CHARTA LEARNING · LESSON NOTES

Credit risk transfer mechanisms

FRM Part I

1 A story: the bank that lent too much to one friend

- Credit risk = the chance a borrower or partner fails to pay
- Old tools: spread, limit, take security
- New tool: pay someone else to carry the risk
- Credit derivative = credit risk traded apart from the asset

IN THE LESSON

- Picture a small bank whose best customer is a single large factory.
- The bank lends it a great deal of money, and for years it is repaid.
- Then the factory runs into trouble.
- The bank now faces credit risk: the chance that a borrower or a trading partner fails to pay what it owes.
- The bank has two broad choices.
- It can use old fashioned tools, such as spreading its lending around, asking for security, and limiting how much it will ever lend to one name.
- Or it can use a newer tool and pay someone else to take on the risk.
- That second route is credit derivatives, and it lets you buy or sell credit risk separately from owning the loan or the bond itself.

2 The five credit derivatives to know

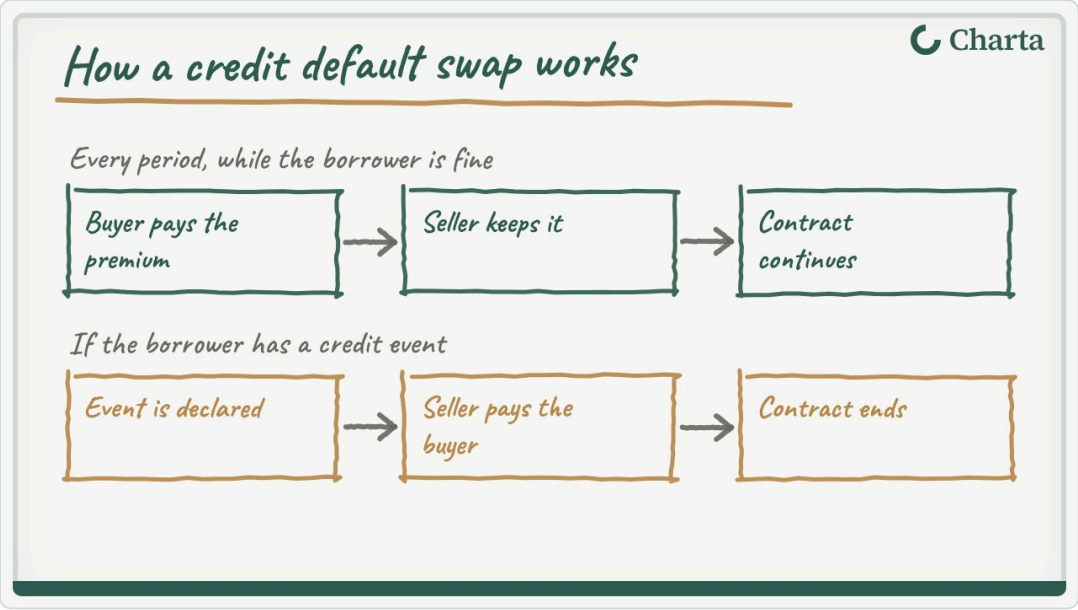
Five contracts, five different jobs

Contract	What it does
Credit default swap	Premium paid, payout on a credit event
Total return swap	Passes on all gains and losses
Credit-linked note	Funded: principal paid up front
Credit spread option	Pays on spread moves, no default
First-to-default basket	Pays on the first default of several

IN THE LESSON

- There are five contracts to compare.
- The credit default swap, or C D S, is the plain protection contract: one side pays a regular premium, and the other pays out if the named borrower has a credit event.
- The total return swap hands over the whole return of an asset, so it carries market risk as well as credit risk.
- The credit linked note is a bond with protection built in, and it is funded, because the investor pays the principal up front.
- The credit spread option pays when the extra yield over a safe rate moves, with no default needed.
- The first to default basket pays out on only the first default among several names, and it costs less than buying protection on each one.

3 How a credit default swap works



IN THE LESSON

- Let's follow a credit default swap.
- There is a protection buyer, perhaps a bank that holds a loan.
- There is a protection seller, perhaps an insurer or another bank.
- There is also a reference entity, the borrower whose credit is being insured.
- The buyer pays the seller a periodic premium, in the way you pay for house insurance.
- If the reference entity has a credit event, such as failing to pay or going bankrupt, the seller pays the buyer.
- If nothing happens, the buyer simply loses the premiums, just as you hope never to claim on your house.
- Two details matter.
- The contract pays only on a defined credit event, and the buyer still depends on the seller to honour the promise.

