

Implied Volatility Around Earnings Announcements

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Project Overview

Are stock returns fat-tailed excluding days around earnings?

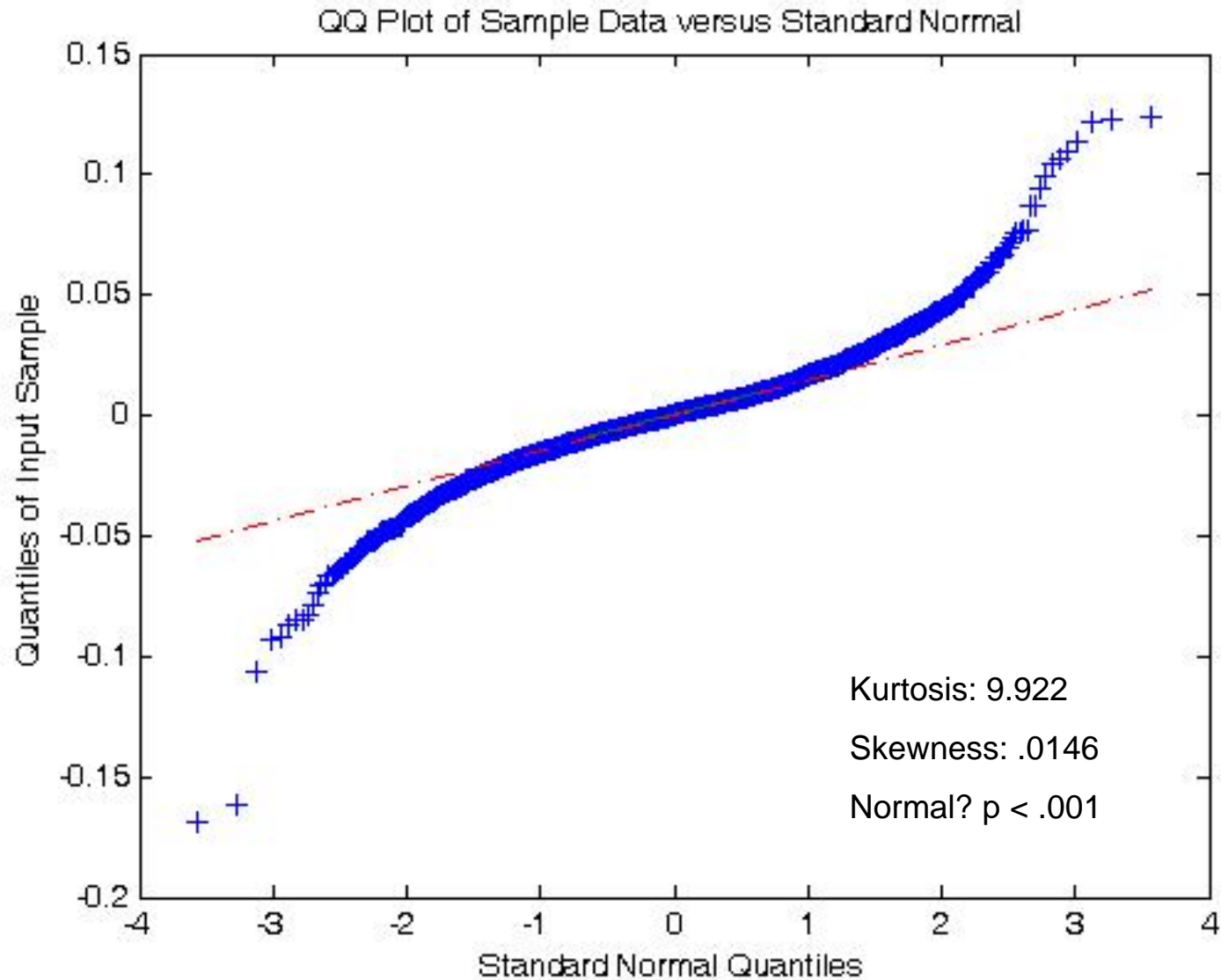
- Yes, but less so
- Days within a 14 day window of earnings announcements account for a substantial proportion of kurtosis
- Skewness / kurtosis coefficients change around earnings

