a cutoff loss but says nothing about how bad things get beyond it.
- Expected shortfall, or E S, averages losses beyond the cutoff, but still from history.
- A quiet sample period can understate rare events, and some positions have so little history that the models have almost nothing to work with.
- Stress tests fill those gaps by looking forward instead of back.

3 The core stress loss calculation

Stress loss = Σ exposure × sensitivity × move

Exposure	How much is held
Sensitivity	Change per unit of market move
Scenario move	The move set by the scenario
Stress loss	Sum over all positions

IN THE LESSON

- Here is how a simple stress loss is worked out.
- You start with a scenario, which is a list of moves in the markets, such as shares falling or credit spreads widening.
- For each position you take the size of the exposure, multiply it by how sensitive the position is to that market factor, and multiply again by the size of the move in the scenario.
- That gives the gain or loss on that position.
- Add up the positions to get the stress loss for the portfolio.
- This is a first-order shortcut.
- For very large moves, firms revalue each position fully instead, because the shortcut ignores curvature, but the idea is the same.

4 Example 1: a stress loss

Illustration: shares $50m, corporate bonds $30m, government bonds $20m

Shares, $50m	falls 30%	**-$15.0m**
Corporate bonds, $30m	30 × 4 × 0.02	**-$2.4m**
Government bonds, $20m	20 × 6 × 0.01	**+$1.2m**
Total stress loss	-15 - 2.4 + 1.2	**-$16.2m**

IN THE LESSON

- Let's make up a portfolio worth one hundred million dollars.
- Fifty million is in shares, thirty million in corporate bonds, and twenty million in government bonds.
- The scenario says shares fall thirty per cent, corporate credit spreads widen by two percentage points, and government yields fall by one point.
- Shares first: fifty million times minus thirty per cent is a loss of fifteen million.
- Corporate bonds have a spread duration of four, so the loss is thirty million times four times point zero two, which is two point four million.
- Government bonds have a duration of six, and falling yields raise prices: twenty million times six times point zero one is a gain of one point two million.
- Net result: a loss of sixteen point two million dollars.

5 What a stress test gives you

- Looks forward and needs little data
- Shows concentrations and hidden correlations
- Tests capital and liquidity; feeds limits and planning
- No probability attached: complements VaR

IN THE LESSON

- A stress test earns its place for several reasons.
- It is forward looking, so it can examine a threat that has never happened.
- It works for exposures with little data, such as a new product.
- It reveals concentrations and hidden correlations, for example two apparently different positions that lose money for the same reason.
- It shows whether capital and liquidity would survive a crisis, and it forces managers to think about what could go wrong.
- Results also feed limit setting, risk appetite and contingency planning.
- Now the classic trap: a stress loss is not a probability weighted number.
- Scenarios normally carry no probability, so stress testing complements V a R and never replaces it.

6 Where stress testing sits

Which measures attach a probability to the loss?

Measure	Probability?
VaR	Yes
Expected shortfall	Yes
Economic capital	Yes
Stress test	No

IN THE LESSON

- Think of the risk framework as a toolbox.
- Value at risk, expected shortfall and economic capital all describe losses with a probability attached, under broadly normal conditions.
- V a R gives a cutoff at a confidence level.
- Expected shortfall averages the losses beyond that cutoff.
- Economic capital is the cushion a firm believes it needs against unexpected losses.
- Stress tests are the odd one out in the best sense.
- They describe the loss under a named severe condition, and they carry no probability.
- That is a feature, not a flaw: it lets managers look at events that history cannot rank.
- The tools answer different questions, so a sensible firm reports all of them together to senior management.

7 Doing it enterprise-wide

- One scenario set for all businesses, entities and risks
- Market, credit, liquidity and operational risk together
- Compared with appetite, capital and liquidity buffers
- Reported with VaR and expected shortfall

IN THE LESSON

- Stress testing can be done desk by desk, but it works best across the whole enterprise.
- That means one coherent set of scenarios applied to every business line, every legal entity and every type of risk: market, credit, liquidity and operational.
- The results are then aggregated into a single picture.
- Why bother?
- Because stress losses interact.
- In a crisis, trading losses, credit deterioration and funding strain tend to arrive together, one feeding the next.
- Enterprise-wide results are compared with the firm's risk appetite and with its capital and liquidity buffers, and reported to senior management alongside V a R and expected shortfall.
- A scenario that is only run in one department tells you very little about whether the firm as a whole survives.

