We develop a mathematical model for option pricing processes under both structural and external stochastic perturbations. The structural and external perturbations are described by hidden semi Markov and Levy jump processes, respectively. Introducing a few basic properties of the developed model, an infinitesimal generator and characteristic function are derived. An equivalent risk neutral measure is also exhibited. Furthermore, establishing an option pricing formula, simulation results are obtained. (Received September 11, 2013)