CHARTA LEARNING · LESSON NOTES

The Failure Mechanics of Dealer Banks

FRM Part II

1 A story: the dealer that died in a week

- Halverton reports a modest trading loss
- A rumour: lenders shorten, raise haircuts, refuse to roll
- Clients pull cash; counterparties demand collateral
- Within days it cannot pay, though solvent on paper

IN THE LESSON

- Imagine Halverton Securities on a quiet Monday.
- It reports a modest trading loss, small next to its capital.
- By Tuesday a rumour spreads that the loss is bigger, and lenders start to shorten their loans, raise haircuts, or refuse to roll them over at all.
- By Wednesday, hedge fund clients are pulling their cash, and derivatives counterparties are demanding more collateral.
- Within days Halverton cannot pay what it owes, even though, on paper, its assets are still worth more than its debts.
- That is the pattern this lesson explains.
- A dealer bank rarely dies of the trading loss itself.
- It dies when the people who fund it and trade with it lose confidence, all at the same time.

2 What a dealer bank does

- Stands between clients and markets
- Earns spreads and fees for that service
- Funded largely with short-term borrowing
- Each business line has its own dominant risk

IN THE LESSON

- First, what is a dealer bank?
- It is a large bank, or a securities firm, that earns its living by standing between clients and markets.
- A pension fund that wants to sell bonds, a company that wants to hedge a currency, a hedge fund that wants to borrow: the dealer takes the other side of each request.
- It earns spreads and fees for that service.
- To do this it holds large inventories and lends to clients, and it is funded largely with short-term borrowing, some secured on collateral and some unsecured.
- Each business line carries its own dominant risk.
- The exam asks you to set the lines side by side, so let us do exactly that, in two tables.

3 Business lines, part one

For each line: how it earns, and the risk that dominates

Business line	How it earns	Dominant risk
Market making	Bid-ask spread	Inventory risk
OTC derivatives	Spread on contracts	Counterparty, margin, triggers
Matched-book repo	Thin financing spread	Rollover and haircut risk

IN THE LESSON

- For each line: how it earns, and the risk that dominates.
- Market making means quoting prices to buy and to sell, and holding the securities in between.
- It earns the bid-ask spread, the gap between the price at which the dealer buys and the price at which it sells.
- Its dominant risk is inventory risk, the chance that prices fall, or buyers vanish, while the dealer holds the bonds.
- Over the counter derivatives dealing, written O T C, means writing swaps and options directly with clients, not on an exchange.
- It earns a spread on each contract.
- It adds counterparty credit exposure, meaning the client may fail while owing money, margin and collateral demands, and rating triggers, which are clauses that require more collateral if the dealer is downgraded.
- Matched-book repo earns a thin financing spread, and it carries rollover and haircut risk, which we meet shortly.

4 Business lines, part two

The remaining lines: prime brokerage, underwriting, proprietary trading

Business line	How it earns	Dominant risk
Prime brokerage	Interest; custody, clearing fees	Client credit, run risk
Underwriting	Fee for placing issues	Unsold securities
Proprietary trading	Trading gains	Pure market risk

IN THE LESSON

- Now the remaining lines: prime brokerage, underwriting and proprietary trading.
- Prime brokerage is a bundle of services for hedge funds: financing their positions, custody, which means holding their securities, and clearing their trades.
- It earns interest and fees.
- It carries client credit risk, because a fund may fail while owing money, and run risk, because clients can pull their cash balances quickly, and the dealer may have rehypothecated their collateral.
- To rehypothecate is to re-use collateral a client has pledged, for example by pledging it again to raise the dealer's own funding.
- Underwriting earns a fee for placing a new issue of securities with investors, and its risk is being left holding the unsold securities.
- Proprietary trading means trading for the firm's own account.
- It earns trading gains, and it is pure market risk.

5 Example 1: market making and inventory risk

Halverton buys $500m of bonds from a client; spread 0.2% of value

Spread earned on resale	0.2% × 500m	**$1m**
Price falls 2% before resale	2% × 500m	**−$10m**
Net result	1 − 10	**−$9m**
Loss ÷ spread earned	10 ÷ 1	**10 times**

Small spreads pay for holding risk; buyers can vanish too

IN THE LESSON

- Halverton buys five hundred million dollars of corporate bonds from a client, and the bid-ask spread it expects to capture is point two per cent of value.
- If it sells the bonds on quickly, the spread earned on resale is point two per cent times five hundred million, which is one million dollars.
- But suppose the price falls two per cent before it can resell.
- The loss is two per cent times five hundred million, ten million dollars.
- The net result is one minus ten, a loss of nine million.
- The loss divided by the spread earned is ten over one, ten times.
- Small spreads pay for holding risk, and in a stress buyers can vanish too, so the dealer cannot sell at any sensible price.

