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Abstract

An informationally efficient price keeps investors as a group in the state of maximum uncertainty about the next price change. The Entropy Pricing Theory (EPT) captures this intuition and suggests that, in informationally efficient markets, perfectly uncertain market beliefs must prevail. When the entropy functional is used to index the market uncertainty, then the entropy-maximizing market beliefs must prevail. The EPT resolves the ambiguity of asset valuation in incomplete markets, notably, the valuation of derivative securities. We use the EPT to derive a new stock option pricing model that is similar to Black–Scholes' with the lognormal distribution replaced by a gamma distribution. Unlike the Black–Scholes model, the gamma model does not restrict the dynamics of the stock price or the short-term interest rate. Option replication based on the gamma model accounts for random changes in the stock price, price volatility and interest rates.

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