8 Example 2: diversification disappears

Illustration: market VaR $10m, credit VaR $8m

Market VaR alone		**$10m**
Credit VaR alone		**$8m**
Combined, correlation 0.2	√(100 + 64 + 32)	**$14m**
Combined, correlation 1	10 + 8	**$18m**

IN THE LESSON

- Here is why interactions matter.
- A bank has a market risk V a R of ten million dollars and a credit risk V a R of eight million.
- In normal times the two are only weakly related, say a correlation of point two.
- Combine them with the usual square root formula: ten squared is one hundred, eight squared is sixty four, and two times point two times ten times eight is thirty two.
- The sum is one hundred and ninety six, and its square root is fourteen million.
- Now suppose a crisis pushes the correlation to one.
- The combined figure is simply ten plus eight, eighteen million.
- Diversification that was worth four million in normal times has vanished exactly when the bank needs it.

9 Silos understate the total

Illustration: market loss is $16m in both views

View	Total loss
Silo: 16 + 8 + 3	$27m
Enterprise: 16 + 11 + 6	$33m
Understated by	$6m

IN THE LESSON

- A related mistake is to run a separate stress test in each silo, each built on its own assumptions, and then add the answers.
- Suppose the market risk team assumes a recession and finds a loss of sixteen million.
- The credit team assumes mild conditions in the markets and finds eight million.
- The funding team assumes everything else is calm and finds three million.
- Added up, that is twenty seven million.
- Now run one coherent scenario across the firm.
- The same recession lifts credit losses to eleven million, because defaults rise as shares fall, and fire sales and nervous lenders push the funding cost to six million.
- The total is thirty three million.
- Adding silo tests understated the loss by six million.

10 Ordinary against stressed measures

Same method, same portfolio: only the data window differs

Feature	Setting
Traditional VaR, ES	Latest 1-4 years
Stressed VaR, ES	Fixed stress year
Portfolio used (both)	Today's
Stressed number moves	With the portfolio, not the market

IN THE LESSON

- Now to the stressed versions of V a R and E S.
- Traditional V a R and E S are computed on recent market data, often the latest one to four years, applied to the portfolio the bank holds today.
- Because the data window moves forward, these measures move with current conditions: calm markets give small numbers, turbulent markets give large ones.
- Stressed V a R and stressed E S use exactly the same method and the same current portfolio.
- The one change is the data.
- They take market moves from a fixed window of serious stress in the past, for example a year of crisis, chosen because it is relevant to the portfolio.
- So the stressed numbers answer a different question: how bad would things be if that crisis came back now?

11 Basel two and a half capital

Capital = max(VaR yesterday, m × VaR average)
+ max(sVaR yesterday, m × sVaR average)

Previous day	Yesterday's 10-day 99% figure
60-day average	60-day mean; sVaR = stressed VaR
Multiplier m	At least 3, set by the supervisor
Capital	Ordinary piece plus stressed piece

IN THE LESSON

- Regulators wrote the stressed measure into the capital rules, in the package often called Basel two and a half.
- The V a R based capital for the trading book is two pieces added together.
- For the ordinary piece, take the larger of two things: yesterday's ten day, ninety nine per cent V a R, or a multiplier times the average of that figure over the last sixty days.
- The multiplier is at least three.
- The stressed piece is built the same way from stressed V a R: the larger of yesterday's stressed V a R, or its own multiplier times its sixty day average.
- Add the two pieces.
- Taking the larger of each pair means the average over time usually dominates, since three times an average beats a single day.

12 Example 3: the capital number

Illustration: multiplier 3 for both pieces

Ordinary: 3 × average	3 × 10	**$30m**
Ordinary: yesterday		**$12m**
Ordinary piece: the larger	max(12, 30)	**$30m**
Stressed piece: the larger	max(25, 3 × 22)	**$66m**
Total capital	30 + 66	**$96m**

IN THE LESSON

- Let's work it through.
- Yesterday's ten day V a R was twelve million dollars, and its sixty day average is ten million.
- With a multiplier of three, the second candidate is thirty million, which beats twelve, so the ordinary piece is thirty million.
- The stressed piece: yesterday's stressed V a R was twenty five million and its sixty day average is twenty two million.
- Three times twenty two is sixty six million, which beats twenty five, so the stressed piece is sixty six million.
- Total capital for these two pieces is thirty plus sixty six, ninety six million dollars.
- Notice how much of the total comes from the stressed piece: sixty six out of ninety six, more than two thirds.

