

## Statistical Analysis for Price Changes of Carbon European Union Allowances

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**Abstract:** Recent years, several national and regional emission markets have been established, the carbon emission related assets already become an main investment goods. We analyzed the price changes time series of European Union allowances (EUA) futures in European Climate Exchange (ECX) market, which is the world's largest single market for CO<sub>2</sub> emission allowances. We showed probability density function of price changes time series. We find that there are long-range correlations in the absolute of price changes (volatility). Further, detrended fluctuation analysis (DFA) approach is assessed with focus on long-range correlations and Hurst exponent. We find long-range power-law auto-correlations in the absolute of price changes (volatility) that quantify the size of risk, and find that they decay much more slowly than the auto-correlation of return time series. We also investigate the multi-fractal status of volatility of EUA time series. All results show that the EUA price change time series have very similar statistic properties as stocks price changes.