

Calibrating the Schwartz type 1 model

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the Schwartz type 1 model is defined as:

$$dS_t = \kappa(\mu - \ln S_t)S_t dt + \sigma S_t dW$$

Calibration can be done through a linear regression which recover a,b,c from:

$$\ln S_{t+\delta t} = a \ln S_t + b + cN_{0,1}$$

The model parameters are then given by:

$$\kappa = -\frac{\ln a}{\delta t}$$

$$\sigma = c \sqrt{\frac{2\kappa}{1 - e^{-2\kappa\delta t}}}$$

$$\mu = \frac{b}{1 - e^{-\kappa\delta}} + \frac{\sigma^2}{2\kappa}$$

The Schwartz type 1 model is a log price Ornstein-Uhlenbeck stochastic process. The calibration can be done through a regression of the logprices as described in the above equation.

Symbol list:

κ	Mean reversion rate
μ	Mean
σ	volatility
δt	Time step between observations