

Optimal dividend payments and optimal time for acquisition: A two-dimensional problem

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Abstract

The uncontrolled joint surplus of two insurance companies follows a bivariate compound Poisson process with drift. Assume that company A has the possibility of acquiring company B at any acquisition time. Suppose also that company B is following the optimal dividend payment strategy (or any other dividend band strategy known to the manager of company A); and also that the price of this acquisition depends on the current surplus y of company B (for example, this price could be $V_B(y) + K$ where V_B is the optimal value function of company B and K is a fixed cost of acquisition). This is a two-dimensional mixed singular control/optimal stopping problem. We characterize the optimal value function as the smallest viscosity solution of the associated Hamilton-Jacobi-Bellman equation in the stripes corresponding to the non-action regions of the band strategy followed by company B . We find a verification result to check optimality. We propose a convergent numerical scheme to approximate this two-dimensional optimal dividend strategy in some examples.

Keywords: Bidimensional compound Poisson process; optimal dividends; optimal acquisition time. Hamilton-Jacobi-Bellman equation; viscosity solutions; convergent numerical scheme.

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