Project Overview

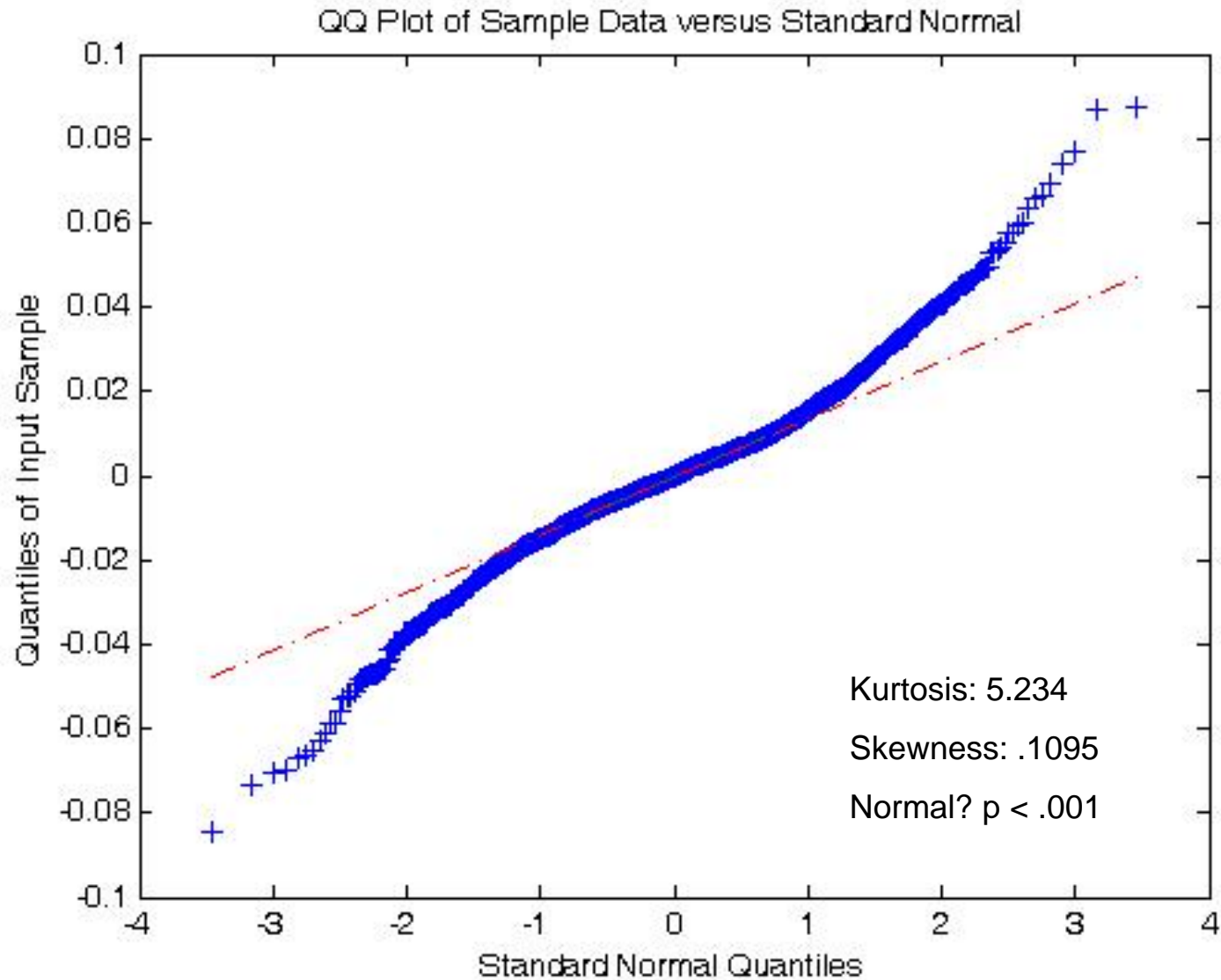
How can we characterize implied volatility of call options around earnings announcements?

