Tradable Volatility Estimates

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Outline

I. Trading Volatility Estimates

SPX 2006 to 2011 Data

Historical volatility tends to depend on the sampling frequency

SPX 2006 Data

Historical volatility tends to depend on the sampling frequency

SPX 2007 Data

Historical volatility tends to depend on the sampling frequency

SPX 2008 Data

Historical volatility tends to depend on the sampling frequency

SPX 2009 Data

Historical volatility tends to depend on the sampling frequency

SPX 2010 Data

Historical volatility tends to depend on the sampling frequency

SPX 2011 Data

Historical volatility tends to depend on the sampling frequency

Historical Vol / Historical Vol Arbitrage

If weekly historical vol < daily historical vol :

 buy strip of T options, Δ-hedge daily

 sell strip of T options, Δ-hedge weekly

Adding up :

 do not buy or sell any option;

 play intra-week mean reversion until T;

 final P&L :

Daily / Weekly Vol Arbitrage

Intra week mean reversion strategy

1 day/1 week volatility trade
More profitable when vol is high

500 stocks cross section

Daily – Weekly Vol Spread for S&P 500 constituents

Jan 2008 to Apr 2015

Daily – Weekly Vol Spread for S&P 500 constituents

Jan 2008 to Apr 2015

Covariation Trading

Historical Cov / Historical Cov Arbitrage

II. Tradable Estimates

Some Definitions
(Normal as opposed to Lognormal convention)