13 Why the stressed piece steadies capital



IN THE LESSON

- Now see why supervisors wanted this.
- Along the bottom is time, through a long calm spell.
- Up the side is the capital requirement in millions of dollars.
- The ordinary piece, in green, starts at thirty million, but as markets stay quiet the recent average falls to six million, and three times six is eighteen, so the piece slides down.
- That is the problem with recent-data measures: capital shrinks just when everyone feels safe, and then must rise in a hurry when trouble returns.
- The stressed piece, in amber, stays at sixty six million, because its data window is fixed and the portfolio is assumed unchanged.
- The total, in the red line, only falls from ninety six to eighty four, a far gentler slope.

14 Strengths and weaknesses

Stressed VaR and stressed ES: what you gain and what you give up

Feature	Verdict
Steadies calm-time capital	Gain
Less procyclical	Gain
Window is a judgment	Drawback
Backward-looking, new factors	Drawback
Not backtestable	Drawback

IN THE LESSON

- So what are the strengths and weaknesses of stressed measures?
- The big advantage is that they stop capital falling away in calm markets, which reduces what economists call procyclicality, the tendency of rules to make booms and busts bigger.
- But there are real drawbacks.
- Choosing the stress window is subjective, because different years hurt different portfolios.
- The window is backward looking, so it cannot contain a crisis unlike any before, and a new risk factor has no history at all to draw on.
- Finally, stressed V a R cannot be backtested the way ordinary V a R can, because you cannot count exceptions against a period that is not the present.
- Judgment, not a scoreboard, has to defend the choice of window.

15 Where scenarios come from

- Historical: replay a past crisis on today's portfolio
- Credible and easy to explain, but may not repeat
- Hypothetical: designed around current worries
- Forward-looking, but rests on judgment

IN THE LESSON

- Now scenarios themselves.
- There are two broad sources.
- Historical scenarios replay a past crisis on today's portfolio: take the market moves of a famous bad period and ask what they would do to the positions held now.
- They are credible, because they really happened, and easy to explain.
- Their weakness is that the next crisis will not repeat the last one exactly, and today's portfolio may hold products that did not exist then.
- Hypothetical scenarios are designed by management and risk managers to reflect current worries, such as a sovereign default, a cyber outage at a clearing house, or a sudden jump in interest rates.
- They can look ahead, but they depend on imagination and judgment, and are easier to argue away.

