

# REAL OPTIONS UNDER FAST MEAN REVERSION STOCHASTIC VOLATILITY

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ABSTRACT. In this paper, we study the McDonald-Siegel (MS) model for real options under the assumption that the spanning asset undergoes a stochastic volatility dynamics that reverts to a historical value according to an Ornstein-Uhlenbeck process driven by a second source of uncertainty. In this case, the market is not complete, and valuation, even for a perfectly correlated asset, is not as straightforward as in the MS model. Nevertheless, it is possible to derive a pricing equation by risk-neutral arguments that depends on the so-called market risk premium. Under the further assumption that the driving volatility process is fast-mean reverting, we derive an asymptotic approximation for the value of a real-option. In such case, the model becomes very parsimonious and can be calibrated to real data.

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