6 Example 2: a matched-book repo

Clients pledge $100bn of bonds. Client haircut 10%; Halverton's lender takes 5%

Lent to clients	100 × (1 − 10%)	**$90bn**
Borrowed from lenders	100 × (1 − 5%)	**$95bn**
Cash freed for Halverton	95 − 90	**$5bn**
Spread: clients pay 0.2% more	90 × 0.2%	**$180m a year**

Client loans run 3 months; Halverton's funding is overnight

IN THE LESSON

- Clients pledge one hundred billion dollars of bonds.
- Halverton's client haircut is ten per cent, and its own lender takes five per cent.
- What does that mean?
- A repo, short for repurchase agreement, is a loan secured on securities: one side sells bonds for cash and agrees to buy them back later at a slightly higher price.
- The haircut is the share by which the loan falls short of the collateral's value.
- So Halverton lends to clients one hundred times ninety per cent, ninety billion, and, pledging the same bonds onward, borrows from lenders one hundred times ninety five per cent, ninety five billion.
- Cash freed for Halverton is ninety five minus ninety, five billion.
- Clients pay point two per cent more than Halverton pays, so the spread is ninety billion times point two per cent, one hundred and eighty million dollars a year.
- Thin.
- And client loans run three months, while Halverton's funding is overnight.

7 Example 3: prime brokerage, credit and run risk

Fund Brackwater borrows $400m from Halverton against securities worth $600m

Collateral cover at the start	600 − 400	**$200m**
Securities fall 40%	600 × (1 − 40%)	**$360m**
Shortfall if Brackwater fails	400 − 360	**$40m**
Client cash Halverton holds	free balances, all clients	**$20bn**

Rehypothecated: $30bn of the $50bn client collateral

IN THE LESSON

- A hedge fund, Brackwater Capital, borrows four hundred million dollars from Halverton against securities worth six hundred million.
- That is client credit risk.
- At the start, the collateral cover is six hundred minus four hundred, two hundred million.
- Now the securities fall forty per cent, to six hundred times sixty per cent, three hundred and sixty million.
- If Brackwater fails before Halverton can sell, the shortfall is four hundred minus three hundred and sixty, forty million dollars of credit loss.
- Then there is run risk.
- Across all clients, the client cash Halverton holds as free balances, money clients can withdraw on demand, is twenty billion dollars, and Halverton uses it to fund itself.
- It has also rehypothecated thirty billion dollars of the fifty billion of collateral that clients pledged.
- If clients leave, both must be handed back, fast.

8 Example 4: underwriting leaves unsold securities

Halverton underwrites a $2bn bond issue at a price of 100; fee 1%

Underwriting fee	1% × 2bn	**$20m**
Sold to investors	60% of the issue	**$1.2bn**
Left on Halverton's books	2 − 1.2	**$0.8bn**
Price falls to 97	3% × 0.8bn	**−$24m**
Net result	20 − 24	**−$4m**

Proprietary trading: pure market risk, no client spread

IN THE LESSON

- Halverton underwrites a two billion dollar bond issue at a price of one hundred, for a fee of one per cent.
- The underwriting fee is one per cent times two billion, twenty million dollars.
- But investor demand is weak, and only sixty per cent of the issue is sold to investors, one point two billion.
- The rest is left on Halverton's books: two minus one point two, point eight billion.
- Then the price falls to ninety seven, a fall of three per cent.
- The loss is three per cent of point eight billion, twenty four million.
- The net result is twenty minus twenty four, a loss of four million dollars.
- Proprietary trading goes one step further.
- It is pure market risk, with no client spread or fee at all to cushion it.

