

## Portfolio Optimization under a Hybrid Stochastic Volatility and Constant Elasticity of Variance Model

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**Abstract :** This paper studies the portfolio optimization problem for a pension fund under a hybrid model of stochastic volatility and constant elasticity of variance (CEV) using asymptotic analysis method. When the volatility component is fast mean-reverting, it is able to derive asymptotic approximations for the value function and the optimal strategy for general utility functions. Explicit solutions are given for the exponential and hyperbolic absolute risk aversion (HARA) utility functions. The study also shows that using the leading order optimal strategy results in the value function, not only up to the leading order, but also up to first order correction term. A practical strategy that does not depend on the unobservable volatility level is suggested. The result is an extension of the Merton's solution when stochastic volatility and elasticity of variance are considered simultaneously.

**Keywords :** asymptotic analysis, constant elasticity of variance, portfolio optimization, stochastic optimal control, stochastic volatility

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