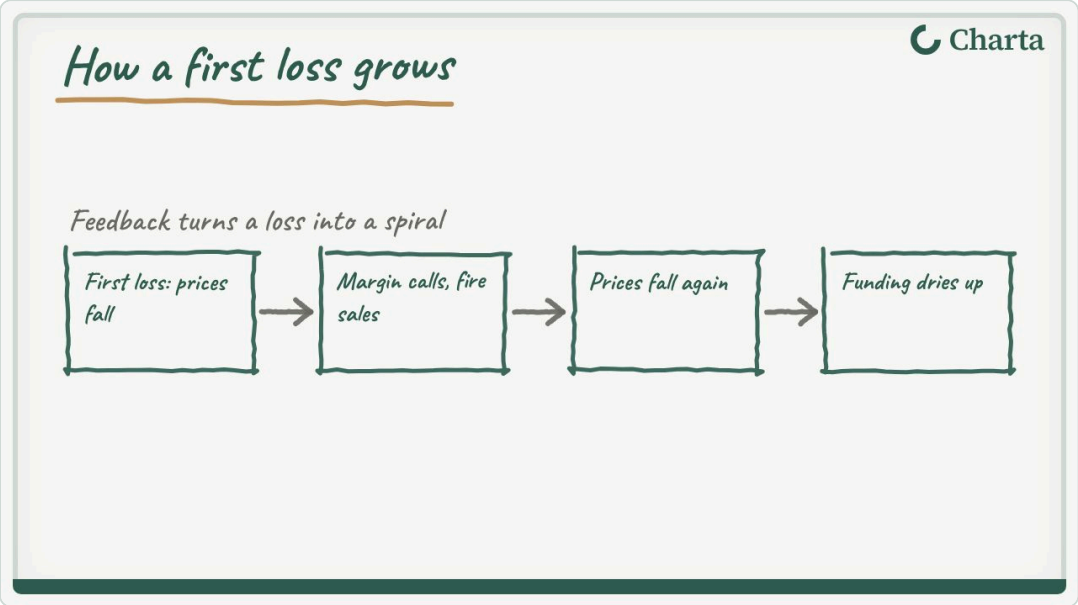
16 Severity, plausibility, coherence

- Too mild teaches nothing; too extreme is ignored
- Aim for extreme but plausible
- Coherent: shares, volatility, spreads, correlations together
- Ask: could one story cause all of these moves?

IN THE LESSON

- A scenario developer has to weigh several things at once.
- The first is severity against plausibility.
- A scenario that is too mild teaches nothing, since the firm would sail through it.
- One that is too extreme is dismissed by the board as fantasy, and nothing is done.
- The target is extreme but plausible.
- The second is coherence.
- A big fall in shares does not arrive alone.
- In real markets it comes with a jump in volatility, wider credit spreads and a shift in correlations.
- If you shock only the equity price and leave everything else untouched, the scenario is internally inconsistent and tells you less than it seems to.
- The test is simple: could one story in the world produce all of these moves together?

17 How a first loss grows



IN THE LESSON

- Building the models is harder still.
- Look at the chain on the board, reading left to right.
- A first-round loss hits the firm, because prices have fallen.
- Leveraged holders then face margin calls and must sell assets quickly, which are called fire sales.
- Those sales push prices down further, hurting everyone who holds the same assets, including the firm itself.
- Lenders see the damage and become nervous, so funding gets dearer or disappears, which forces yet more selling.
- These feedback effects amplify the first-round loss, and they are difficult to capture because they depend on how other firms behave.
- A model that stops at the first round will almost certainly understate the real damage.

18 Why stress models are hard to build

- Normal-time correlations break down in stress
- Liquidity dries up: unwinding and hedging are optimistic
- No probability: judgment weighs the scenarios
- State assumptions openly and test them

IN THE LESSON

- There are three more difficulties.
- First, relationships estimated in normal times, especially correlations, break down in stress.
- Assets that wandered independently suddenly fall together, so a model fitted on quiet data will be too hopeful.
- Second, market liquidity dries up.
- The model may assume a position can be sold or hedged at the usual price in a day or two, but in a crisis buyers vanish and the hedge costs more than expected.
- Unwinding assumptions are therefore optimistic.
- Third, scenarios carry no probability, so judgment is needed in deciding which to take seriously and how much to act on each.
- Good developers state their assumptions openly and test how the answer changes when they are altered.

19 Regulatory stress testing

- US Federal Reserve: C C A R and D F A S T
- About nine quarters, supervisor-set scenarios
- Baseline, adverse and severely adverse
- Banks use own models on the same scenarios

IN THE LESSON

- Supervisors use stress tests too.
- The standard example is the programme run by the United States Federal Reserve, known by the letters C C A R and D F A S T.
- Large banks project their losses and their capital over a horizon of about nine quarters.
- The supervisor provides the scenarios, typically three: a baseline, which is the expected path of the economy, an adverse scenario, and a severely adverse one.
- The banks run the same scenarios through their own models, so results are comparable, and supervisors can judge whether each bank would stay adequately capitalised throughout.
- European supervisors run similar exercises across the European Union.
- The test is not a prediction; it asks whether the bank would survive a severe downturn.