9 Example 5: a trading loss versus a run

Capital $20bn. Short-term funding $150bn. Compare two shocks

Trading loss of $3bn	capital 20 − 3	**$17bn left**
Loss as share of capital	3 ÷ 20	**15%**
Funding not rolled	20% × 150	**$30bn of cash**
Run ÷ capital	30 ÷ 20	**1.5 times**

Exam point: dealers fail through funding and counterparty channels

IN THE LESSON

- Halverton has capital of twenty billion dollars and short-term funding of one hundred and fifty billion.
- Compare two shocks.
- A trading loss of three billion leaves capital of twenty minus three, seventeen billion.
- That is a loss of three over twenty, fifteen per cent of capital: painful, but Halverton is still solvent.
- Now suppose lenders refuse to roll twenty per cent of the short-term funding.
- Twenty per cent of one hundred and fifty is thirty billion dollars of cash that must be found in days.
- The run divided by capital is thirty over twenty, one point five times.
- Capital cannot pay a run.
- Only cash can.
- That is the exam point: dealers fail through funding and counterparty channels faster than through trading losses alone.

10 Why a dealer is exposed to a run

Halverton's $150bn of short-term funding, by source

Repo funding the matched book	from Example 2	**$95bn**
Other repo, own inventory	secured, mostly overnight	**$20bn**
Commercial paper	unsecured, matures in weeks	**$15bn**
Prime brokerage client cash	withdrawable on demand	**$20bn**
Total short-term funding	95 + 20 + 15 + 20	**$150bn**

Short funding against assets that are slow to sell

IN THE LESSON

- Here is Halverton's one hundred and fifty billion dollars of short-term funding, by source.
- Repo funding the matched book, from example two, is ninety five billion.
- Other repo, which funds Halverton's own inventory, is secured and mostly overnight, twenty billion.
- Commercial paper, short-term unsecured notes sold to investors, matures within weeks, fifteen billion.
- Prime brokerage client cash, which is withdrawable on demand, is twenty billion.
- The total short-term funding is ninety five plus twenty plus fifteen plus twenty, one hundred and fifty billion.
- Against this, many of Halverton's assets, such as corporate bonds and loans to clients, cannot be sold quickly without a big discount.
- Short funding against assets that are slow to sell is the root of the danger.

11 Four scenarios that start a liquidity crisis

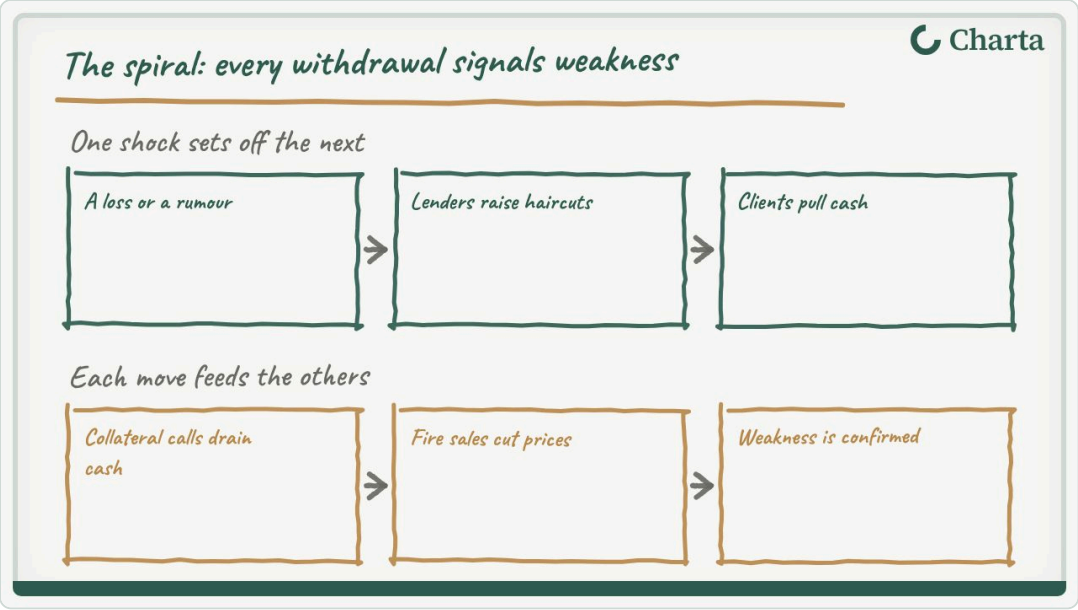
Who pulls cash, and what sets them off

Who acts	What they do
Repo and CP lenders	Refuse to roll, or raise haircuts
Derivatives counterparties	Demand collateral after a downgrade
Prime brokerage clients	Withdraw cash, move positions
Clearing agents and CCPs	Raise margin