4 The credit default swap payout

Payout = Notional × (1 − Recovery rate)

Payout	Cash the seller pays the buyer
Notional	Face amount of protection bought
Recovery rate	Share of the debt recovered

IN THE LESSON

- Here is the payout.
- It equals the notional, multiplied by one minus the recovery rate.
- The notional is the face amount of protection the buyer bought.
- The recovery rate is the share of the debt that creditors still get back after the default, from selling assets or restructuring.
- One minus the recovery rate is therefore the share that is lost, which is the loss given default.
- So the seller pays only the loss.
- If recovery is forty per cent, the loss is sixty per cent of the notional.
- In a standard contract the recovery rate is the actual recovery on the defaulted debt, set at settlement, and it is the seller who bears the uncertainty about how much will be recovered.

5 Example 1: a credit default swap pays out

Notional $10m, premium 2% a year, recovery 40% (illustration)

Annual premium	2% × 10.0	**$0.2m**
Payout on default	10.0 × (1 − 0.40)	**$6.0m**
Loss on the bond	10.0 − 4.0	**$6.0m**
Net after one year	6.0 − 6.0 − 0.2	**−$0.2m**

IN THE LESSON

- A bank holds a corporate bond of ten million dollars and buys protection on it with a credit default swap.
- The premium is two per cent a year, which is two hundred thousand dollars every year.
- After one year the company defaults.
- Recovery turns out to be forty per cent.
- The payout is ten million times one minus point four, which is six million.
- Meanwhile the bank's bond is worth only four million, so it has lost six million on the bond.
- The payout cancels that loss.
- What is left is the premium it paid, two hundred thousand, which is the price of having slept soundly.
- These are made up round numbers, only an illustration.

6 Total return swaps and credit-linked notes

- Total return swap: receiver gets coupons and price changes
- So it carries market risk as well as credit risk
- Credit-linked note: investor pays principal up front
- Funded: investor bears the loss, issuer holds cash

IN THE LESSON

- Now two more contracts.
- In a total return swap, one side, the receiver, gets the whole economic return of an asset, such as a bond: its coupons plus any rise in price, and it also suffers any fall.
- In exchange it pays a funding rate.
- So the receiver takes market risk as well as credit risk, and can do it without owning the bond.
- A credit linked note is different because it is funded.
- The investor buys a note and pays the principal up front, and the issuer pays interest.
- If the reference entity defaults, the investor takes the loss, so the issuer is effectively insured, with cash already in hand.
- That cash means the issuer faces little counterparty risk.

7 Example 2: a total return swap with no default

Bond $10m, coupon 5%, funding 4%, price 100 to 92 (illustration)

Coupon received	5% × 10.0	**+$0.5m**
Price change	(92 − 100)% × 10.0	**−$0.8m**
Funding paid	4% × 10.0	**−$0.4m**
Net result, no default	0.5 − 0.8 − 0.4	**−$0.7m**

IN THE LESSON

- Here is the market risk point in numbers.
- A receiver enters a total return swap on a ten million dollar bond that pays a five per cent coupon.
- It pays a funding rate of four per cent.
- The company does not default, but its credit worsens and the bond price falls from one hundred to ninety two.
- The receiver collects the coupon, five hundred thousand, loses eight hundred thousand on the price fall, and pays four hundred thousand in funding.
- The net result is a loss of seven hundred thousand dollars, with no default at all.
- A credit default swap would have paid nothing in this case, which shows how the two contracts differ.

8 Spread options and first-to-default baskets

- Credit spread = extra yield over a safe rate
- Spread option pays on spread moves, even with no default
- First-to-default: pays on the first default, then ends
- Costs less than the sum of the single-name CDS spreads

IN THE LESSON

- A credit spread is the extra yield a risky borrower pays above a safe rate.
- A credit spread option gives the holder the right to buy or sell at a set spread.
- It pays when spreads move, so it can pay out without any default, and it suits a holder who fears that spreads will widen.
- Now a basket.
- Suppose you want protection on several companies.
- In a first to default basket, the seller pays only on the first default among the names, and then the contract ends.
- Because it pays at most once, it costs less than buying a separate credit default swap on every name.
- The cheaper price comes at a cost: the later defaults are no longer covered.

9 Example 3: pricing a first-to-default basket

Three names, $10m each, recovery 40% (illustration)

Sum of three CDS spreads	100 + 150 + 250	**500 bp**
First-to-default spread	illustration	**320 bp**
Cheaper by	500 − 320	**180 bp**
Payout at first default	10.0 × (1 − 0.40)	**$6.0m**
Cover left after payout	contract has ended	**none**

IN THE LESSON

- Take three companies with single name credit default swap spreads of one hundred, one hundred and fifty and two hundred and fifty basis points.
- A basis point is one hundredth of one per cent.
- Buying all three costs five hundred basis points in total.
- A first to default basket on the same three might cost, say, three hundred and twenty.
- That is an illustration.
- It is cheaper by one hundred and eighty, because the seller pays only once.
- If one name defaults with ten million at stake and forty per cent recovery, the payout is six million.
- After that the contract ends, and the buyer has no cover left on the other two.