20 Capital ratio and breakeven shock

Ratio = (capital - net loss) ÷ RWA
Breakeven shock = buffer ÷ exposure

Capital	Starting loss-absorbing money
Net loss	Losses less income
Risk-weighted assets	Exposures weighted by risk
Buffer	Capital above the minimum

IN THE LESSON

- Two small formulas carry most of the numerical work here.
- First, the capital ratio: take the bank's capital, subtract the net loss over the stress period, which is losses less any income earned, and divide by risk-weighted assets, which are the bank's exposures scaled by how risky each is.
- The ratio is compared with the required minimum.
- Second, the breakeven shock, a simple example of working backwards from an unacceptable outcome.
- If a position has a given size and the firm has a given buffer of capital above its minimum, then the move in that position that exactly uses up the buffer is the buffer divided by the exposure.
- A smaller move is survivable on its own, and a larger one is not.

21 Example 4: a nine-quarter test

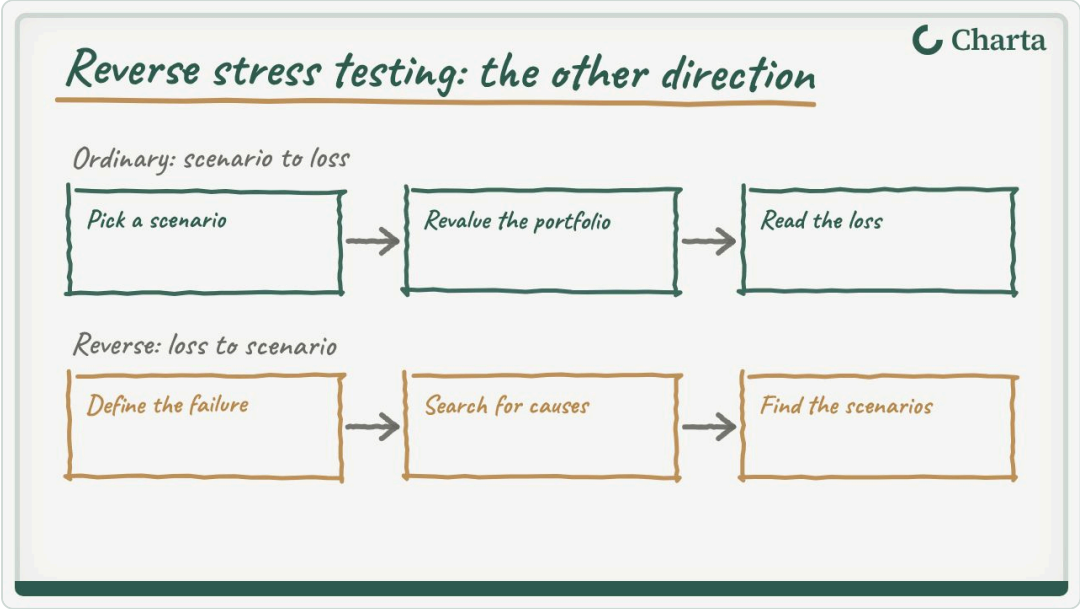
Illustration: capital 100, RWA 1,000 (ratio 10%), minimum 4.5% of 1,050 = 47.25

Net loss over nine quarters	70 - 30	**40**
Capital at the trough	100 - 40	**60**
Stressed RWA	grows to	**1,050**
Ratio after stress	60 ÷ 1,050	**5.71%**
Headroom over minimum, pass	60 - 47.25	**12.75**

IN THE LESSON

- Let's run a mini regulatory test.
- A bank starts with capital of one hundred and risk-weighted assets of one thousand, in made-up units, so the ratio is ten per cent.
- Over nine quarters of a severe scenario, loan and trading losses total seventy, while earnings before those losses bring in thirty.
- The net loss is forty, so capital falls to sixty.
- Risk-weighted assets also grow, to one thousand and fifty, because borrowers slip down in quality.
- The stressed ratio is sixty over one thousand and fifty, about five point seven one per cent.
- With a minimum of four and a half per cent, the bank needs forty seven and a quarter, so it passes with headroom of twelve and three quarters.
- Supervisors look at the lowest point reached.

22 Reverse stress testing: the other direction



IN THE LESSON

- Reverse stress testing turns the process round.
- In an ordinary stress test, shown on the top row, management picks a scenario, revalues the portfolio, and reads off the loss.
- In a reverse test, shown below, management first defines an outcome it regards as unacceptable, such as insolvency, a breach of minimum capital or running out of liquidity.
- It then searches for the scenarios and combinations of events that could produce that outcome.
- The value lies in not being anchored to the scenarios already imagined, so the exercise exposes hidden vulnerabilities and concentrations.
- The usual error in an exam is to mix up the direction.
- Ordinary tests run from scenario to loss.
- Reverse tests run from loss to scenario.