IN THE LESSON

- Who pulls cash, and what sets them off?
- First, repo lenders and commercial paper investors.
- After a loss, or even a rumour, they may refuse to roll their funding, or raise haircuts so that each bond raises less cash.
- Second, derivatives counterparties may demand collateral after a downgrade of the dealer's credit rating, often under the rating triggers we met earlier.
- Third, prime brokerage clients may withdraw their free cash balances and move their positions to another dealer.
- Fourth, clearing agents, the banks that settle a dealer's trades, and central counterparties, written C C P, which stand between the two sides of cleared trades, may raise the margin they require.
- Each of these alone is manageable.
- The danger is that they arrive together.

12 The spiral: every withdrawal signals weakness



IN THE LESSON

- Here is why the scenarios feed on each other.
- Read the top row: one shock sets off the next.
- It starts with a loss or a rumour.
- Lenders raise haircuts to protect themselves.
- Clients see this and pull their cash.
- Now the bottom row: each move feeds the others.
- Collateral calls from counterparties drain still more cash.
- To raise it, the dealer sells assets in a hurry, and these fire sales cut prices, which creates new losses and new margin calls.
- Every withdrawal signals weakness to everyone watching, and so weakness is confirmed, and the next lender pulls back too.
- Pulling back is rational for each lender on its own, and fatal for the dealer.

13 Example 6: lenders raise the repo haircut

Matched book: $100bn of client bonds. Lender haircut rises from 5% to 15%

Borrowed before	100 × 95%	**$95bn**
Borrowed after	100 × 85%	**$85bn**
Lent to clients, locked in	loans run 3 months	**$90bn**
Shortfall to fund	90 − 85	**$5bn**
Cash swing	95 − 85	**$10bn**

Rollover and haircut risk: 3-month loans, overnight funding

IN THE LESSON

- Back to the matched book, with one hundred billion dollars of client bonds.
- After the rumour, Halverton's lenders raise their haircut from five per cent to fifteen per cent.
- Borrowed before was one hundred times ninety five per cent, ninety five billion.
- Borrowed after is one hundred times eighty five per cent, eighty five billion.
- But the ninety billion lent to clients is locked in, because those loans run three months, and Halverton cannot call them back early.
- So the shortfall to fund is ninety minus eighty five, five billion dollars.
- The cash swing, from a surplus of five to a hole of five, is ninety five minus eighty five, ten billion.
- This is rollover and haircut risk: three month client loans funded overnight.

14 Example 7: a downgrade triggers collateral calls

Rating agencies cut Halverton by two notches

First notch: trigger contracts	set in the agreements	**$1.5bn**
Second notch: further calls	set in the agreements	**$2.5bn**
Collateral to post	1.5 + 2.5	**$4bn**
Timing	can land with the funding run	**same week**

Trigger exposure is known in advance, so it can be limited

IN THE LESSON

- Rating agencies cut Halverton by two notches, a notch being one step on the rating scale.
- Halverton's derivatives agreements contain rating triggers.
- On the first notch, the trigger contracts require extra collateral of one point five billion dollars, as set out in the agreements.
- The second notch brings further calls, again set in the agreements, of two point five billion.
- The collateral to post is one point five plus two point five, four billion dollars, in cash or high quality bonds that Halverton can then no longer use for anything else.
- Notice the timing.
- A downgrade often follows the loss that worried lenders, so it can land with the funding run, in the same week.
- The good news is that trigger exposure is known in advance, so it can be limited.

15 Example 8: prime brokerage clients leave

Free client cash $20bn. Client collateral $50bn, of which $30bn (60%) rehypothecated

Clients withdraw 40% of cash	40% × 20	**$8bn**
Clients move 20% of positions	20% × 50 × 60% rehyp.	**$6bn**
Cash needed	8 + 6	**$14bn**

Rehypothecated collateral: its funding must be repaid first

IN THE LESSON

- Halverton holds twenty billion dollars of free client cash, and of the fifty billion of collateral that clients pledged, it has rehypothecated thirty billion, sixty per cent.
- Nervous hedge funds withdraw forty per cent of their cash: forty per cent of twenty billion, eight billion dollars.
- Some clients also move twenty per cent of their positions to another prime broker, and the collateral behind those positions must go with them.
- That is twenty per cent of the fifty billion, ten billion.
- Assume rehypothecation is spread evenly across clients, so sixty per cent of it, six billion, was pledged onward to raise Halverton's own funding.
- Ignoring haircuts, Halverton must repay six billion of funding before it can hand that collateral back.
- The cash needed is eight plus six, fourteen billion dollars.
- Rehypothecated collateral cannot simply be handed back: its funding must be repaid first.

