Project Overview

Are stock returns fat-tailed excluding days around earnings?

• Yes, but less so

• Days within a 14 day window of earnings announcements account for a substantial proportion of kurtosis

• Skewness / kurtosis coefficients change around earnings
Project Overview

How can we characterize implied volatility of call options around earnings announcements?

- Formal characterization framework
- N=30 stocks, variety of industries / sectors
- Varied time windows (30 to 180 days)
- No clear patterns emerge across stocks
IBM Daily Log-Returns

QQ Plot of Sample Data versus Standard Normal

Kurtosis: 9.922
Skewness: .0146
Normal? p < .001
Log-Returns Excluding Earnings

QQ Plot of Sample Data versus Standard Normal

Kurtosis: 5.234
Skewness: .1095
Normal? p < .001
S&P 500 Constituent Stocks

QQ plot of S&P 500 Daily Log-Returns from 1996 to 2006
QQ Plot for S&P 500 Daily Log-Returns Excluding Earnings
Options Trades Near Earnings

Goldman Sachs
Option with highest open interest

Call Option Volume around Earning Dates

Call Option Implied Volatilities around Earning Dates
Identifying Earnings Effects

Problem: Too many variables changing
Need to isolate effects of earnings

Solution: Use moneyness to normalize for strike and expiration

\[ m = \frac{\ln(S / K) + rT}{\sigma \sqrt{T}} \]

Normalize implied volatilities as well for comparison over different stocks

\[ \tilde{\sigma} = \frac{\sigma - \sigma_{atm}}{\sigma_{atm}} \]
Normalized Volatility Surface

Average Normalized Volatility for Morgan Stanley, 2003-2006
Normalized Volatility Intensity Plot

Average Normalized Volatility for Morgan Stanley, 2003-2006

Time

Moreyness
No Pattern Emerges

Average Normalized Implied Volatility for Morgan Stanley, 2003-2006
No Pattern Emerges

Average Normalized Implied Volatility for Barrick Gold Corp, 2003-2006
No Pattern Emerges

Average Normalized Implied Volatility for Ford, 2003-2006
Normalized Volume Surface

Normalized Average Volumes for Morgan Stanley, 2003-2006
Future Work

Calculate moneyness based on fat-tailed distributions

Put options, Small Cap stocks

Predict earnings outcomes based on options trading
  • Statistical pattern matching
  • Normalized implied volatility as a feature