23 Example 5: a breakeven shock

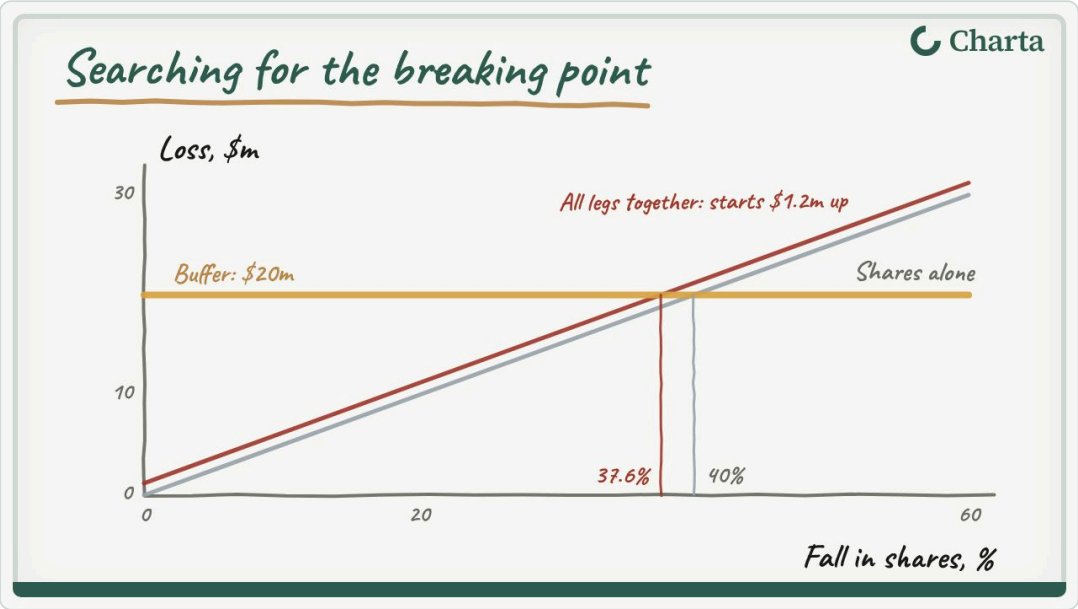
Illustration: buffer $20m above the minimum, shares $50m

Capital buffer	above the minimum	**$20m**
Shares alone	20 ÷ 50	**40%**
Bond legs already lose	2.4 - 1.2	**$1.2m**
Left for shares	20 - 1.2	**$18.8m**
Share fall that breaches	18.8 ÷ 50	**37.6%**

IN THE LESSON

- Return to the portfolio from our first example, with fifty million dollars in shares.
- Suppose the firm holds twenty million of capital above its regulatory minimum, and the unacceptable outcome is using it all up.
- If only shares fell, the breakeven shock is twenty divided by fifty, a forty per cent fall.
- But the other legs of the scenario matter.
- Wider credit spreads cost two point four million on corporate bonds, while falling yields earn one point two on government bonds, a net loss of one point two million.
- That leaves eighteen point eight million of buffer for shares.
- Divide by fifty and the breakeven share fall is thirty seven point six per cent, a little milder than the first answer.