- 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

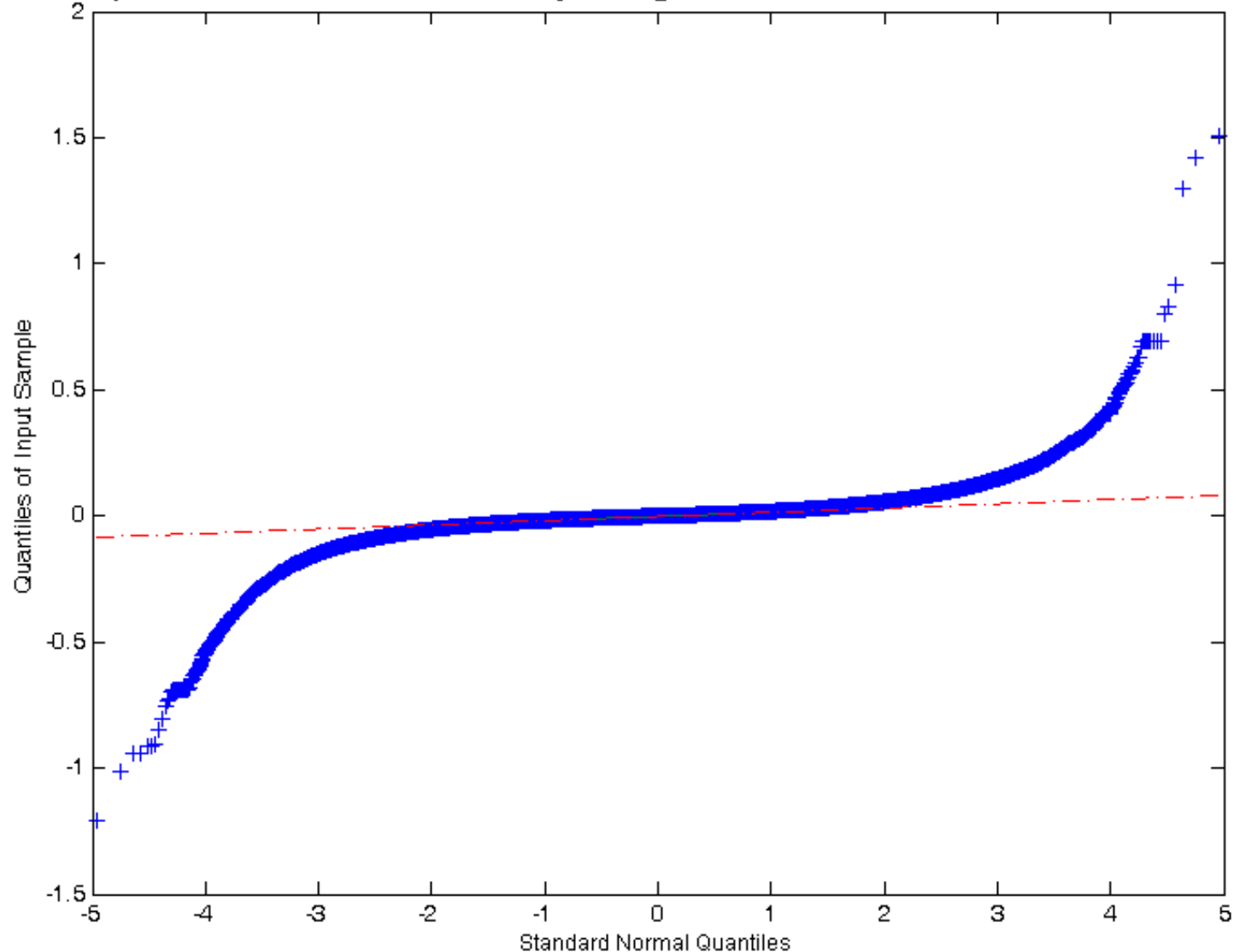


Log>Returns Excluding Earnings



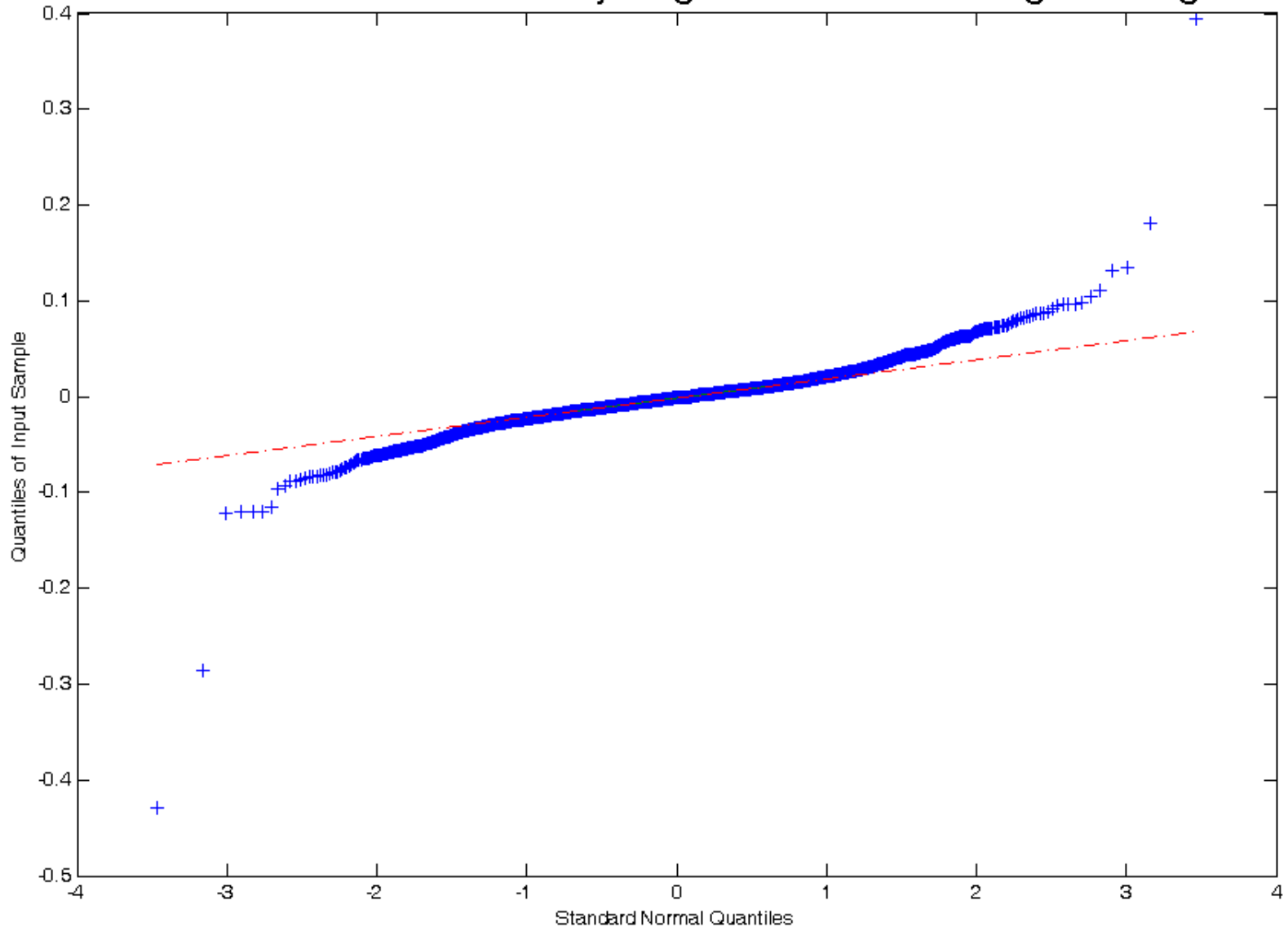