16 Example 9: adding up the stressed outflows

Halverton's stress test: one bad month, all channels at once

Repo: haircut 5% to 15%	Example 6	**$10bn**
Commercial paper not rolled	60% × 15	**$9bn**
Downgrade calls; prime brokerage	Example 7: 4; Example 8: 14	**$4bn + $14bn**
CCP margin up 20%	20% × 10	**$2bn**
Total outflow	10 + 9 + 4 + 14 + 2	**$39bn**

All channels hit in the same month

IN THE LESSON

- Halverton's stress test puts one bad month together, with all channels at once.
- Repo, with the haircut rising from five to fifteen per cent, drains ten billion dollars, from example six.
- Commercial paper not rolled: sixty per cent of the fifteen billion matures in the month and finds no buyers, which is nine billion.
- Downgrade collateral calls, from example seven, take four billion.
- Prime brokerage outflows, from example eight, take fourteen billion.
- And the C C P raises margin by twenty per cent on the ten billion of initial margin Halverton already posts, which is two billion more.
- Initial margin is collateral posted up front against possible future losses.
- The total outflow is ten plus nine plus four plus fourteen plus two, thirty nine billion dollars.

17 Example 10: the buffer that really counts

Headline liquid assets $50bn. Stressed need $39bn

Headline liquid assets	on the balance sheet	**$50bn**
Less encumbered: pledged	50 − 10	**$40bn**
Less trapped in a subsidiary	40 − 5	**$35bn**
After 10% stressed haircut	35 × 90%	**$31.5bn**
Shortfall against the need	39 − 31.5	**$7.5bn**

Counts only if unencumbered and it can reach the entity

IN THE LESSON

- Halverton's headline liquid assets are fifty billion dollars, against a stressed need of thirty nine billion.
- It looks safe.
- Now apply the tests.
- Headline liquid assets on the balance sheet: fifty billion.
- Less ten billion that is encumbered, meaning already pledged as collateral, so it is not free to sell or to borrow against: fifty minus ten, forty.
- Less five billion trapped in a foreign subsidiary, where local rules stop it being moved to the parent, which is where the cash is needed: forty minus five, thirty five.
- Then value what is left after a stressed haircut of ten per cent, because in a crisis even good bonds raise less cash: thirty five times ninety per cent, thirty one point five billion.
- The shortfall against the need is thirty nine minus thirty one point five, seven point five billion.
- A buffer counts only if it is unencumbered and can reach the entity that needs the cash.

18 Actions that limit the danger

- Unencumbered HQLA buffer, sized by stress tests
- Valued after stressed haircuts
- Longer funding; diversified lenders and collateral
- A contingent funding plan, written and rehearsed
- Limits on rating-trigger exposure

IN THE LESSON

- What can a dealer do in advance?
- First, hold a buffer of unencumbered high quality liquid assets, written H Q L A, such as government bonds, and size it with stress tests like the one we just ran.
- Second, value that buffer after stressed haircuts, not at today's prices.
- Third, lengthen funding maturities, so that less funding falls due in any one month, and diversify across many lenders and many types of collateral, so that no single lender's exit is fatal.
- Fourth, keep a contingent funding plan, a written plan of who does what, and which sources of cash are used in which order, once stress begins, and rehearse it.
- Fifth, set limits on rating-trigger exposure, so a downgrade cannot drain more than the firm can bear.

