

Risk Management and Derivatives | Lecture 8

Pooling, Tranching, and the Credit Crisis

In Class Group Activity

· SJTU Summer School 2026 · Fatih Kansoy

How this block runs. You work in your home group of four or five, textbook open. Roles rotate today: **Scribe** (writes the answer), **Reporter** (speaks at the microphone), **Sceptic** (must raise one objection), **Timekeeper**. All money today is in US dollars (\$), with pounds sterling (£) and euros (€) in the case. All loss figures are in millions of dollars unless stated.

- **Phase 1, Concept checks (~10 min).** For each question you vote on your own first. Then you talk for about 90 seconds with the people next to you, and vote again. Do not talk before the first vote.
- **Phase 2, Desk problem (~20 min).** One problem in parts. Your Reporter presents one part when the microphone reaches your group. Then we solve it together, part by part.
- **Phase 3, Case (~25 min).** You read one real story. The ending is hidden on purpose. You answer four questions and take a position. Then we reveal what happened.

A short word list for this block. **Securitisation** means pooling many loans and selling claims on the pool. A **tranche** is one slice of those claims; it is paid in a fixed order. The **equity tranche** loses first, the **mezzanine** loses next, and the **senior tranche** loses last. A tranche's **attachment point** is the pool loss at which it first starts to lose, and its **detachment point** is the pool loss at which it is fully wiped out. **Default correlation** is how much the loans tend to fail together. A **CDO** (collateralised debt obligation) is a securitisation; a **re-securitisation** pools tranches and slices them again.

Phase 1 – Concept checks

~10 MIN

ConcepTest 1. A \$100 million pool of mortgages is split into an equity tranche (the first \$5 million of losses), a mezzanine tranche (the next \$15 million), and a senior tranche (the top \$80 million). Compared with holding the whole pool un-sliced, tranching:

- (a) lowers the total expected loss of the pool, because risk is shared out.
- (b) raises the total expected loss, because more parties are involved.
- (c) leaves the total expected loss unchanged, but changes who bears losses first.
- (d) removes risk from the senior tranche and adds none anywhere else.

ConcepTest 2. Two pools have the *same* average default rate. In Pool X the loans default fairly independently. In Pool Y the loans are highly correlated, so they tend to default together. The **senior** tranche is:

- (a) equally safe in both, because the average default rate is the same.
- (b) safer in Pool Y, because correlation spreads the timing of defaults.
- (c) riskier in Pool Y, because high correlation makes defaults cluster and reach the senior tranche.
- (d) risk-free in both, because it is rated AAA.

ConceptTest 3. A lender writes a mortgage and immediately **sells** it into a securitisation, keeping none of the default risk but earning an up-front origination fee. Compared with a lender that **keeps** the loan, the seller has:

- (a) a stronger incentive to screen the borrower carefully.
- (b) the same incentive, because its reputation is always at stake.
- (c) a weaker incentive to screen, because it no longer bears the default loss.
- (d) no incentive to make the loan at all.

Phase 2 – The desk problem

~20 MIN

A structured-credit desk slices a pool, then meets correlation

The setting. One problem in parts. All money is in US dollars (\$). You work on the structured-credit desk of a London bank. You package a \$100 million pool of consumer loans into a securitisation with three tranches, and you must work out who loses what. The tranche structure, used throughout:

- **Equity tranche:** absorbs the first \$5 million of pool losses (attachment 0, detachment \$5m).
- **Mezzanine tranche:** absorbs the next \$15 million (attachment \$5m, detachment \$20m).
- **Senior tranche:** absorbs everything above \$20 million, up to \$80 million (attachment \$20m, detachment \$100m).

(a) Split the loss. For three separate scenarios the realised pool loss L is \$4m, then \$12m, then \$30m. Fill in each tranche's loss. Use this method:

$$\text{Equity} = \min(L, 5), \quad \text{Mezz} = \min(\max(L - 5, 0), 15), \quad \text{Senior} = \min(\max(L - 20, 0), 80).$$

Check that the three tranche losses add up to L in each scenario.

(b) Attachment and the loss rate.

- (1) State the loss level at which the senior tranche *first* starts to lose money.
- (2) Find the pool-loss **rate** (as a percent of the \$100m pool) that exactly wipes out both the equity and the mezzanine tranches.

(c) The two-loan correlation example. Take a tiny pool of two loans. Each loan defaults with probability 10 per cent and, if it defaults, causes a loss of 50 (so the pool is 100). Define a “senior” piece that loses money *only if both* loans default. Work out the probability the senior piece loses:

- (1) when the two loans default **independently**;
- (2) when they are **perfectly correlated** (they always default together or not at all).

Then check the pool's total expected loss in each case, and say in one sentence what correlation did and did not change.

(d) Keep it or sell it. You originate one loan of 100 (thousand). If you **keep** it: with probability 92 per cent the borrower pays and you earn 6 of interest; with probability 8 per cent the borrower defaults and you lose 60 (the loss given default). If instead you **sell** the loan into a securitisation, you collect a 2 origination fee up front and bear *no* default risk. Compare the originator's expected profit under each choice, and say which is larger and by how much.

(e) **Re-securitisation.** Suppose several deals each produced a mezzanine tranche like the one above. A bank pools these mezzanine tranches into a *new* securitisation and again sells a “senior” slice off the top. In two or three sentences, explain why a modest rise in housing-wide losses can wipe *both* the new senior slice and the underlying mezzanines.

Extension (for fast groups): the ratings illusion. A BBB mezzanine tranche on its own is clearly risky. Yet in 2005–07 banks pooled many BBB tranches and the top slice of the new CDO was rated AAA. Using part (c), explain in a few sentences why that AAA rating was an illusion.

Phase 3 – The case

~25 MIN

Goldman Sachs and “Abacus 2007-AC1” (United States)

How to run this. Read the story with your group. The ending is hidden on purpose. Your group must take a position on the four questions and hold your decision. Do not search the internet. Use only what you know from the lecture. I will reveal what happened only after every group has answered.

The story. It is early 2007. The US subprime housing market is starting to wobble, but most of Wall Street is still bullish. The investment bank Goldman Sachs is asked to build a **synthetic** collateralised debt obligation, codenamed Abacus 2007-AC1. A synthetic CDO does not own mortgages. It references a chosen portfolio of subprime mortgage bonds, and investors bet on whether that reference portfolio will perform or fail.

A hedge-fund manager, John Paulson, is closely involved in choosing *which* subprime bonds go into the reference portfolio. On the other side, long investors take the view that the portfolio will hold up. The German bank IKB puts in about \$150 million, and the bond insurer ACA takes a large long position. Goldman markets the deal, telling investors the portfolio was selected by ACA Management, and is paid a fee of about \$15 million to put it all together. The deal closes on 26 April 2007.

The story stops here.

Four discussion questions (answer all four in your group; take a position):

1. **Who wins each way?** In a synthetic CDO, who profits if the reference portfolio fails, and who profits if it performs? Which side is IKB on?
2. **The chooser’s incentive.** Paulson helped choose the bonds in the reference portfolio. If you wanted that portfolio to fail, what kind of bonds would you put in it? Why does his role matter?
3. **The missing fact.** Investors were told the portfolio was “selected by” the manager ACA. What *one* fact, if disclosed, would most change how IKB and ACA judged the deal?
4. **You are the regulator.** It is 2007. Write the single sentence you would most want Goldman to have told every long investor before they signed. Then predict: what happened to the long investors, and what happened to Paulson?

End of activity handout. Solutions are distributed after the block.