S&P 500 Constituent Stocks

QQ plot of S&P 500 Daily Log>Returns from 1996 to 2006



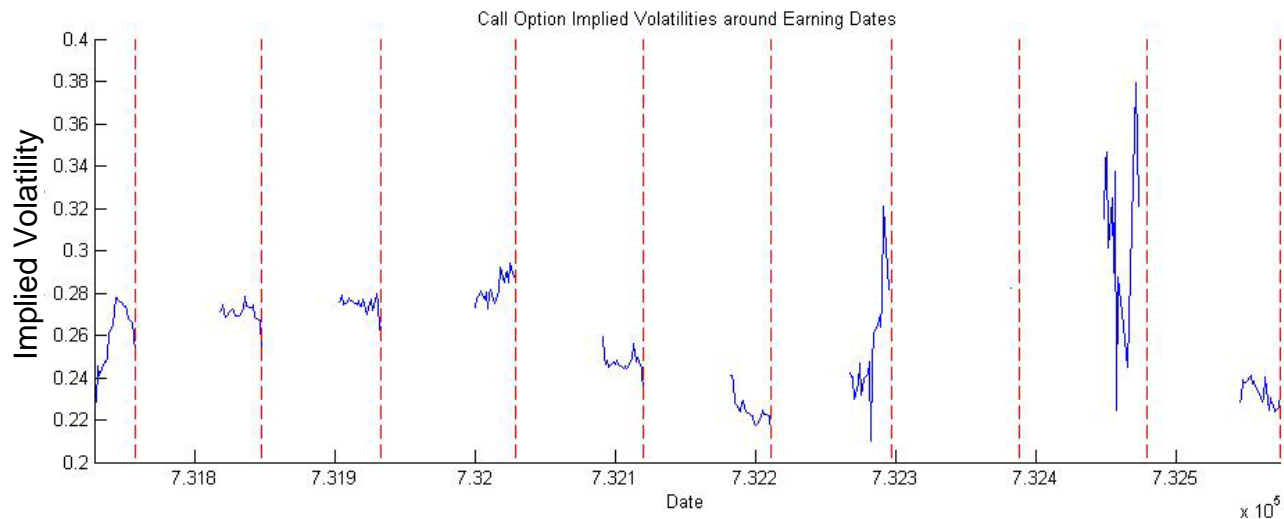
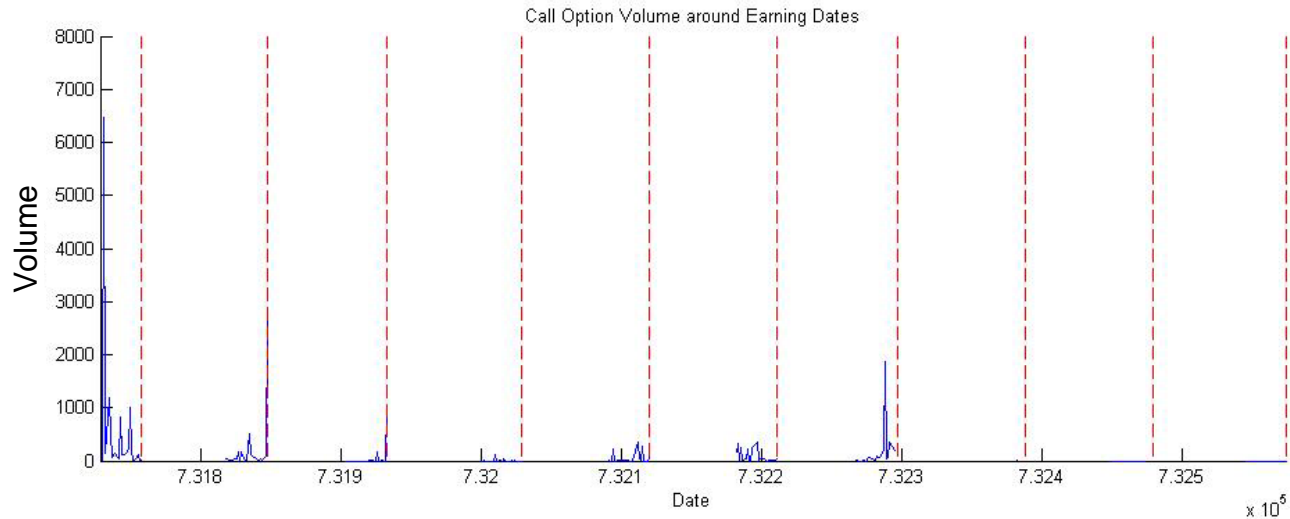
S&P 500 Constituent Stocks