Tradable
Unbiased

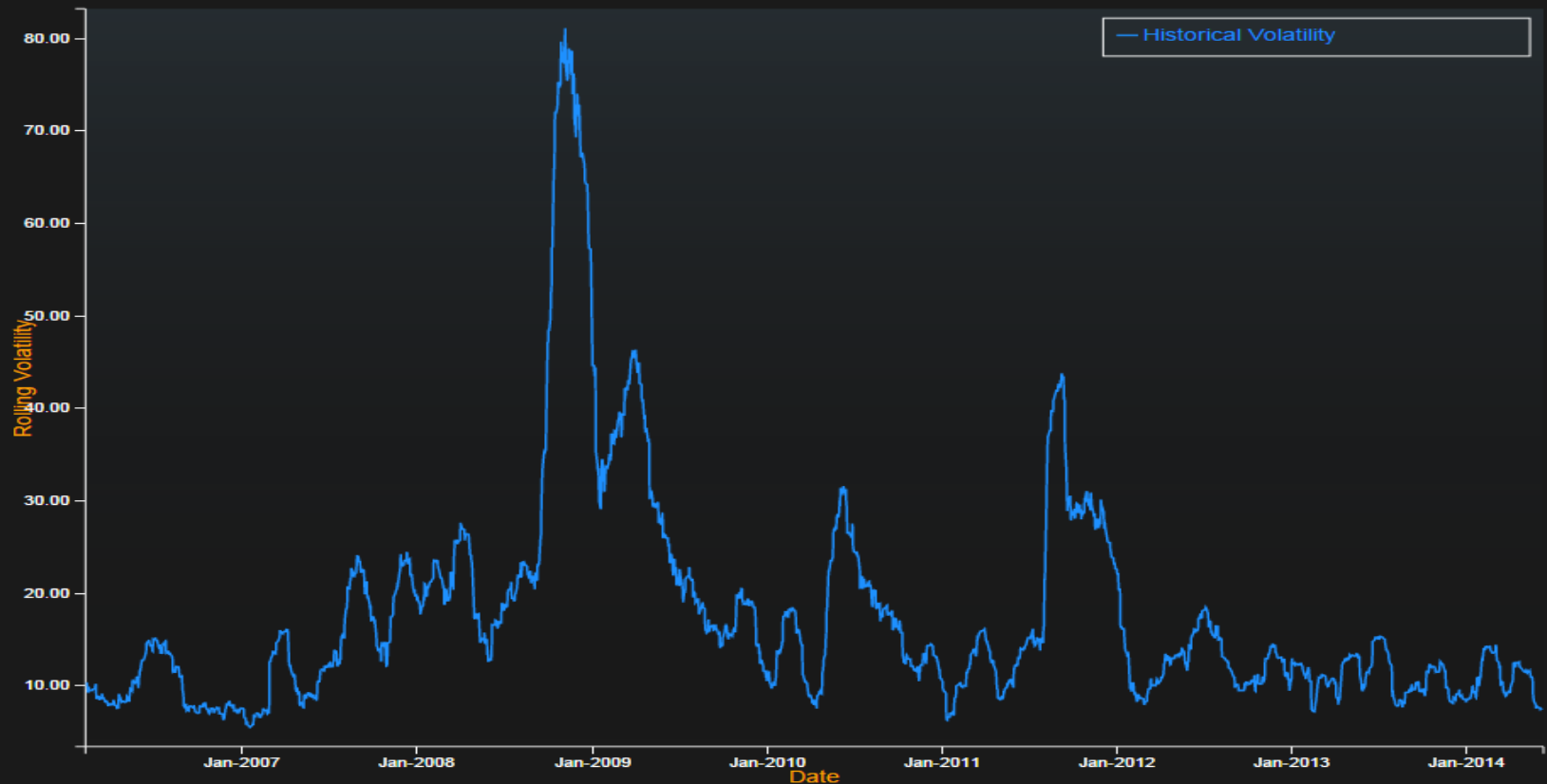# Discretized Quadratic Variation

Δ hedge of a parabola

Tradable unbiased estimate

Costless stock trading
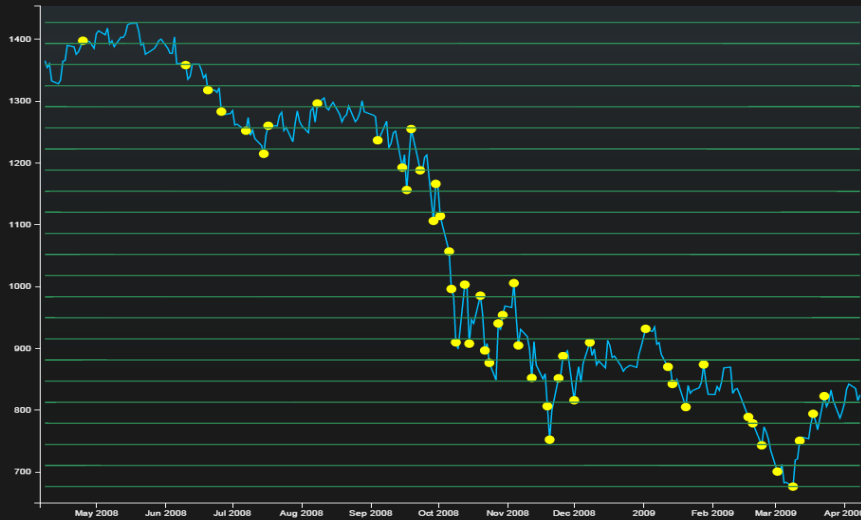
Classical Estimator