10 What credit derivatives are for, and their limits

- Hedge: cut the risk of a loan you hold
- Diversify: take or shed credit risk by name or sector
- Take a view: bet on credit quality without owning the bond
- Limits: seller may fail; pays only on a defined credit event

IN THE LESSON

- Why use these contracts?
- Three reasons.
- Hedging: a lender cuts the risk of a loan it holds.
- Diversifying: a firm can take on credit risk to many borrowers it never lent to, and sell off credit risk it holds too much of.
- And taking views: an investor who thinks a borrower is safer, or riskier, than the market believes can bet on it without buying a bond.
- The benefits are flexibility, cost, and keeping the client relationship, since the loan stays where it is.
- Now the limits.
- The protection buyer still faces counterparty risk, because the seller might fail.
- And a credit default swap pays only on a defined credit event, so a bad outcome that falls outside the definition pays nothing.

11 Conventional tools: spread it and cap it

- Diversify across borrowers, industries and countries
- Set limits so that no single default is large
- No counterparty is needed, so no counterparty risk
- Weak when many borrowers fail together

IN THE LESSON

- Before derivatives, companies and banks used simpler tools, and still do.
- The first is diversification.
- Do not lend too much to one borrower, one industry, or one country, so that no single default is large.
- This is enforced with limits by borrower, by industry and by country, and a request that would go over the limit needs special approval.
- Think of it as not keeping all your eggs in one basket.
- Limits need no counterparty, so they carry no counterparty risk of their own.
- Their weakness is that they work only against failures that are not tied together.
- In a deep recession, many borrowers in different industries can all fail together, and diversification helps much less than hoped.

12 Collateral, margin and what is left over

- Collateral and margin: assets held against the exposure
- Threshold: exposure allowed with no collateral
- Minimum transfer amount: small moves trigger no call
- Delay in collecting: value can move meanwhile

IN THE LESSON

- The second tool is collateral, also called margin.
- The counterparty pledges assets, usually cash or safe bonds, which the firm can keep if the counterparty fails.
- This reduces the amount lost if it fails.
- But some exposure always remains, for three reasons.
- A threshold is an amount of exposure allowed before any collateral is required.
- A minimum transfer amount means small changes in value do not trigger a call.
- And there is a delay between the last collateral call and the moment you could actually seize the assets, during which the value of the trades can move against you.
- So collateral cuts the risk, but never to zero.

13 Example 4: how much exposure collateral leaves

Exposure $20m, threshold $4m, value rises $3m before collection (illustration)

Collateral held	20 − 4, received	**$16m**
Unsecured by threshold	the threshold	**$4m**
Value rises during delay	not yet called	**+$3m**
Exposure if it fails then	4 + 3	**$7m**

IN THE LESSON

- Suppose the market value of trades with a counterparty is twenty million dollars in our favour, so it owes us twenty.
- Our agreement has a threshold of four million.
- So we can call collateral only for the part above the threshold: twenty minus four, sixteen million, and we assume it has been delivered, ignoring any minimum transfer amount.
- The remaining four million is unsecured.
- Now add the delay.
- If the counterparty defaults before the next call, and in the meantime the value of the trades rises by three million, our exposure grows to seven million, the four unsecured plus the three of fresh movement.
- The collateral helped a lot, from twenty to seven, but it did not remove the risk.
- These figures are made up.

14 Close-out netting

Exposure = larger of (Net value of all trades, 0)

Exposure	Amount we could lose
Net value of all trades	All trades added, plus and minus
Zero floor	Floor: exposure cannot be negative

IN THE LESSON

- Next, close-out netting.
- Two firms often trade many contracts with each other, some in which one is owed money and some in which it owes.
- Under a single enforceable master agreement, such as an I S D A master agreement, if one party defaults, all those trades are closed out and added together into one net claim.
- The exposure is then the larger of the net value and zero.
- Not the sum of the positive trades.
- Terms: exposure is what we could lose.
- The net value is all trades added, positives and negatives.
- And the zero floor says that if the net value is negative, we owe money and have nothing to lose, so exposure is zero, not a negative number.

15 Example 5: netting cuts the exposure

Trade values to us, $m (illustration)

Case 1: +30, −12, +5, no netting	30 + 5	**35**
Case 1: with netting	larger of (23, 0)	**23**
Case 2: +10, −25, +5, no netting	10 + 5	**15**
Case 2: with netting	larger of (−10, 0)	**0**

IN THE LESSON

- Let's see it with two cases.
- Case one: three trades with one counterparty worth plus thirty, minus twelve and plus five million to us.
- Without netting we could lose the sum of the positives, thirty plus five, thirty five.
- With netting the net value is twenty three, so that is the exposure.
- Case two: trades worth plus ten, minus twenty five and plus five.
- Without netting the exposure is ten plus five, fifteen.
- With netting the net value is minus ten, which is below zero, so exposure is zero.
- But the netting must be legally enforceable in the courts that matter.
- If it is not, a liquidator may be able to demand the money we owe while paying us only a part of what we are owed.

