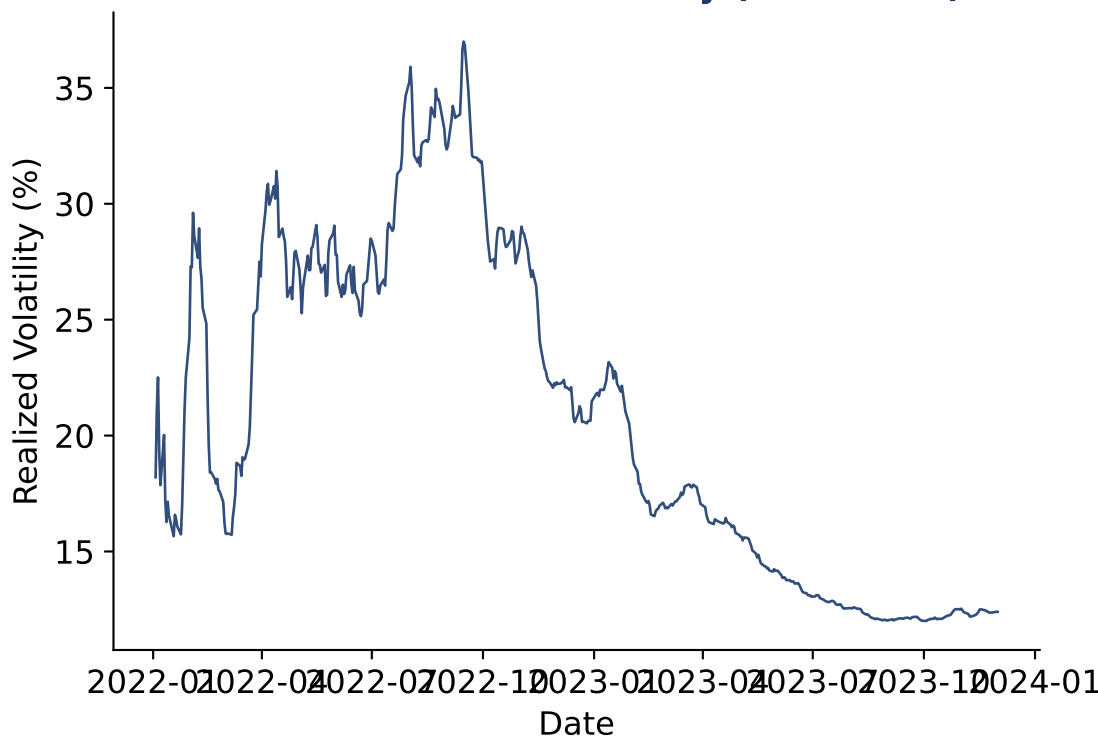
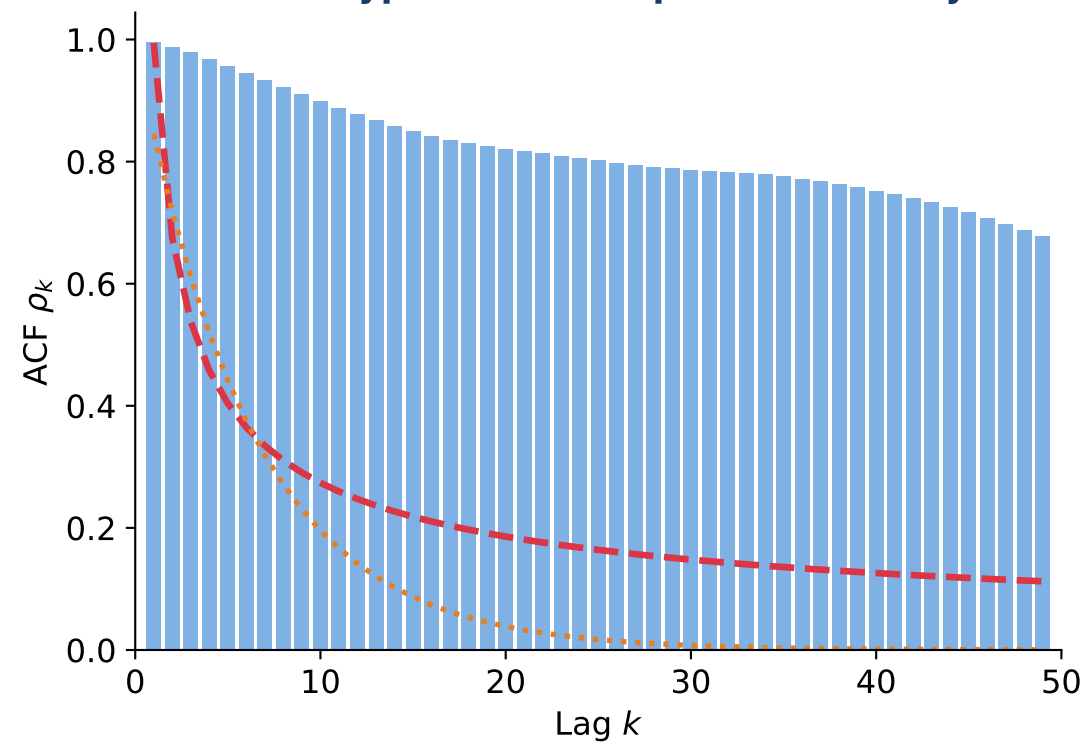