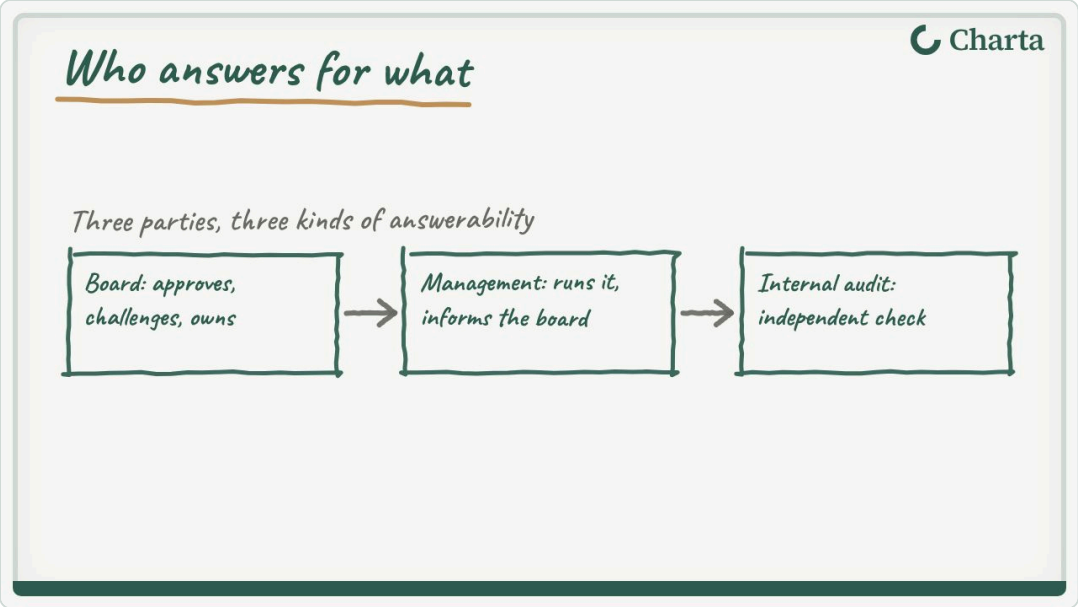
24 Searching for the breaking point



IN THE LESSON

- Here is the same search drawn out.
- Along the bottom is the fall in shares, from nothing to sixty per cent.
- Up the side is the total loss in millions of dollars.
- The grey line is the loss from shares alone, rising by half a million for every point of fall.
- The red line starts a little higher, at one point two million, because the bond legs of the scenario already lose before shares move at all.
- The flat amber line is the twenty million buffer.
- Where a loss line crosses the buffer, the firm breaches its minimum.
- Shares alone reach it at forty per cent.
- The red line, with all legs together, gets there sooner, at thirty seven point six.
- The gap shows why combinations matter.

25 Who answers for what



IN THE LESSON

- Now governance: who answers for stress testing?
- There are three parties, shown left to right.
- The board of directors has ultimate responsibility.
- It approves the objectives and the programme, makes sure there are resources and independence, challenges assumptions and results, and ensures that stress testing really informs risk appetite, capital and liquidity decisions, and strategy.
- Senior management implements the programme the board approved.
- It makes the framework work in practice with adequate data, systems and staff, reviews results and limitations, decides or recommends actions, and keeps the board properly informed.
- Internal audit is the third line.
- It independently and periodically assesses the framework and its adherence to policy, and reports its findings upward.

26 Keep the roles apart

Match the job to the party

Job	Who
Approve programme, challenge	Board
Run it, supply data and staff	Management
Inform the board	Management
Independent periodic assessment	Audit
Design scenarios, own models	Not audit

IN THE LESSON

- The most common exam trap is giving someone the wrong job.
- Look at the table.
- The board approves the programme and challenges the results; it does not build scenarios or run models day to day.
- Senior management does the day-to-day work: it provides the systems, data and staff, and reports to the board.
- Internal audit is the third line of defence.
- It assesses whether validation and controls operate effectively, but it does not design scenarios or own the models.
- If it did, it would end up auditing its own work, and the independence that gives audit its value would be gone.
- Remember the rule of thumb: board for oversight and ultimate responsibility, management for implementation, audit for independent assurance.

27 Validation, review and written policy

- Validation: are the models and data sound?
- Independent review: challenges the whole programme
- Done by people not involved in building or running it
- Policies: written rules, updated when things change

IN THE LESSON

- Three elements hold the governance together.
- Validation tests whether the models, assumptions and data are conceptually sound and work as intended.
- It uses checks on methodology, back-testing of components where possible, sensitivity tests and ongoing monitoring, and it must be done by qualified people independent of the developers.
- Independent review is wider: it challenges the whole programme, including scenarios, assumptions, results and how they are used.
- It is carried out by staff or outsiders who were not involved in building or running the programme, so management is not marking its own work.
- Policies and procedures are the written rules: objectives, roles, scenario design, methods, data, frequency, escalation and documentation, updated whenever the business or models change.