16 More tools, and how triggers can backfire

- Guarantees, letters of credit and credit insurance
- Shorter maturities: less time to fail
- Covenants and rating triggers: repay or post collateral
- Triggers demand cash exactly when the firm is weakest

IN THE LESSON

- There are more conventional tools.
- Guarantees: a stronger party promises to pay if the borrower does not.
- Letters of credit: a bank promises to pay on the borrower's behalf.
- Credit insurance, bought from an insurer.
- Shorter maturities, because there is less time for the borrower to fail.
- And covenants, which are promises in the loan agreement that, if broken, allow the lender to demand repayment.
- Rating triggers work the same way: if the firm's rating falls, it must post extra collateral or repay early.
- These triggers have a sting.
- They demand cash exactly when the firm is at its weakest, and so can push a wobbling firm over the edge.

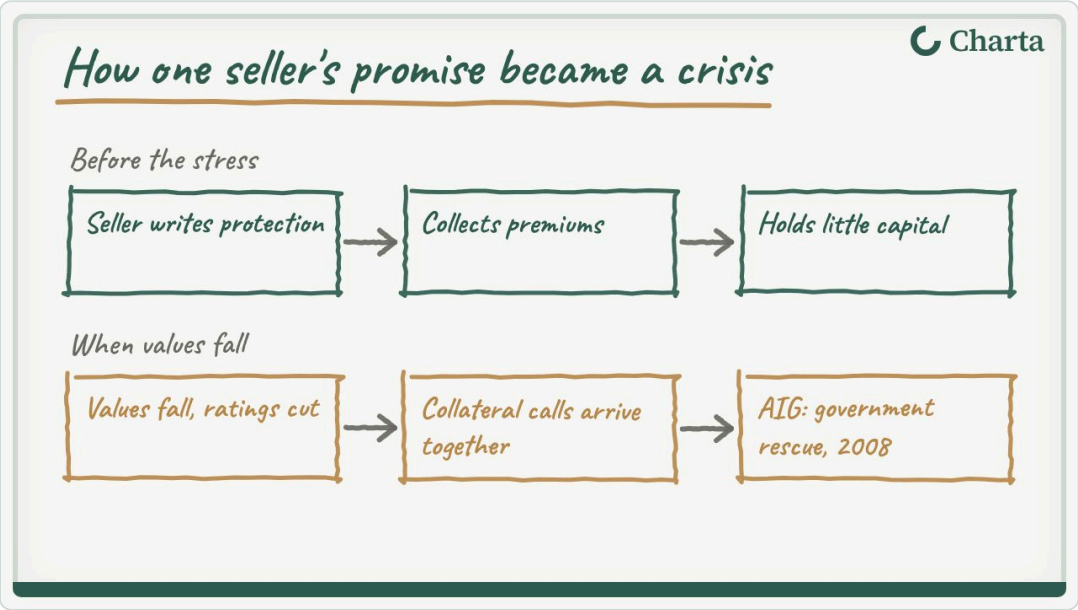
17 The role of credit derivatives in the crisis

- Credit derivatives did not create the crisis
- They spread the losses and hid them
- AIG Financial Products and monolines sold protection
- On super-senior tranches, with too little capital

IN THE LESSON

- Now to the financial crisis of two thousand seven to two thousand nine.
- Credit derivatives did not cause it.
- The root causes lay elsewhere, in poor lending and the growth of risky structured products.
- But credit derivatives spread the losses and hid them.
- Large sellers of protection, above all the financial products unit of A I G and the monoline insurers, wrote credit default swaps on the super senior tranches of structured credit.
- Monolines are insurers that specialise in guaranteeing bonds.
- A tranche is a slice of a pool of loans, explained later, and super senior means the very safest slice, so they believed a loss was close to impossible.
- They collected premiums, and did not hold enough capital or collateral against the chance that they were wrong.

18 How one seller's promise became a crisis



IN THE LESSON

- Follow the chain.
- Step one: the seller writes protection on a super senior tranche, and collects its premium.
- Step two: the housing market weakens, the market value of the structured securities falls, and the rating agencies cut ratings.
- Step three: because the contracts carried collateral clauses linked to market value and ratings, the sellers had to post more collateral, and recognise mark to market losses, all at once.
- Step four: they could not find the cash.
- A I G needed a government rescue in two thousand eight.
- For A I G in particular, it was the speed of the collateral calls and mark to market losses, arriving all at once, that created the cash crisis, even before final losses on the underlying assets were known.

