

Mini-Project 3: Simplified CDO analysis
FRE 6103 – Valuation for Financial Engineers
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The underlying assets

A bank has placed 10 speculative grade corporate bonds in a CDO it is looking to sell. Each bond is 5 years in duration, makes quarterly coupon payments at an annual coupon rate of 6%, and the annual default probability is 4%. The LGD is 60% for all bonds. The market YTM on the bonds is 9%, and the risk-free interest rate is 1% per year. The “correlation” between any two bonds’ default dates is equal to a constant of 0.20. The bonds’ face values are \$10 MM each.

The CDO

The structuring group has proposed two PACs for the CDO. The Class A tranche has an initial notional value of \$20 MM and a coupon rate of 2% per year. The Class B tranche has a notional value of \$10 MM and a coupon rate of 4% per year. The bank will retain the residuals as equity.

The Waterfall

The waterfall is as follows: Class A is paid first from available cash flows, and then Class B is paid. The residual goes to the bank. There are no carry-forwards, all cash flows are distributed as earned.

Task 1.

Build a simulation model of the aggregate quarterly cash flows of the portfolio, as a function of the quarterly cash flows.

Task 2.

Apply the waterfall rules to determine the cash flow patterns to each class.

Task 3.

The target credit rating for the Class A is Moody’s Aa. What is the highest notional value of tranche A that will support that rating?

Task 4.

Assume that tranche A is priced to yield 50 bppa over the risk-free rate. Using your new notional value for tranche A in Task 3, keeping the Class B issuance at \$10 MM in face value, and the discount rate for B as 4% per year over treasuries, answer the following:

- What is the probability of default for class B and the expected loss given default? (do not discount)
- Value of Class A, B and equity
- ROE for the bank (as equity holder)

Task 5

Discuss the reasons why the bank might have done this structure.