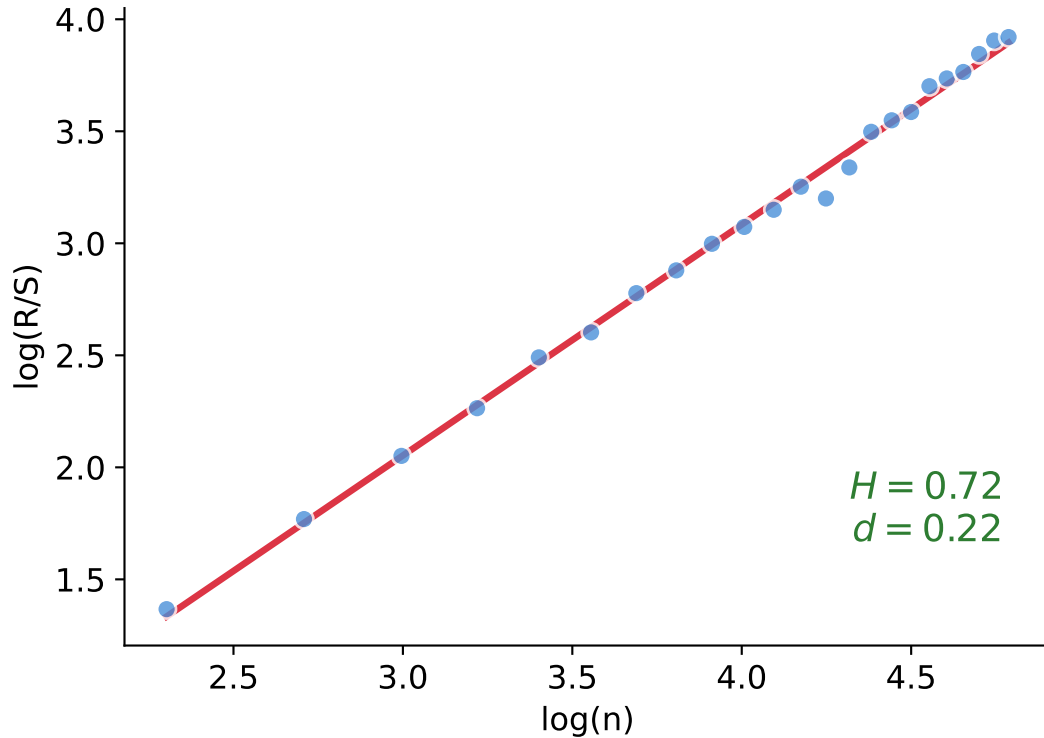
S&P 500 Realized Volatility (Simulated)



ACF: Hyperbolic vs Exponential Decay



R/S Analysis for Hurst Exponent



Estimation Results

Sample: $n = 500$ observations

Hurst Exponent (R/S):
 $H = 0.72$

Fractional Differencing:
 $d = H - 0.5 = 0.22$

Interpretation:

- $d > 0 \rightarrow$ Long Memory ✓
- ACF decays as k^{2d-1}
- Shocks persist longer than ARMA

Model: ARFIMA(1, 0.22, 0)

Real-World Examples:

- Volatility clustering
- Inflation persistence
- Network traffic
- River flow data