19 Example 11: Halverton closes its gap

Need $39bn, usable buffer $31.5bn. Three fixes

Term out CP: 30% due a month	15 × 30% = 4.5; 9 − 4.5 = 4.5	**need $34.5bn**
Cap rating triggers at $2bn	4 − 2, saves 2	**need $32.5bn**
Add $2bn HQLA at the parent	31.5 + 2 × 90%	**buffer $33.3bn**
Surplus	33.3 − 32.5	**$0.8bn**

IN THE LESSON

- Halverton needs thirty nine billion dollars and has a usable buffer of thirty one point five.
- It makes three fixes.
- First, it terms out its commercial paper, issuing longer notes so that only thirty per cent falls due in any month.
- The run on its paper becomes fifteen times thirty per cent, four point five billion, against nine before, which saves four point five, so the need falls to thirty four point five.
- Second, it caps rating triggers at two billion: four minus two saves two, and the need falls to thirty two point five.
- Third, it adds two billion of H Q L A held at the parent, where the cash is needed.
- After the stressed haircut that adds one point eight, so the buffer becomes thirty one point five plus two times ninety per cent, thirty three point three billion.
- The surplus is thirty three point three minus thirty two point five, point eight billion.

20 Policy: two aims for big dealers

- Aim 1: make a dealer less likely to fail
- Aim 2: make a failure less damaging
- Liquidity rules: LCR and NSFR
- Capital rules: risk-based, leverage, surcharges
- Structural: Volcker, clearing, resolution, stays

IN THE LESSON

- Now step back from Halverton to the regulators.
- A big dealer can hurt itself, and it can hurt the whole system, because its lenders, clients and counterparties are other financial firms.
- Policy has two aims.
- The first is to make a dealer less likely to fail.
- The second is to make a failure less damaging if it happens anyway.
- The tools fall into three groups.
- Liquidity rules: the liquidity coverage ratio, written L C R, and the net stable funding ratio, N S F R.
- Capital rules: risk-based minimums, a leverage ratio and surcharges.
- And structural rules: the Volcker rule, central clearing, resolution plans and stays on termination rights.
- We take each group in turn, then the cost of each.

21 The two liquidity ratios

LCR = HQLA ÷ net 30-day outflows ≥ 100%
NSFR = ASF ÷ RSF ≥ 100%

High-quality liquid assets	Unencumbered high-quality assets
Net stressed cash outflows	Inflows capped at 75% of outflows
Available stable funding	Funding that stays for a year
Required stable funding	What the assets need, over 1 year

IN THE LESSON

- Here are the two liquidity ratios.
- The L C R equals high quality liquid assets divided by net stressed cash outflows over thirty days, and it must be at least one hundred per cent.
- In words, the dealer must hold enough unencumbered liquid assets to survive a month of stress on its own.
- Net outflows are outflows minus inflows, but inflows are capped at seventy five per cent of outflows, so a firm can never rely wholly on money coming in.
- The N S F R equals available stable funding divided by required stable funding, over a one year horizon, and it too must be at least one hundred per cent.
- Available stable funding is the funding expected to stay for a year, such as capital and long-term debt.
- Required stable funding is the amount the assets need, given how hard they are to sell.

22 Example 12: Halverton's LCR

Regulator's 30-day scenario: outflows $80bn, inflows $70bn

HQLA: unencumbered, movable	50 − 10 − 5	**$35bn**
Inflow cap	75% × 80	**$60bn**
Net outflows	80 − 60	**$20bn**
LCR	35 ÷ 20	**175%: pass**
Wrong: inflows uncapped	35 ÷ (80 − 70)	**350%**

LCR passes; Halverton's own harsher test showed a gap

IN THE LESSON

- In the regulator's thirty day scenario, Halverton's outflows are eighty billion dollars and its inflows seventy billion.
- H Q L A counts only assets that are unencumbered and free to move, so fifty, minus ten encumbered, minus five trapped, thirty five billion.
- Assume the trapped five billion is all surplus to the subsidiary's own needs, so none of it counts at group level, and that the rest is top quality government bonds, which the rule counts in full, with no haircut.
- Halverton's own test chose a harsher ten per cent.
- The inflow cap is seventy five per cent of eighty, sixty billion.
- Net outflows are eighty minus sixty, twenty billion.
- The L C R is thirty five over twenty, one hundred and seventy five per cent, a pass.
- The common error is to leave inflows uncapped: thirty five over eighty minus seventy gives three hundred and fifty per cent, double the true figure.
- And the L C R passes even though Halverton's own harsher test showed a gap.
- The rule is a floor.