QQ Plot for S&P 500 Daily Log>Returns Excluding Earnings



Options Trades Near Earnings

Goldman Sachs Option with highest open interest



Identifying Earnings Effects

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

Solution: Use moneyness to normalize for strike and expiration

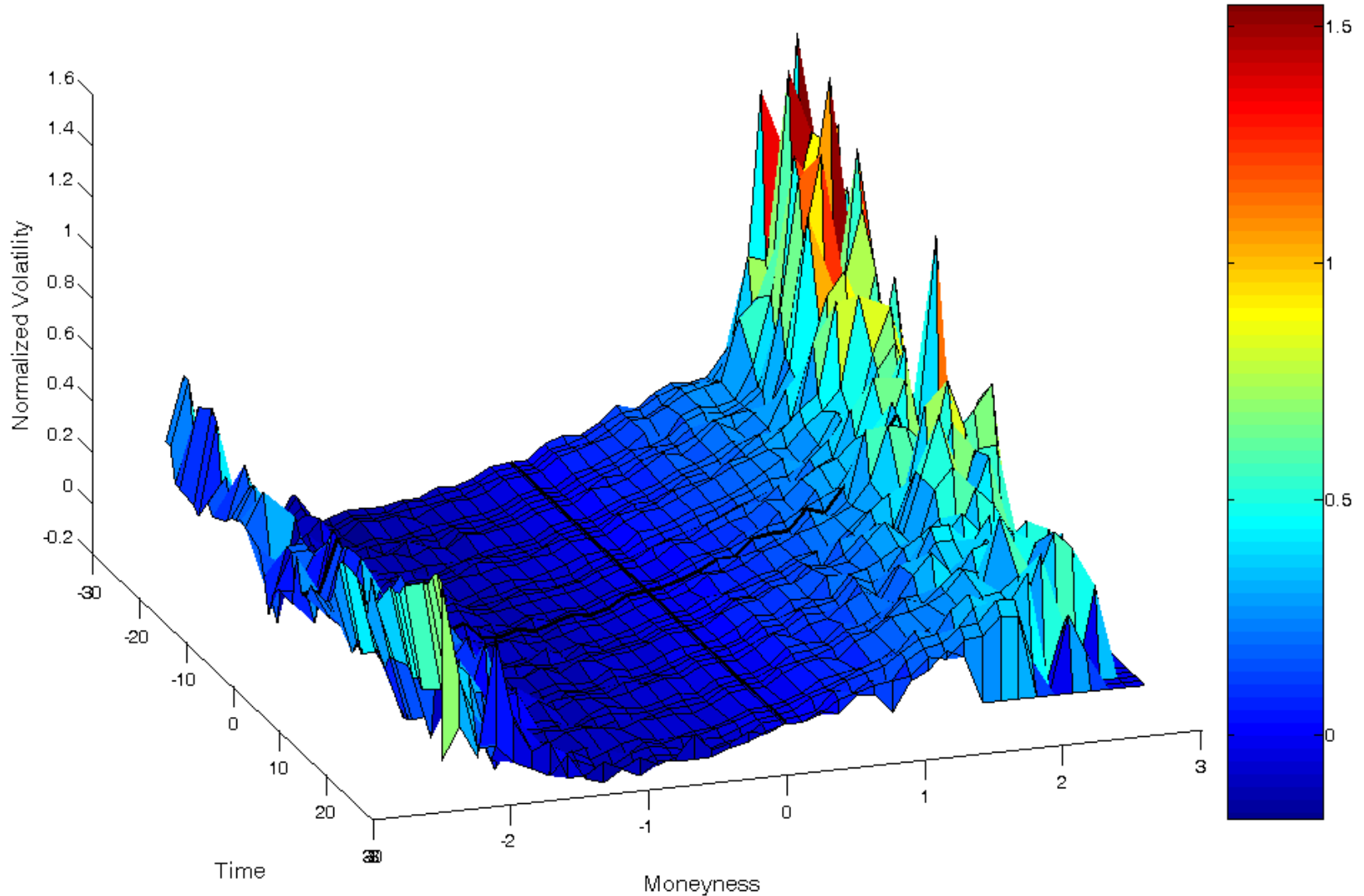
$$m = \frac{\ln(S / K) + rT}{\sigma\sqrt{T}}$$

Normalize implied volatilities as well for comparison over different stocks

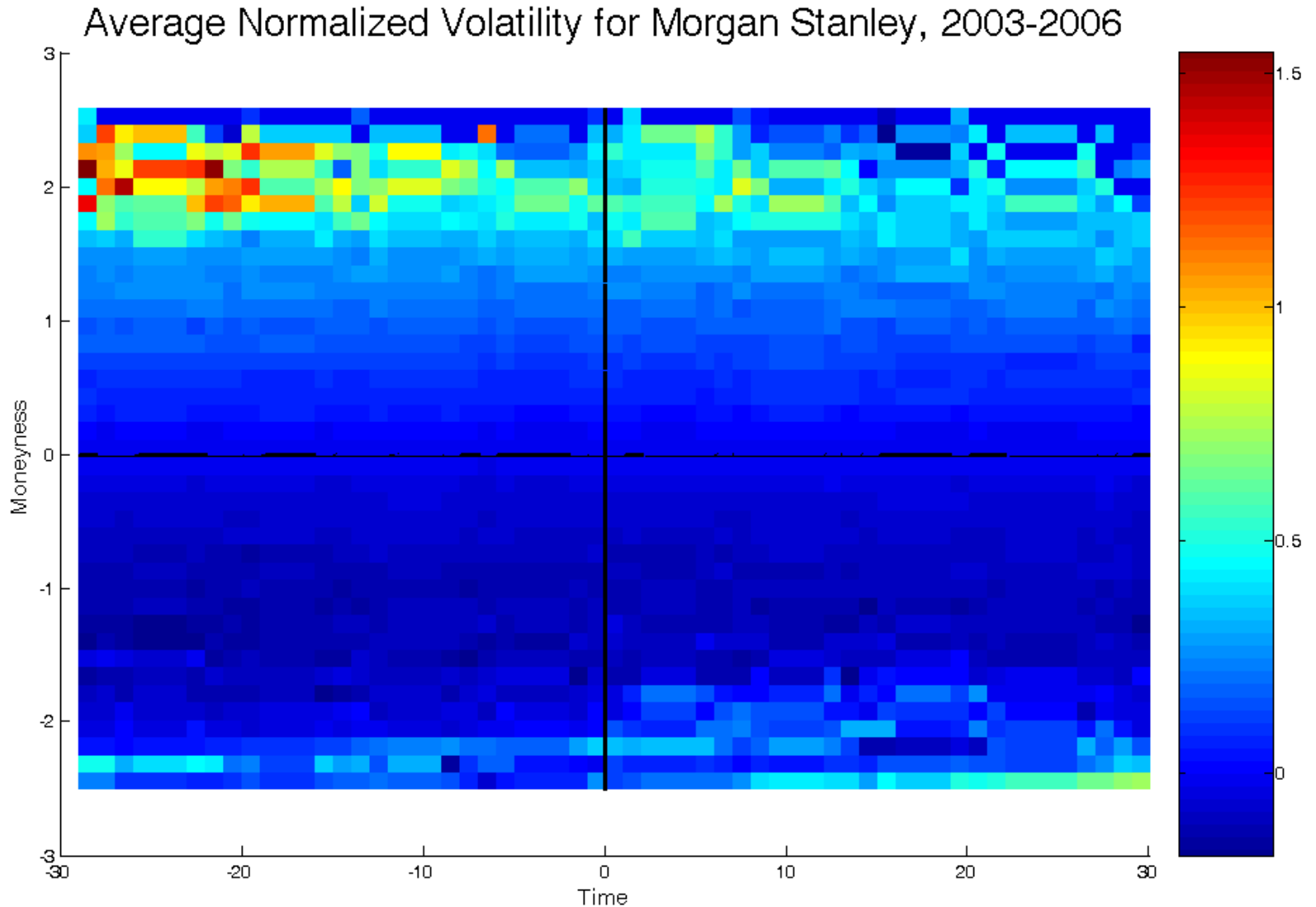
$$\tilde{\sigma} = \frac{\sigma - \sigma_{atm}}{\sigma_{atm}}$$

