

Black-Scholes Model

Fischer Black and Myron Scholes developed a precise model for determining the equilibrium value of an option. They observed that the option pricing concepts can be used to value other contingent claims. In particular, the model provides rich insight into the valuation of debt relative to equity. The Black-Scholes model has been extended and refined in major ways, and new applications are unfolding. The model has both theoretical importance for valuing contingent claims and practical importance for identifying overvalued and undervalued options in the market.

The Model in General

A number of assumptions are in order to operate the model:

1. Only European options are considered; that is, options that can be exercised only at expiration.
2. There are no transaction costs. Options and stocks are infinitely divisible, and information is available to all without cost.
3. No imperfections exist in writing an option or selling a stock short.
4. The short-term interest rate is known and constant throughout the duration of the option contract. Market participants can both borrow and lend at this rate.
5. The stock pays no dividend.
6. Stock prices behave in a manner consistent with a random walk in continuous time.
7. The probability distribution of stock returns over an instant of time is normal.
8. The variance of the return is constant over the life of the option contract and is known to market participants.