23 Example 13: Halverton's NSFR

Available stable funding $90bn; required stable funding $100bn

NSFR today	90 ÷ 100	**90%: fails**
Term out $10bn beyond 1 year	ASF 90 + 10	**$100bn**
NSFR after	100 ÷ 100	**100%: passes**

LCR survives a month; NSFR cuts rollover risk at the source

IN THE LESSON

- Available stable funding is ninety billion dollars, and the stable funding Halverton's assets require is one hundred billion.
- The N S F R today is ninety over one hundred, ninety per cent, which fails.
- Halverton terms out ten billion of short-term funding, replacing it with debt that matures beyond one year.
- Assume the funding it replaces counted for nothing, and the new debt counts in full.
- Available stable funding becomes ninety plus ten, one hundred billion.
- The N S F R after the change is one hundred over one hundred, exactly one hundred per cent, a pass.
- Notice the link with the crisis scenarios.
- The L C R makes the dealer survive a month.
- The N S F R cuts rollover risk at the source, by pushing long, hard to sell assets onto long funding.
- Longer funding costs more, and that is the price.

24 Capital rules for big dealers

- Risk-based minimums: capital ÷ risk-weighted assets
- Leverage ratio: capital ÷ exposure, no risk weights
- Surcharges for global systemically important banks
- Loss-absorbing capacity: debt written down or converted

IN THE LESSON

- Capital rules make a failure less likely by giving more room to absorb loss.
- Risk-based minimums require capital of at least a set share of risk-weighted assets, where each asset is weighted by its riskiness.
- The leverage ratio divides capital by total exposure with no risk weights at all, so it acts as a backstop when risk weights are too low or are gamed.
- Global systemically important banks, written G S I Bs, the largest and most connected, pay a surcharge, an extra layer of capital, because their failure would do the most damage.
- Last, loss-absorbing capacity for resolution: enough capital and long-term debt that can be written down or turned into equity if the bank fails, so that losses fall on investors rather than taxpayers.

25 Example 14: why the leverage ratio bites a dealer

Tier 1 capital $20bn. Risk-weighted assets $160bn. Total exposure $400bn

Risk-based ratio	20 ÷ 160	**12.5%**
Leverage ratio	20 ÷ 400	**5.0%**
Matched-book repo in exposure	from Example 2	**$90bn**
Add $100bn repo: risk-based	10% weight: 20 ÷ (160 + 10)	**11.8%**
Same repo: leverage ratio	20 ÷ (400 + 100)	**4.0%**

Repo: low risk weight, but counts in full for leverage

IN THE LESSON

- Halverton has tier one capital, its highest quality capital, mainly shareholders' equity, of twenty billion dollars.
- Its risk-weighted assets are one hundred and sixty billion, and its total exposure, on and off the balance sheet, is four hundred billion.
- The risk-based ratio is twenty over one hundred and sixty, twelve point five per cent.
- The leverage ratio is twenty over four hundred, five per cent.
- The matched-book repo loans to clients, ninety billion from example two, already sit in that exposure.
- Now suppose Halverton adds another one hundred billion of repo, secured on good collateral, with a risk weight of ten per cent.
- Risk-weighted assets rise by only ten, so the risk-based ratio becomes twenty over one hundred and seventy, about eleven point eight per cent, barely moved.
- But exposure rises by the full one hundred, so the leverage ratio becomes twenty over five hundred, four per cent, a fall of one fifth.
- So the leverage ratio limits how far a dealer can grow thin-spread, secured businesses.

26 Structural measures

Change what dealers do, and how they fail

Measure	What it does
Volcker rule	Limits proprietary trading
Central clearing and margin	Standard OTC trades via CCPs
Resolution plans	A worked-out plan for failure
Temporary stays	Pause termination at resolution

IN THE LESSON

- Structural measures change what dealers do, and how they fail.
- The Volcker rule, a United States rule, limits proprietary trading by banks, the pure market risk line from our first tables.
- Central clearing and margin: standardised O T C derivatives must be cleared through a C C P, and trades that are not cleared must carry margin, so exposures are backed by collateral.
- Resolution plans, sometimes called living wills, set out in advance how the dealer could be wound down without chaos.
- Temporary stays pause counterparties' rights to terminate their contracts when a dealer enters resolution, so that thousands of derivatives are not closed out at once, which would drain the dealer and flood markets with collateral sales.

