



CDO Tranche Risk Estimation

- Write a macro that simulates losses from a portfolio of loans described by the user and estimates risk on CDO tranches collateralized by the portfolio. Each loan description includes the probability of default, loss given default, exposure at default, and sensitivity to a common factor (loans are Vasicek distributed). The user chooses the number of simulations and the attachment point for each tranche. Required outputs include the probability of default and the average percentage loss for each CDO tranche.

Assignment

- When a loan defaults, loss by definition equals loss given default times exposure at default
- The log of asset value for firm i is distributed as

$$wZ + \sqrt{1 - w^2} Z_i$$

Where Z is a standard normal variable representing market risk, Z_i is a standard normal variable representing idiosyncratic risk, and w is the market factor sensitivity

- Default occurs when $wZ + \sqrt{1 - w^2} Z_i < \mathcal{F}^{-1}(p_i)$

Where \mathcal{F}^{-1} is the inverse standard normal cumulative distribution and p_i is the probability of default for firm i

Default

- Assuming that the total portfolio loss is measured as a percentage of portfolio par value,
 - (a) a tranche is in default whenever the portfolio loss exceeds the tranche's attachment point, and
 - (b) the percentage loss for the tranche is either $(\text{total portfolio loss} - \text{tranche attachment point}) / (\text{next-tranche attachment point} - \text{tranche attachment point})$ or 100%, whichever is the lowest amount.

Tranche Risk

Visual Basic Macros Record Macro Use Relative References Macro Security Code Add-Ins COM Add-Ins Insert Design Mode Run Dialog Properties View Code Run Dialog Source Map Properties Expansion Packs Import Export Refresh Data XML Document Panel Modify

	A	B	C	D	E	F	G	H	I	J	K
1	Simulation specifications						Simulation results for tranches				
2							Attachment	PD	EL		
3	# trials		1,000,000				0%				
4							3%				
5							7%				
6		Run simCDO									
8	Portfolio										
9	Loan	PD	LGD	EAD	w						
10	1	1.00%	50%	100	0.3						
11	2	1.00%	50%	100	0.3						
12	3	1.00%	50%	100	0.3						
13	4	1.00%	50%	100	0.3						
14	5	1.00%	50%	100	0.3						
15	6	1.00%	50%	100	0.3						
16	7	1.00%	50%	100	0.3						
17	8	1.00%	50%	100	0.3						
18	9	1.00%	50%	100	0.3						
19	10	1.00%	50%	100	0.3						
20	11	1.00%	50%	100	0.3						
21	12	1.00%	50%	100	0.3						
22	13	1.00%	50%	100	0.3						
23	14	1.00%	50%	100	0.3						
24	15	1.00%	50%	100	0.3						
25	16	1.00%	50%	100	0.3						
26	17	1.00%	50%	100	0.3						
27	18	1.00%	50%	100	0.3						
28	19	1.00%	50%	100	0.3						
29	20	1.00%	50%	100	0.3						
30	21	1.00%	50%	100	0.3						
31	22	1.00%	50%	100	0.3						