SPX Index 30 Day Rolling Window Historical Volatility Estimate

Move-Based Estimator

For option pricing, a volatility estimate should reflect the cost of hedging

Hedge according to spot moves (move based) better than hedge at fixed times (time based)
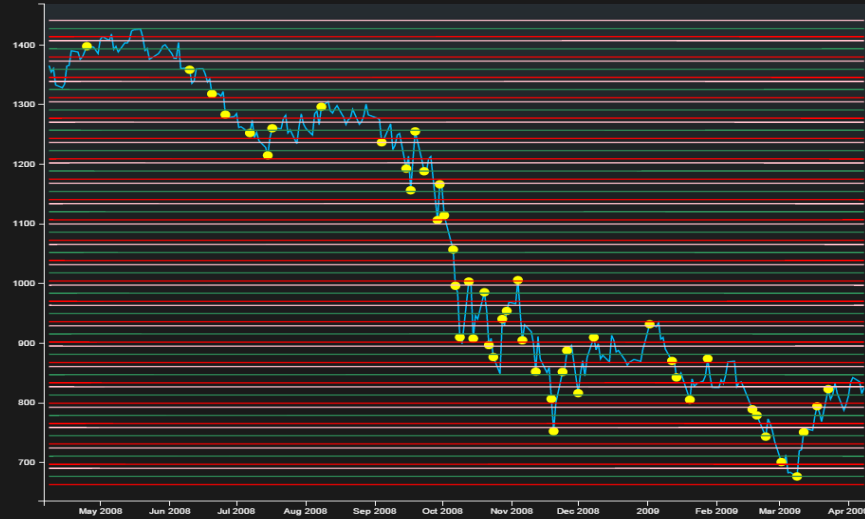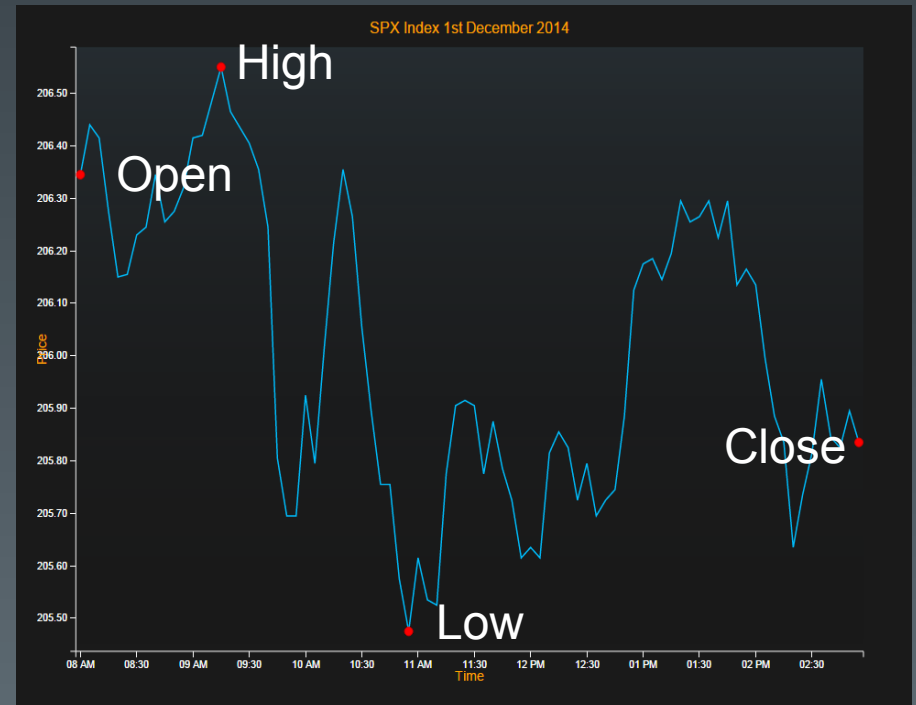
Move-Based Estimator