19 Opacity: nobody could see who owed whom

- Over the counter: private, bilateral contracts
- No one saw the whole web of who owed whom
- Counterparty risk was hard to measure
- Fear spread because nobody knew where losses sat

IN THE LESSON

- A second problem was how the contracts were traded.
- Most credit derivatives were over the counter, which means bilateral agreements between two firms, not trades on an open exchange.
- Nobody had a full picture of who had sold how much protection to whom.
- Dealers were linked in a thick web of promises, and a failure at one could hurt many others, but no one could measure how badly.
- This made counterparty risk very hard to measure, and when fear took hold, firms stopped trusting each other.
- So when the crisis came, the question was not only how large the losses were, but where they sat, and nobody knew the answer.

20 What changed after the crisis

Four reforms, each aimed at a crisis weakness

Reform	Aim
Standard contracts, fixed coupons	Make trades alike and nettable
Central clearing	Face a clearing house, with margin
Trade reporting	Let regulators see positions
Higher capital and margin	Make uncleared trades costlier

IN THE LESSON

- Afterwards, several reforms followed.
- First, standardised contracts, with fixed coupons and an upfront payment to settle the difference between the coupon and the true price of the risk.
- This makes contracts the same, so they can be netted and cleared.
- Second, central clearing: a central counterparty steps between buyer and seller, so each faces the clearing house, not each other.
- Third, trade reporting, so that regulators can see positions.
- And fourth, higher capital and margin for trades that are not cleared, to make the private route more expensive, and so push trading into the cleared route.
- Together, these aim at a market that is more standard, more visible and better protected.

21 Example 6: what clearing does to exposure

B owes A $10m; A owes C $10m (illustration)

Bilateral: A exposed to B	B owes A	**$10m**
Bilateral: C exposed to A	A owes C	**$10m**
Cleared: A's net position	+10 − 10	**0**
Risk that remains	the clearing house	**concentrated**

IN THE LESSON

- Take three dealers.
- Dealer B owes dealer A ten million on one contract, and A owes dealer C ten million on another.
- Bilaterally, A is exposed to B for ten million, and C is exposed to A for ten million.
- Now clear both through a clearing house.
- A faces the clearing house on both contracts: plus ten and minus ten, which net to zero.
- That is multilateral netting.
- A's exposure drops from ten million to nothing, and the clearing house collects margin from each member to cover losses.
- But note what has happened.
- Bilateral exposure has been swapped for exposure to one clearing house.
- Clearing reduces counterparty risk but concentrates it in one place, and it does not remove credit risk.

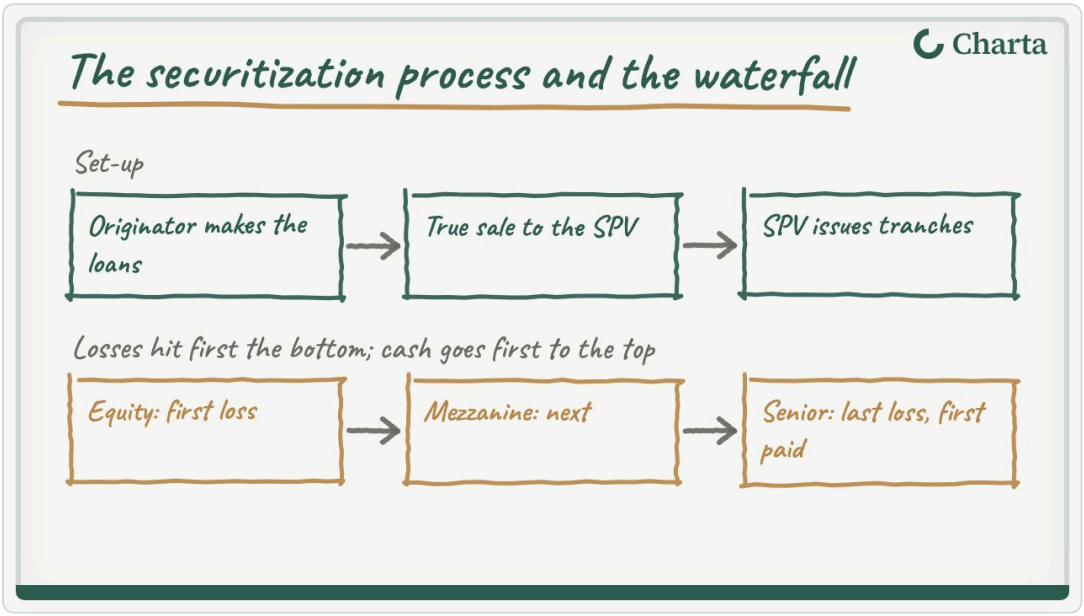
22 Securitization: pooling loans and selling the cash flows

