McGill Computational Science and Engineering Seminar

Friday January 28th at 13:30 in Burnside Hall room 1205

Modeling of Market Volatility

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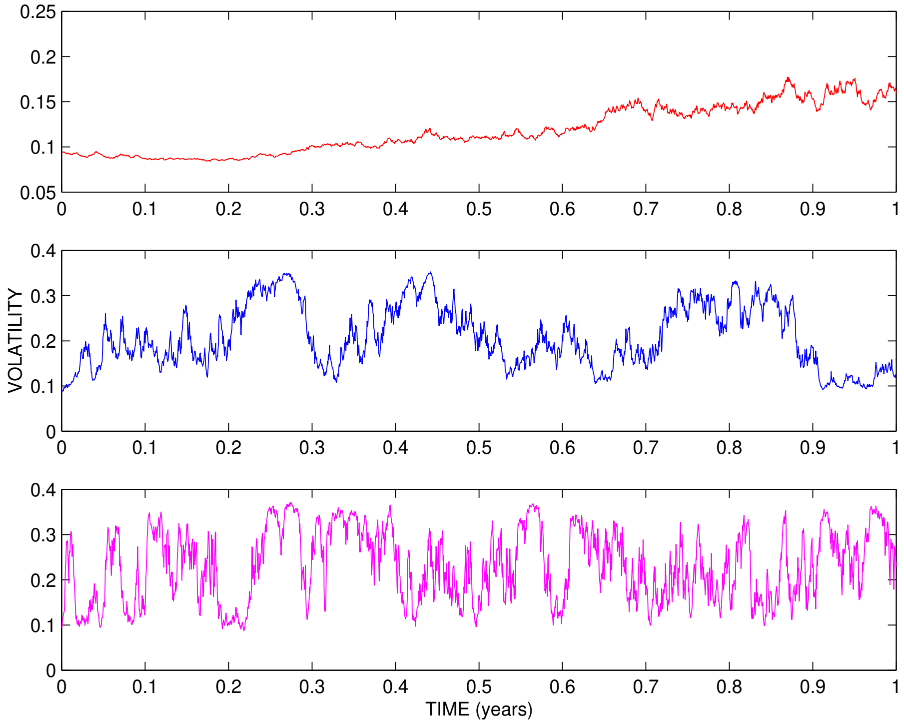
In modern financial markets, investors and trading institutions are faced with an environment of uncertain and changing volatility which renders perfect hedging (elimination of risk) of potential derivative losses impossible. The goal is to find an acceptable tradeoff between the risk of a failed hedge and the cost of implementing it.

We begin with a brief description of the Black-Scholes theory of option pricing and hedging suitable for a general audience, and then describe an asymptotic and statistical analysis of the problem that exploits the tendency of volatility to come in bursts, or cluster. It provides a correction to the Black-Scholes pricing and hedging theory that adjusts for random volatility in a robust way in that it does not depend on specific modeling of the volatility process. We illustrate how the modeling assumptions fit S&P 500 index data, and how the corrected theory identifies stable market quantities that are easily estimated from the observed implied volatility surface.

Joint work with Jean-Pierre Fouque, George Papanicolaou and Knut Solna.



Simulated volatility paths with increasing rates of mean-reversion (top to bottom). Notice how the volatility tends to cluster or come in short bursts as the rate increases.

Coffee and desserts are served after the seminar at 14:30 in the lounge, Burnside Hall 1024