noise is smoothed out by phase averaging

OHLC
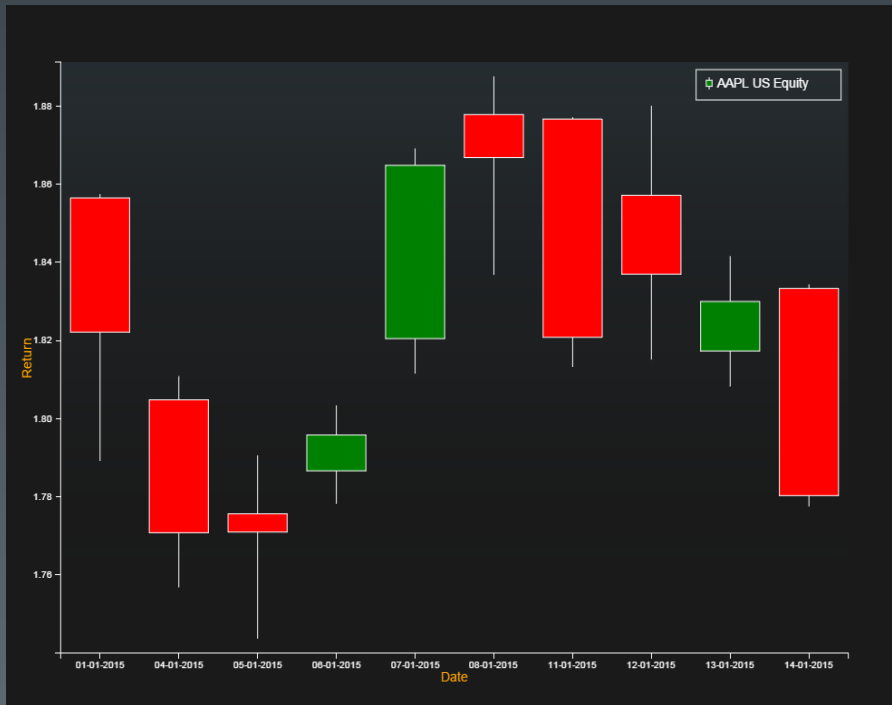
Hi-Lo Estimates

The Uncertainty of the Night
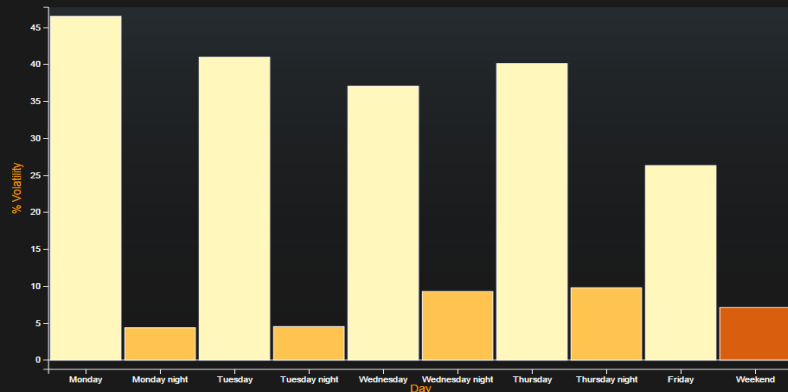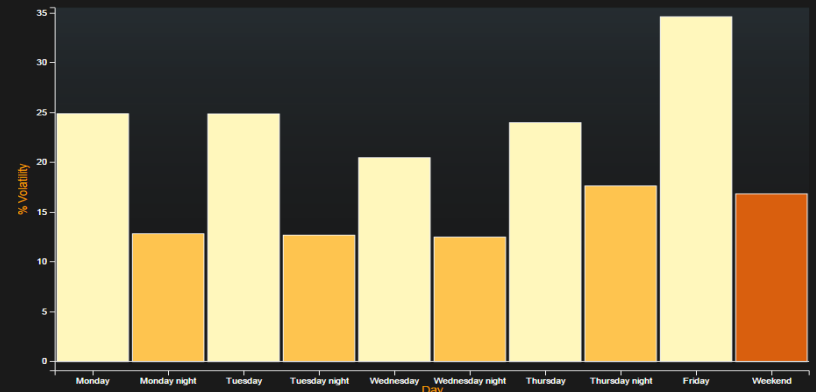
But…

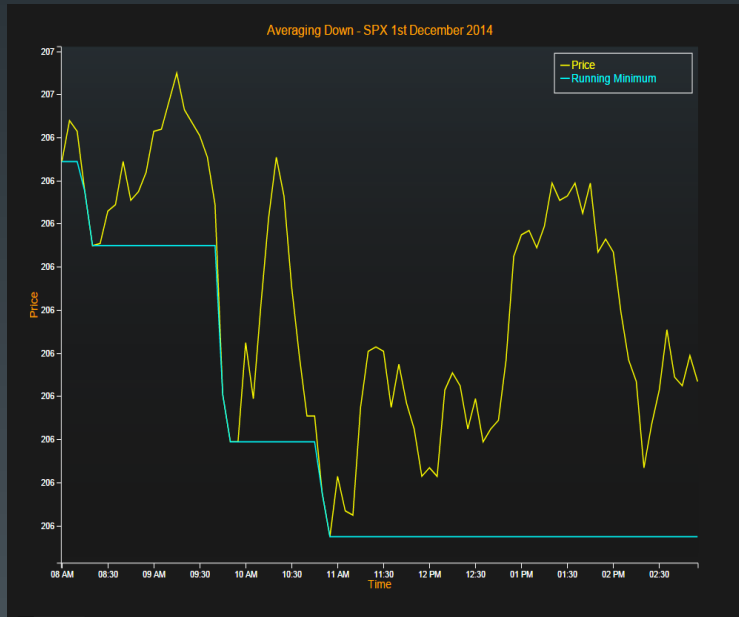- Hi-Lo Estimators are less useful than the classical one because they cannot be traded

