

Optimal Investment and Consumption Decision for an Investor with Ornstein-Uhlenbeck Stochastic Interest Rate Model through Utility Maximization

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Abstract : In this work; it is considered that an investor's portfolio is comprised of two assets; a risky stock which price process is driven by the geometric Brownian motion and a risk-free asset with Ornstein-Uhlenbeck Stochastic interest rate of return, where consumption, taxes, transaction costs and dividends are involved. This paper aimed at the optimization of the investor's expected utility of consumption and terminal return on his investment at the terminal time having power utility preference. Using dynamic optimization procedure of maximum principle, a second order nonlinear partial differential equation (PDE) (the Hamilton-Jacobi-Bellman equation HJB) was obtained from which an ordinary differential equation (ODE) obtained via elimination of variables. The solution to the ODE gave the closed form solution of the investor's problem. It was found the optimal investment in the risky asset is horizon dependent and a ratio of the total amount available for investment and the relative risk aversion coefficient.

Keywords : optimal, investment, Ornstein-Uhlenbeck, utility maximization, stochastic interest rate, maximum principle

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