A Valuation of Joint and Survivor RAM with Intensity-form Model

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Abstract

Considering the life-cycle of the homeowner and asset management as two perspectives, we use an intensity-form approach to create a pricing model of Reverse Annuity Mortgage (hereafter RAM) that takes account of the risks associated with joint and survivor of the homeowner, volatility of interest rates, and changes in the value of the property. The advantage of this approach is that it can make use of exogenous market information (e.g., Life Table) to evaluate termination probability of RAM. In addition, we argue that the expected return and the risk premium of housing price are important factors in determining the housing price; thus, we include these two factors in our calculations to make the valuation of RAM more precise. To broaden market acceptance of RAM, we have developed a pricing model which contains the factors of the settlement period and the cost of settlement. Moreover, we have developed a "joint and survivor model" for cases in which the settlement occurs only when two owners—such as a husband and wife, are deceased. To illustrate the effect of each of the following parameters, we present numerical examples. The main findings are: (1) the forward rate, the adjusted rate of appreciation of the property, the volatility of the interest rate, the expected return of housing price, and the risk premium of housing return tend to increase the RAM premium; (2) there is a negative relationship between the RAM premium and the volatility of the return, the depreciation of the property, the correlation between the interest rate and the housing return, the settlement period, and the cost of the settlement.

Keywords: Joint and Survivor, RAM, Intensity-form Approach, Risk Premium