27 Example 15: central clearing nets, but concentrates

Values to Halverton: Alder +$6bn, Birch +$4bn, Cedar −$5bn

Bilateral exposure	6 + 4; Cedar is owed, not owing	**$10bn**
After clearing: net	6 + 4 − 5	**$5bn**
Exposure cut	10 − 5	**$5bn, 50%**
Who it is now owed by	a single CCP	**concentrated**

IN THE LESSON

- The values of Halverton's derivatives, to Halverton, are plus six billion dollars with a dealer called Alder, plus four billion with Birch, and minus five billion with Cedar.
- Bilateral exposure is six plus four, ten billion.
- Cedar's minus five does not help, because Halverton owes Cedar, and cannot set that against what Alder or Birch owe it.
- After clearing, all three trades face one C C P, so they net into one position: six plus four minus five, five billion.
- The exposure cut is ten minus five, five billion, or fifty per cent.
- But who is it now owed by?
- A single C C P, which also stands behind every other dealer's trades.
- Risk is concentrated in the clearing house, so a C C P failure would be a system event.

28 Every rule has a cost

Each rule cuts one risk and creates a cost

Rule	Main cost
LCR and NSFR	Low-yield assets, dearer funding
Leverage ratio	Penalises safe, thin-spread repo
Volcker rule	Less inventory: thinner market liquidity
Central clearing	Risk concentrated in CCPs
Stays and resolution	Counterparties lose quick exit

IN THE LESSON

- Each rule cuts one risk and creates a cost, and the exam wants you to weigh both.
- The L C R and N S F R force dealers to hold low-yield liquid assets and to pay for longer funding, which squeezes thin businesses such as matched-book repo.
- The leverage ratio penalises safe, thin-spread repo, because it ignores how good the collateral is.
- The Volcker rule must separate market making, which needs inventory, from proprietary trading, and that line is hard to draw, so dealers may hold less inventory and markets may be less liquid.
- Central clearing lowers bilateral exposure but concentrates risk in C C Ps.
- Under stays and resolution, counterparties lose the quick exit rights they once relied on.
- The question is always whether the safety gained is worth the cost.

29 Mistakes to avoid

- Dealers fail via funding and counterparties, not loss alone
- Usable buffer: less encumbered, trapped, haircut
- Cap inflows at 75% of outflows in the LCR
- Matched book is not riskless: haircut and rollover
- Clearing cuts exposure but concentrates it

IN THE LESSON

- Five mistakes to avoid.
- First, thinking a dealer fails mainly through trading losses.
- It fails through funding and counterparty channels, and faster.
- Second, taking the headline buffer as usable.
- Remove what is encumbered, remove what is trapped in another entity, and apply a stressed haircut.
- Halverton's fifty billion became thirty one point five.
- Third, forgetting to cap inflows at seventy five per cent of outflows in the L C R.
- Fourth, calling a matched book riskless because its two legs offset.
- Haircut and rollover risk remain whenever client loans outlast the funding behind them.
- Fifth, assuming that central clearing removes risk.
- It cuts exposure but concentrates it in the clearing house.

30 Try three quick questions

1. Outflows $60bn, inflows $50bn, HQLA $18bn. LCR?
   Answer: Cap 75% × 60 = 45. Net 60 − 45 = 15. 18 ÷ 15 = 120%.
2. Liquid assets $40bn: $8bn pledged, $4bn trapped, 5% haircut. Usable?
   Answer: (40 − 8 − 4) × 95% = $26.6bn.
3. Central clearing cuts bilateral exposure. What cost does it bring?
   Answer: Risk concentrates in the clearing house.

IN THE LESSON

- Now try three quick questions.
- Pause the video, think, then listen to the answers.
- Question one.
- A dealer faces thirty day stressed outflows of sixty billion dollars and inflows of fifty billion, and holds eighteen billion of H Q L A.
- What is its L C R?
- Inflows are capped at seventy five per cent of sixty, forty five billion, so net outflows are fifteen billion, and the L C R is eighteen over fifteen, one hundred and twenty per cent.
- Question two.
- A dealer has forty billion dollars of liquid assets.
- Eight billion is pledged, four billion is trapped in a subsidiary, and the stressed haircut is five per cent.
- What is the usable buffer?
- Forty minus eight minus four is twenty eight, and twenty eight times ninety five per cent is twenty six point six billion.
- Question three.
- Central clearing cuts bilateral exposure.
- What cost does it bring?
- It concentrates risk in the clearing house.