

The Stop-Loss Start-Gain Paradox and Option Valuation: A New Decomposition into Intrinsic and Time Value

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Abstract

The downside risk in a leveraged stock position can be eliminated by using stop-loss orders. The upside potential of such a position can be captured using contingent buy orders. The terminal payoff to this stop-loss start-gain strategy is identical to that of a call option, but the strategy costs less initially. This article resolves this paradox by showing that the strategy is not self-financing for continuous stock-price processes of unbounded variation. The resolution of the paradox leads to a new decomposition of an option's price into its intrinsic and time value. When the stock price follows geometric Brownian motion, this decomposition is proven to be mathematically equivalent to the [Black–Scholes \(1973\)](#) formula.

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