Optimal Time for Acquisitions and Disinvestment for a company in the diffusion model

Pablo Azcue and Nora Muler.
Departamento de Matemática.
Universidad Torcuato Di Tella.
pazcue@utdt.edu and nmuler@utdt.edu

Abstract

We consider two optimal dividend problems involving stopping times:

1. **Disinvestment.** Let us assume that the uncontrolled joint surplus of two branches of a company follows a two-dimensional correlated Brownian motion with drift. The manager has the possibility of closing one of the two branches at any stopping time paying different fees depending on which branch is disinvested. The goal is to find the disinvestment time and the dividend payment strategy which maximize the expected discounted dividend payment up to the ruin time.

2. **Acquisition.** Let us assume that the uncontrolled surplus of a company follows a Brownian motion with drift. The manager of this company has the possibility at any stopping time of acquiring another company paying a certain price. After the time of acquisition, the uncontrolled joint surplus of the two branches follows a two-dimensional correlated Brownian motion with drift. The goal is to find the acquisition time and the dividend payment strategy which maximize the expected discounted dividend payment up to the ruin time. The ruin time occurs when the sum of the surpluses of the two branches reaches zero; before the ruin time we allow negative surplus in one of the branches.

Both optimization problems can be regarded as particular cases of a more general optimal stopping problem. We characterize the value function of this optimal stopping problem as the smallest viscosity supersolution of the associated second-order Hamilton-Jacobi-Bellman equation with obstacle.

We also obtain the optimal dividend payment strategy and the optimal time for disinvestment and acquisitions in some examples.

Keywords: diffusion process, acquisition, disinvestment, stopping time, optimal dividend payment strategies.