FinMath 36702 Homework 4 Due 6pm 27 April 2022.

Lisheng will discuss strategies for solving in the TA session on April 24 and present full solutions on May 1. Please submit homeworks as detailed in "FINM36702 Assignment Submission Instructions" located on Canvas.

A loan can take one of four states as follows:

State	A	B	C	D
Probability of state	0.40	0.30	0.20	0.10
cDR	0.02	0.04	0.06	0.08
cLGD	0.10	0.30	0.50	0.70

Question 1. What is the value of

- The expected loss of the loan (EL)?
- The expected LGD of the loan (ELGD)?
- The "time-weighted LGD" of the loan?

Question 2. Suppose that a loan is characterized by PD = 5%, ELGD = 30%, and ρ = 15%. Suppose that instead of the LGD function preferred by Frye and Jacobs, this loan follows the "Variant A" alternative LGD function that the authors use for hypothesis testing. Plot the function within the unit square for four values of the "a" parameter: {-2, 0, 1, 2}.

Question 3. Suppose that cPD ~ Vasicek [PD = 0.02, ρ = 0.10]. Assuming that cPD and cLoss are comonotonic, plot three LGD functions for three possible distributions of cLoss:

(a) cLoss ~ Vasicek [EL = 0.01, ρ = 0.05]
(b) cLoss ~ Vasicek [EL = 0.01, ρ = 0.1]
(c) cLoss ~ Vasicek [EL = 0.01, ρ = 0.15]

Limit the default axis to {0, 0.5} and limit the vertical axis to {0, 1.2}. Comment on the usefulness of each possible LGD function.

Question 4. Using the assumptions of Question 3(b), what is the value of ELGD?