

Interest Rate and Credit Models

Homework Assignment #6

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Problems

1. Consider the following generalization of the constant hazard rate model:

$$\lambda(t) = \lambda\gamma(\lambda t)^{\gamma-1}, \quad (1)$$

where $\lambda, \gamma > 0$ are constant.

- (i) Why is model (1) inadequate for prepayment modeling?
 - (ii) Derive an explicit formula for the survival probability in this model.
 - (iii) Assuming that the instantaneous discount rate r is constant, write down the expression for the valuation of a TBA.
2. Consider another parametric hazard model:

$$\lambda(t) = \frac{\lambda\gamma(\lambda t)^{\gamma-1}}{1 + (\lambda t)^\gamma}, \quad (2)$$

where $\lambda, \gamma > 0$ are constant. Answer questions (i) - (iii) of Problem 1 (regarding model (2)), as well as the following question:

- (iv) If you were forced to choose between models (1) and (2) as the hazard rate in a prepayment model, how would you choose? Justify the answer.

This assignment is due on May 13.