Normalized Volatility Surface

Average Normalized Volatility for Morgan Stanley, 2003-2006

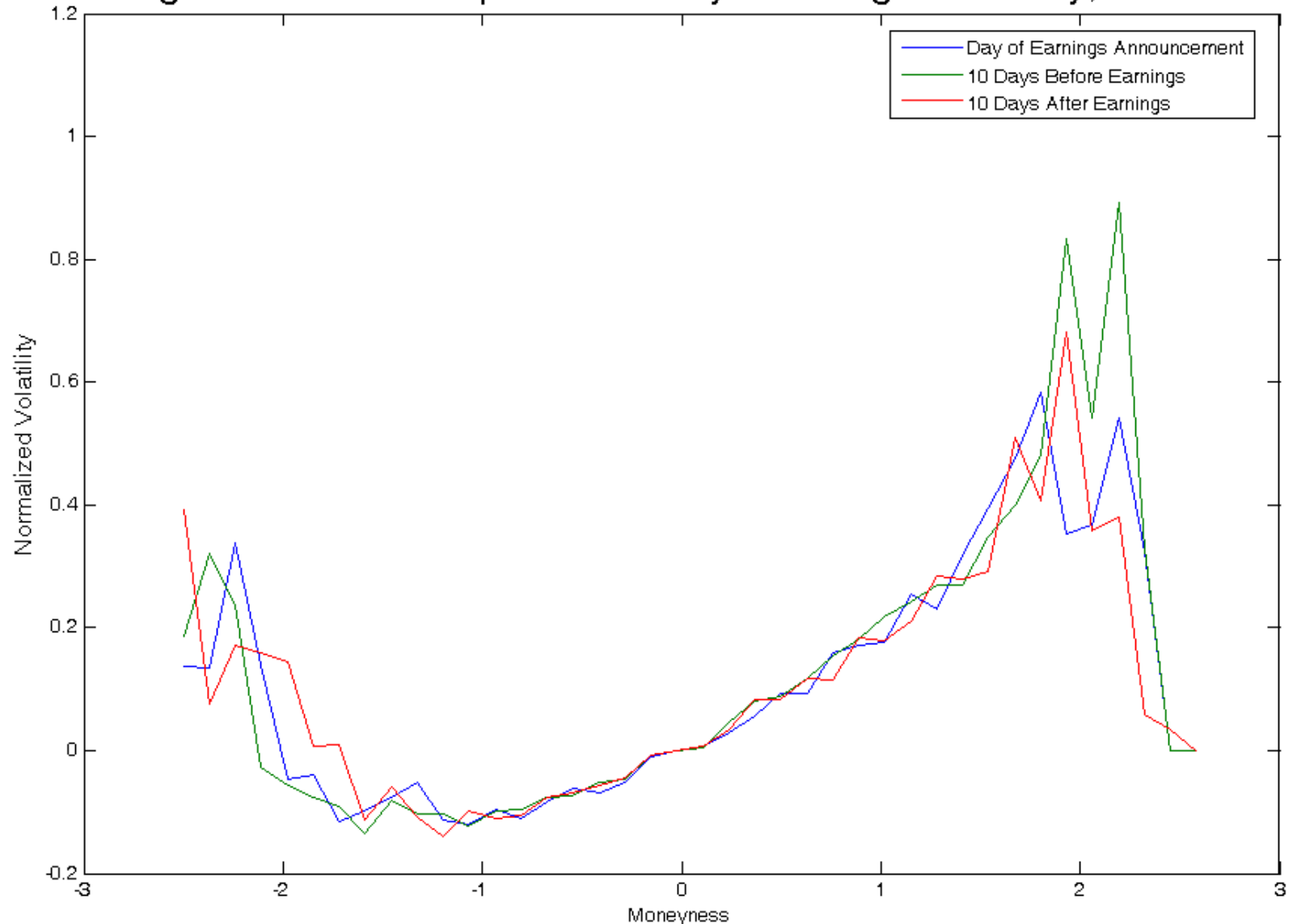


Normalized Volatility Intensity Plot