- Pool many loans, sell claims on the cash flows
- Originator makes a true sale to a special purpose vehicle
- SPV: separate legal entity, bankruptcy remote
- Investors rely on the pool, not on the originator

IN THE LESSON

- Now the fourth topic.
- Securitization means pooling many loans, such as mortgages or car loans, and selling claims on the cash flows from the pool.
- The originator, usually a bank, sells the loans in what is called a true sale to a special purpose vehicle, or S P V.
- This is a separate legal entity, set up for this one job, and it is bankruptcy remote: if the originator fails, creditors cannot reach the loans inside the vehicle.
- Investors therefore depend on the quality of the pool, not on the solvency of the originator.
- That is the whole point of the structure, and why the sale has to be real and not just a loan in disguise.

23 The securitization process and the waterfall



IN THE LESSON

- Here is the process.
- The originator sells the loans to the vehicle.
- The vehicle pays for them by issuing tranches, which are slices of the pool with different priority.
- Losses are absorbed from the bottom.
- First the equity tranche, also called first loss, takes losses.
- Then the mezzanine tranche.
- Only then the senior tranche.
- Cash flows run the other way: the waterfall pays the senior investors first, then the mezzanine, then the equity.
- That is why the senior is safest and pays the least, while the equity is the riskiest and may earn the most.
- The borrowers' payments flow through the vehicle and down the waterfall to the investors.

24 How a tranche loses value

Tranche loss = (Pool loss − Attachment) ÷ Width, between 0% and 100%

Tranche loss	Share of this tranche lost
Pool loss	Loss on the whole pool
Attachment point	Pool loss where it starts to lose
Tranche width	Size of the tranche

IN THE LESSON

- A tranche loses nothing until the pool losses pass its attachment point, the loss level where it starts to be hit.
- Beyond that, the tranche loss equals the pool loss minus the attachment point, divided by the tranche width, capped at one hundred per cent.
- Terms: pool loss is the loss of the whole pool, as a share of the pool.
- The attachment point is where the tranche starts to lose.
- The width is the size of the tranche, the gap between where it starts to lose and where it is wiped out.
- Dividing by the width converts pool loss into the share of this one tranche that has gone.
- A thin tranche is wiped out quickly.

25 Example 7: losses move up the tranches

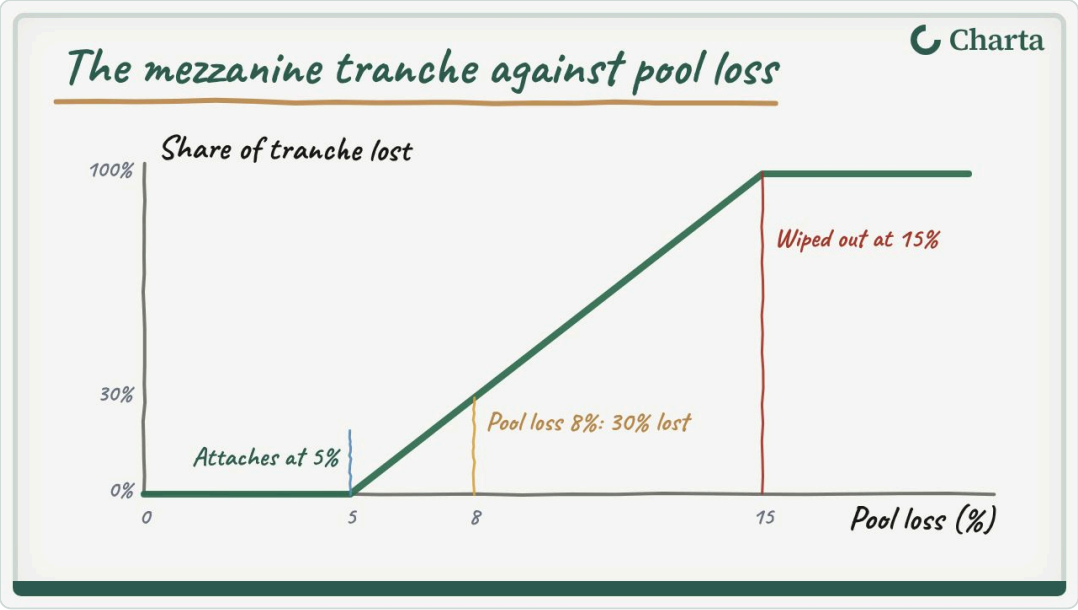
Pool $1,000m. Equity 0-5%, mezzanine 5-15%, senior 15-100% (illustration)

Pool loss 8%: equity	(8 − 0) ÷ 5, capped	**100%**
Pool loss 8%: mezzanine	(8 − 5) ÷ 10	**30%**
Pool loss 8%: senior	below 15%	**0%**
Pool loss 20%: senior	(20 − 15) ÷ 85	**5.9%**

IN THE LESSON

- A pool of one billion dollars is split into three tranches.
- Equity takes the first five per cent of loss, so its attachment is zero and its width is five.
- Mezzanine runs from five to fifteen per cent, a width of ten.
- Senior covers everything above fifteen, a width of eighty five.
- Suppose the pool loses eight per cent.
- Equity is wiped out: one hundred per cent.
- Mezzanine loses eight minus five, over ten: thirty per cent.
- Senior loses nothing.
- Now suppose the pool loses twenty per cent.
- Equity and mezzanine are wiped out, and senior loses twenty minus fifteen, over eighty five, which is about five point nine per cent.
- Even the safest tranche is not safe in an extreme enough loss.

