

# **An Optimal Consumption and Investment Problem with CIR Model**

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**Abstract:** This paper solves an optimal consumption and investment problem when the interest rate follows a Cox-Ingersoll-Ross (CIR) model. This is an extension of [Guasoni, Huberman, Ren], in which the model is constructed with shortfall aversion but constant risk-free rate. In particular, the CIR model is employed to estimate risk-free rate in two different ways: 1) apply the CIR model to the entire time period and estimate the risk-free rate by a single constant; 2) create a sequence of risk-free rates by applying the CIR model to the time period up to each time. Compared to the "NO CIR" model, our new optimal problem gives better results by applying the CIR model in both ways described above. Furthermore, the result of the first way is better than the result of the second way because more information is used to estimate the risk-free rate in the first way.