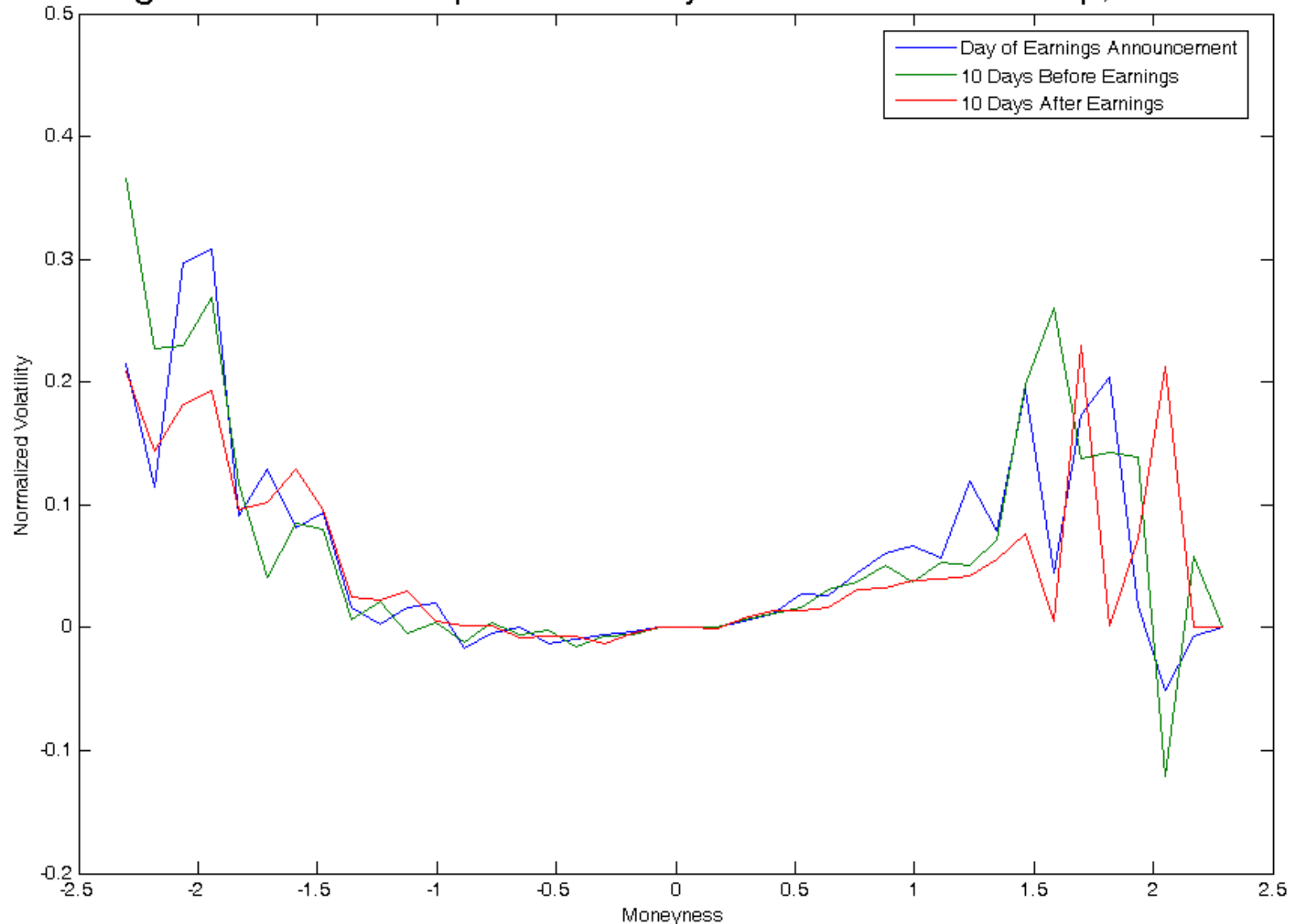
No Pattern Emerges

Average Normalized Implied Volatility for Morgan Stanley, 2003-2006



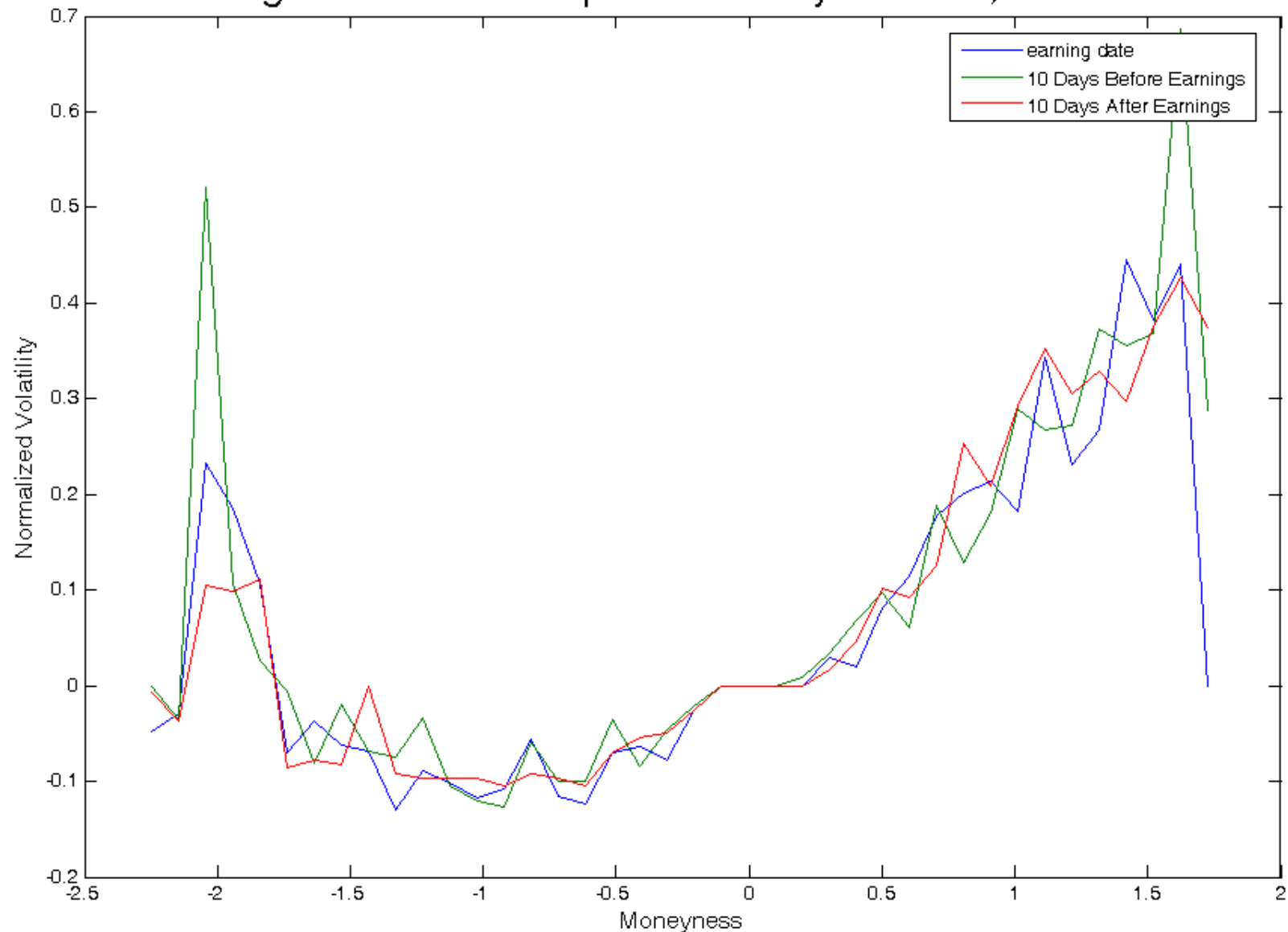
No Pattern Emerges