28 Three checks, three targets

Each element has its own target

Element	About
Validation	The model
Independent review	The programme
Policies and procedures	The written rules

IN THE LESSON

- Students often mix these three up, so here is the clean split.
- Validation is about the model: is it conceptually sound, are the inputs reliable, does it behave as intended?
- Independent review is about the programme as a whole: are the scenarios sensible, are the assumptions reasonable, and are the results actually used in decisions?
- Written policy is the standard against which both are tested.
- If a question asks what the written rules say about escalation when a limit is breached, that is policy.
- If it asks whether the model's sensitivity to correlation was tested by someone independent of its developers, that is validation.
- If it asks whether the programme as a whole was challenged by outsiders, that is independent review.

29 Basel principles, part one

- Clear, documented objectives; part of governance
- Enterprise-wide, including hard-to-model risks
- Range of severities, forward-looking scenarios
- Cover feedback effects and challenge assumptions

IN THE LESSON

- The Basel stress testing principles describe good practice for banks.
- They fall into two groups.
- The first is about the programme itself.
- Objectives should be clear and documented, and stress testing should be an integral part of governance and risk culture, with board and senior management involvement.
- Programmes should be enterprise-wide, covering material risks and business areas, including the ones that are hard to model, such as liquidity, concentrations and complex products.
- They should use a range of scenarios of varying severity, including forward-looking ones that go beyond history, take account of system-wide interactions and feedback effects, and challenge key assumptions.
- Notice how many of these echo ideas we have already met in this lesson.

30 Basel principles, part two

- Reliable data and flexible systems to aggregate exposures
- Report results with assumptions and limits
- Use them in capital, liquidity, appetite, contingency plans
- Document, review and update regularly

IN THE LESSON

- The second group is about data, communication and use.
- Reliable data and flexible information systems are needed so that exposures can be aggregated quickly across the firm, including when a new question arises in a crisis.
- Results should be communicated to senior management and the board together with their assumptions and limitations, so no one mistakes a scenario for a forecast.
- Most important, the results must be used: in decisions on capital, liquidity, risk appetite and contingency planning.
- Finally, the programme must be documented, reviewed and updated regularly, with a frequency suited to the business.
- A stress test that is run but ignored satisfies nobody, least of all the supervisor.

31 Recap: the main ideas

- No probability: stress complements VaR and ES
- Enterprise-wide, coherent scenarios
- Stressed VaR: fixed window, steadier capital
- Board owns, management runs, audit assures

IN THE LESSON

- Let's pull it together.
- Stress testing asks what extreme but plausible events would cost, because V a R and expected shortfall lean on recent history and say little about the tail.
- Scenarios carry no probability, so stress complements V a R.
- Done enterprise-wide, one coherent scenario set shows the interactions that silos miss.
- Stressed V a R and E S use a fixed window of stress with today's portfolio; Basel two and a half adds a stressed piece to capital, steadying it but depending on a subjective window.
- Good scenarios balance severity with plausibility and coherence.
- Reverse tests go from loss to scenario.
- The board owns, management implements, audit assures.
- Validation checks models; review challenges the programme; policy sets the rules.

32 Try three quick questions

1. Previous VaR 9m, average 8m, multiplier 3. Ordinary piece?
   Answer: max(9, 3 × 8) = $24m.
2. Buffer $15m, asset $60m. Fall that uses up the buffer?
   Answer: 15 ÷ 60 = 25%.
3. Reverse stress test: starts from a scenario or a loss?
   Answer: A loss: unacceptable outcome first, scenarios second.

IN THE LESSON

- Time for three quick questions.
- Pause the video after each one, think, then listen.
- Question one.
- The previous day's ten day V a R is nine million, its sixty day average is eight million, and the multiplier is three.
- What is the ordinary piece of capital?
- Three times eight is twenty four, which beats nine, so twenty four million.
- Question two.
- A firm has a buffer of fifteen million above its minimum and holds sixty million in one asset.
- What fall in that asset uses up the buffer?
- Fifteen over sixty, which is twenty five per cent.
- Question three.
- Does a reverse stress test start from a scenario or from a loss?
- It starts from a loss, an unacceptable outcome, and searches for the scenarios that cause it.