26 The mezzanine tranche against pool loss



IN THE LESSON

- Here is a picture of the mezzanine tranche.
- Along the bottom is the pool loss, from zero to twenty per cent.
- Up the side is the share of the mezzanine tranche that is lost.
- For the first five per cent of pool loss the line lies flat at zero, because the equity tranche soaks up the losses.
- That is the attachment point.
- Between five and fifteen per cent the line rises steadily, since each extra point of pool loss eats one tenth of the tranche.
- At fifteen per cent the tranche is wiped out, the detachment point, and the line stays at the top, capped at one hundred per cent.
- The sloping part is steep because the tranche is thin.

27 Credit enhancement: three cushions and a warning

- Subordination: junior tranches absorb losses first
- Overcollateralization: pool worth more than the notes
- Excess spread: loan interest above what investors are paid
- All cushions can fail if defaults are linked

IN THE LESSON

- Structures add cushions, called credit enhancement, so that the senior tranches are safer than the average loan.
- There are three.
- Subordination: the junior tranches below absorb the first losses, as we have seen.
- Overcollateralization: the pool is worth more than the notes issued against it, so there is an extra layer of assets.
- And excess spread: the loans pay a higher interest rate than the investors are paid, and the leftover each period can be used to cover losses before any tranche is hit.
- Together they explain why rating agencies were willing to give high ratings to senior slices of pools of weak loans.
- The danger is trusting these cushions when borrowers' defaults are linked.

28 Example 8: overcollateralization and excess spread

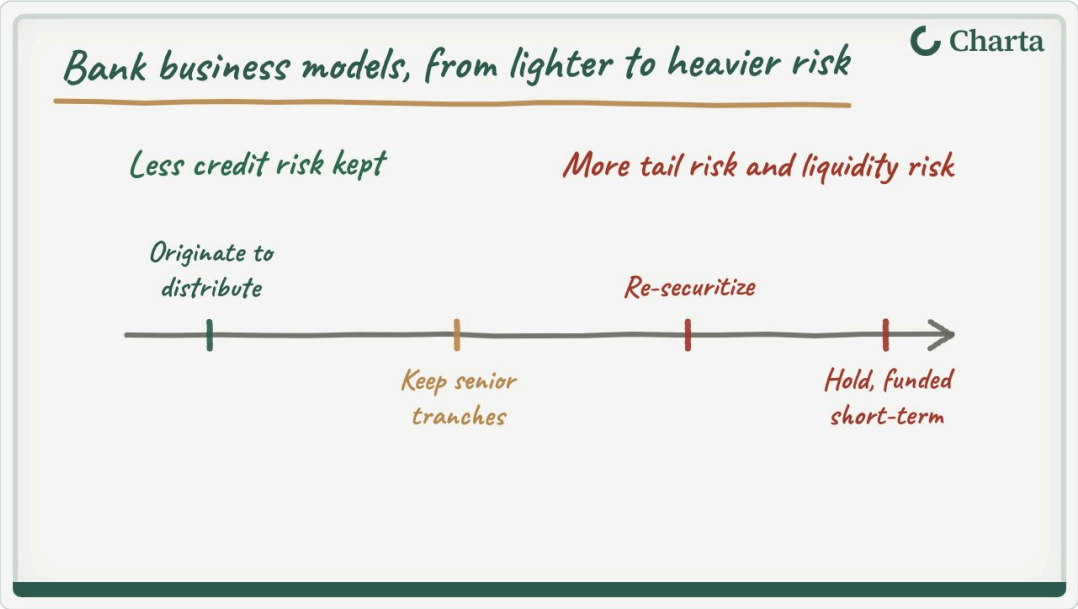
Pool $1,000m at 6%; notes $900m at 4.5% (illustration)

Overcollateralization	1,000 − 900	**$100m**
Interest earned by the pool	6% × 1,000	**$60.0m**
Interest paid on notes	4.5% × 900	**$40.5m**
Excess spread	60.0 − 40.5	**$19.5m**

IN THE LESSON

- A vehicle holds a pool of one thousand million dollars of loans paying six per cent interest.
- It issues notes of only nine hundred million, paying four and a half per cent.
- The pool is bigger than the notes by one hundred million, which is overcollateralization of ten per cent of the pool.
- The pool earns sixty million a year, and the notes cost forty point five million.
- The leftover, nineteen point five million, is the excess spread.
- It can absorb losses first, before any tranche is touched, if, say, a few loans default this year.
- The figures ignore fees, and are only an illustration.