Average Normalized Implied Volatility for Barrick Gold Corp, 2003-2006



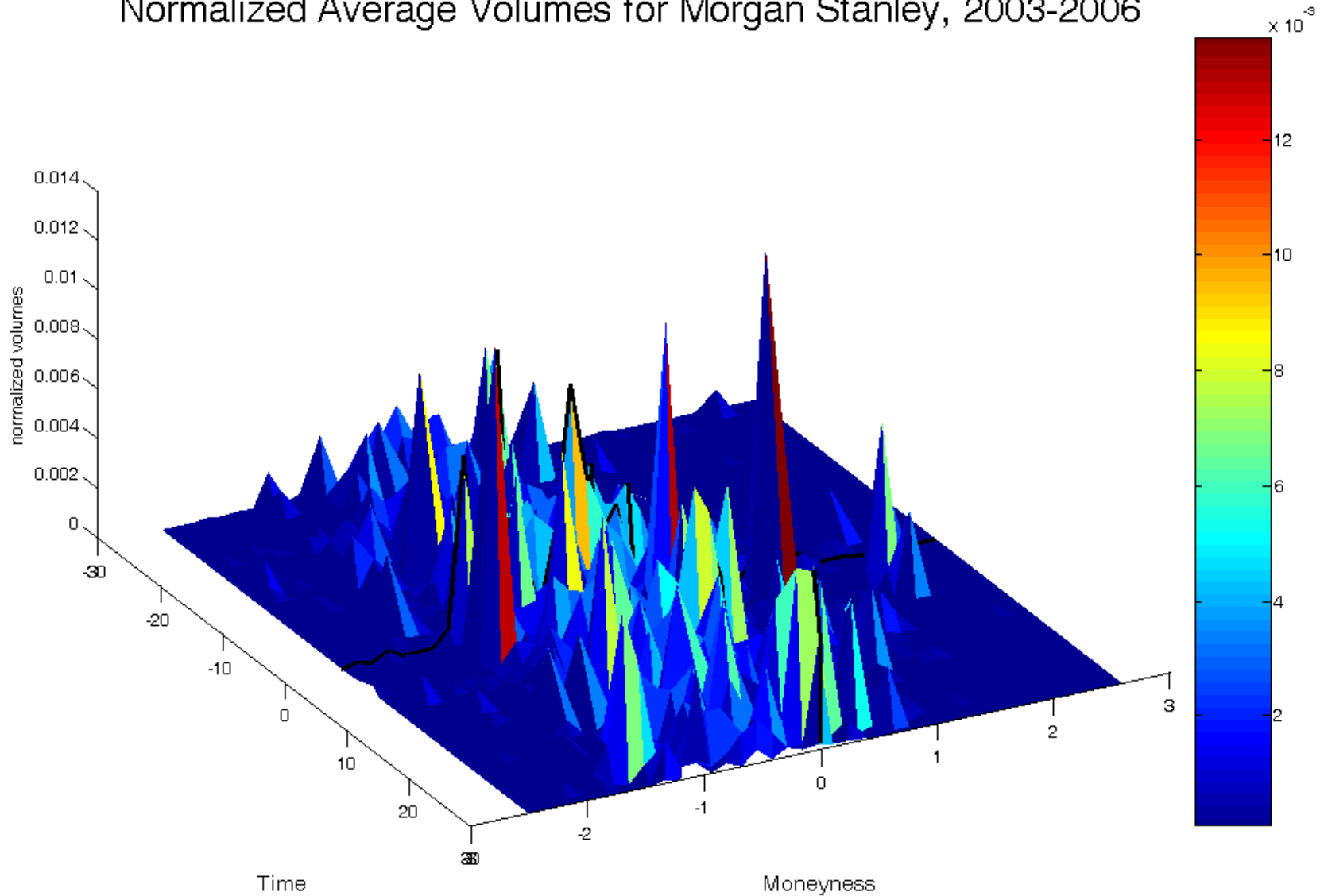
No Pattern Emerges

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