

Abstract

This article investigates a stochastic filtering problem whereby the borrower's hidden credit quality is estimated using ego-network signals. The hidden credit quality process is modeled as a mean reverting Ornstein-Uhlenbeck process. The lender observes the borrower's behavior modeled as a continuous time diffusion process. The drift of the diffusion process is driven by the hidden credit quality. At discrete fixed times, the lender gets ego-network signals from the borrower and the borrower's direct friends. The observation filtration thus contains continuous time borrower data augmented with discrete time ego-network signals. Combining the continuous time observation data and ego-network information, we derive filter equations for the hidden process and the properties of the conditional variance. Further, we study the asymptotic properties of the conditional variance when the frequency of arrival of ego-network signals is increased.