29 Bank business models, from lighter to heavier risk



IN THE LESSON

- Banks used securitization in different ways.
- On the left is originate to distribute.
- The bank makes loans, packages and sells them, and keeps little credit risk, earning fees.
- Its risks lie elsewhere: it must hold loans on its books in a warehouse until the sale, and it may be less careful lending money it plans to pass on.
- Further right, the bank keeps the senior tranches, because they look safe and pay a little extra.
- Further right still, it re securitizes, packaging tranches into new securities.
- And at the far right it holds these positions funded by short term borrowing, which adds liquidity risk, since the funding can vanish quickly.

30 Judging how risky each model is

- Originate to distribute: warehouse and incentive problems
- Retained senior tranches: concentrated tail risk
- Re-securitizing: stacks the tail risk, hides it
- Short-term funding adds liquidity risk

IN THE LESSON

- So how do we judge them?
- Originate to distribute looks safest for credit risk, but it has two weaknesses.
- Warehouse risk: loans sit on the books until sold, and if the market shuts, the bank is stuck with them.
- And an incentive problem: if the bank will not hold the loan, it has less reason to check the borrower.
- Retaining senior tranches looks safe because losses rarely reach them, but the risk is concentrated tail risk.
- It is small most of the time, and then enormous.
- Re securitizing stacks that tail risk and makes it harder to see.
- And funding such holdings with short term borrowing adds liquidity risk, because the bank must refinance often, in just the markets that freeze.

31 Four mistakes to avoid

- Buyer keeps counterparty risk; pays on defined events
- Netting needs legal enforceability
- Clearing concentrates credit risk, it does not remove it
- Senior tranches and distribute models are not risk-free

IN THE LESSON

- Mistake one: forgetting that the protection buyer still faces counterparty risk, and that a credit default swap pays only on a defined credit event.
- Mistake two: assuming netting works everywhere.
- It reduces exposure only if it is legally enforceable, so always check that condition, and remember that exposure is the larger of the net value and zero.
- Mistake three: thinking central clearing removes credit risk.
- It swaps bilateral exposure for exposure to a clearing house, reducing counterparty risk but concentrating it.
- Mistake four: treating a senior tranche, or an originate to distribute model, as risk free.
- Senior tranches can be hit in a bad enough loss, and the model keeps warehouse, incentive and funding risk.

32 Recap: the main ideas

- CDS payout = notional × (1 − recovery)
- Limit exposure: diversify, collateral, enforceable netting
- Crisis hid losses; reforms: standardize, clear, report
- SPV and tranches: losses hit the bottom first
- Bank models: warehouse, incentive, tail, liquidity risk

IN THE LESSON

- Let's pull it together.
- Credit derivatives trade credit risk apart from the asset.
- A credit default swap pays notional times one minus recovery.
- A total return swap passes on market risk too, a credit linked note is funded, a spread option pays on spreads, and a first to default basket costs less than the single names.
- Conventional tools are diversification and limits, collateral with its leftovers, netting, guarantees, insurance, short maturities and covenants, with triggers that can backfire.
- In the crisis, derivatives hid and spread losses, and reforms brought standard contracts, clearing, reporting and higher capital.
- In securitization, an S P V holds the pool and tranches absorb losses from the bottom.
- Bank models carry warehouse, incentive, tail and liquidity risks.

33 Try three quick questions

1. CDS notional 20m, recovery 35% after default. What does the seller pay?
   Answer: 20 × (1 − 0.35) = 13m.
2. Trades worth +8, −3, +1 under enforceable netting. Exposure?
   Answer: Net = 6; larger of 6 and 0 is 6.
3. Pool loss 12%; tranche attaches at 5%, detaches at 15%. Share lost?
   Answer: (12 − 5) ÷ 10 = 70%.

IN THE LESSON

- Now three quick questions.
- Pause after each.
- Question one.
- A credit default swap has a notional of twenty million dollars, and recovery after default is thirty five per cent.
- What does the seller pay?
- Thirteen million, which is twenty times sixty five per cent.
- Question two.
- Trades with one counterparty are worth plus eight, minus three and plus one million, under an enforceable netting agreement.
- What is the exposure?
- Six million, the net value, which is above zero.
- Question three.
- A pool has a loss of twelve per cent, and a tranche attaches at five per cent and detaches at fifteen.
- What share of the tranche is lost?
- Twelve minus five, over ten, which is seventy per cent.