- Highs and Lows are always observed after the fact

- However… we introduce a tradable Hi-Lo based estimator

III. A New Hi-Lo Based Tradable Estimate

Averaging Down

Averaging Down - SPX 1st December 2014
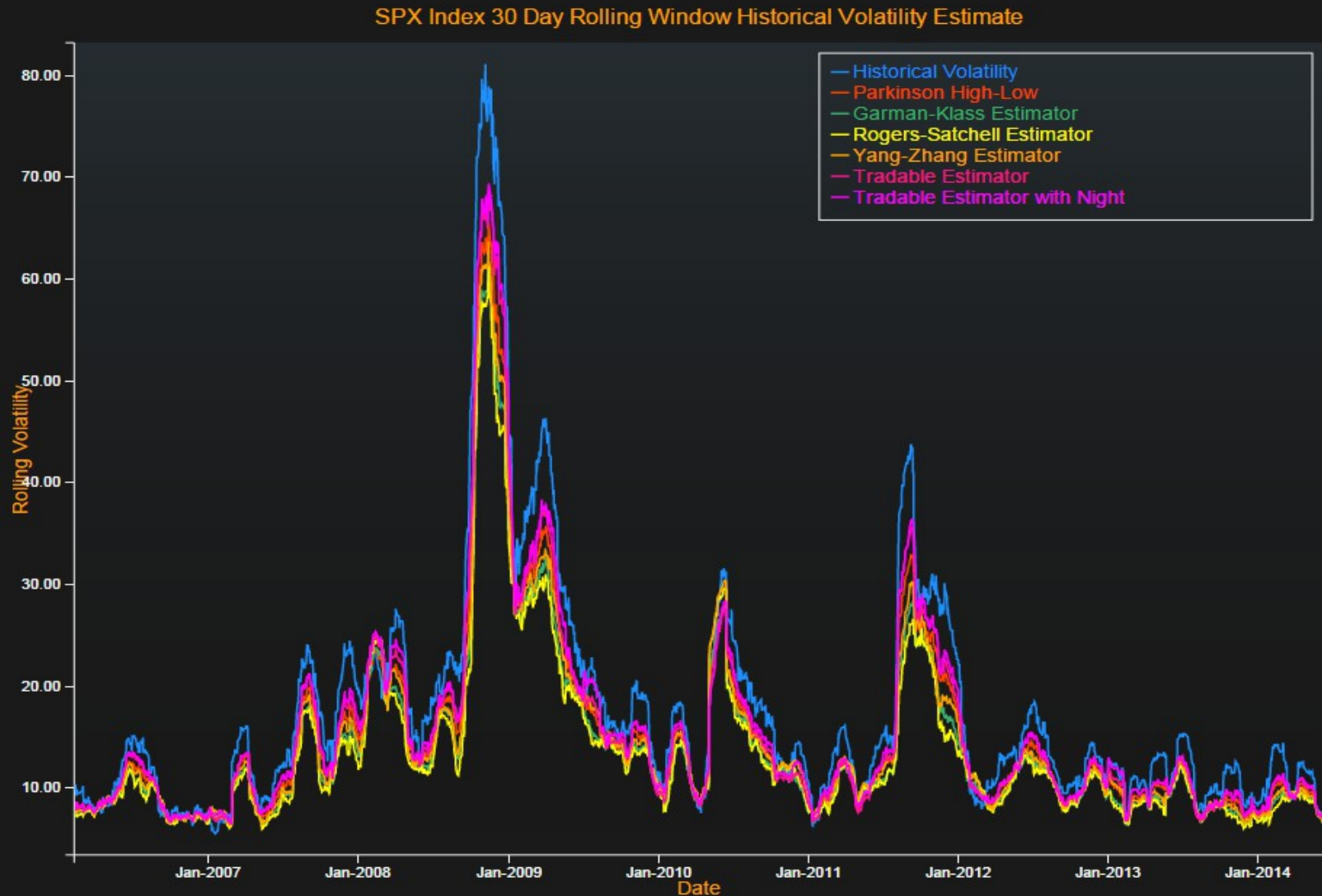

$$S_0 - m_t$$

m_t S_0

A Side Note

A New Estimator

Trading Strategy

(Mid – Close)/Range

Comparison of Estimators

SPX Index 30 Day Rolling Window Historical Volatility Estimate

Conclusion

- Most common volatility trade is historical vs implied

- With tradable estimates: can trade historical vs historical, without any option market

- Hi-Lo estimates are usually not tradable…

Thank You