Continuous time option pricing with scheduled jumps in the underlying asset

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LFE conference, Moscow | November 2011

This version: November 14, 2011

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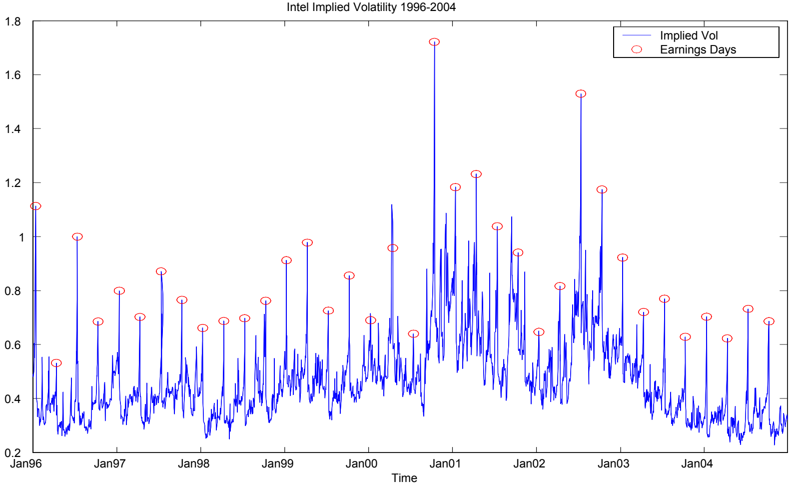
  - The ongoing credit crisis
- Jumps can also capture event risk
  - Scheduled macro announcements
  - FOMC policy decisions
  - **This paper:** corporate earnings announcements

Earnings announcements and jumps



Source: Dubinsky and Johannes (2006)

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- Formally,
  - Black-Scholes: $\sigma_{t,T}^2 = \sigma^2$
  - Accounting for the scheduled announcement: $\sigma_{t,T}^2 = \sigma^2 + \frac{\sigma_a^2}{T-t}$
- Thus,
  - An option IV increases prior to the earnings announcement as $t \to T$
  - IV falls after the earnings announcement: the change in IV gives ex-post measure of the uncertainty
  - IV decreases with maturity: the term spread gives ex-ante measure of the uncertainty

Summary of the paper

- The authors propose a specific model of deterministic jumps
- Provide analysis of hedge ratios
- Empirically test the models against Black-Scholes (no jumps) and Merton (random jumps)
  - Data: AAPL, MSFT, CSCO, INTC, and AMD from 1999 - 2008
  - Re-estimate the models every year to allow for out-of-sample analysis
  - The model outperforms BS and M in terms of mean-square error
  - Average $\sigma_a = 8\%$ [range from 3% to 17%] per day
- The evidence is overall supportive of the model with deterministic jumps

LSE

Comments

- Model
  - The deterministic jump sizes are assumed to be uniformly distributed
  - Because of the no-arbitrage restrictions (absolute continuity of P and Q measures), the distribution must be the same under P and Q
  - Implication: no risk premium for announcement uncertainty
  - Consider specifications with infinite support (e.g., normal jump sizes)
  - Consider more realistic features (e.g., stochastic volatility)

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- Empirics
  - Time-series analysis: how is σ_a related to macro environment?
  - Cross-sectional analysis: compare ex-ante and ex-post measures of uncertainty
  - Study some other industries to see how σ_a is affected

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- Do we understand the behaviour of economic uncertainty better?
  - Not yet.
- Is the risk of uncertainty priced?
  - The presented model does not allow to asses this