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ECONOMETRICS: MATHEMATICAL METHODS & PROGRAMMING eJOURNAL

"Robust Estimation of Skewness and Kurtosis in Distributions with Infinite Higher Moments"

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This paper studies the behavior of the conventional measures of skewness and kurtosis when the data generator process is a distribution which does not possess variance or third or fourth moment and assesses the robustness of the alternative measures for these particular cases. I first show that for symmetric fat tailed distribution skewness is far from being a valid indicator of the presence of asymmetry. Secondly, I study, via Monte Carlo simulations, the behavior of the alternative measures of skewness and kurtosis when applied to distributions that do not possess finite higher moments. Finally, I present an application to the series of daily returns on a large cap US stock and show why alternative measures are a better tool to describe the distribution of financial returns.

"On the Optimality of Multivariate S-Estimators"

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In this paper we maximize the efficiency of a multivariate S-estimator under a constraint on the breakdown point. In the linear regression model, it is known that the highest possible efficiency of a maximum breakdown S-estimator is bounded above by 33% for Gaussian errors. We prove the surprising result that in dimensions larger than one, the efficiency of a maximum breakdown S-estimator of location and scatter can get arbitrarily close to 100%, by an appropriate selection of the loss function.

"The Time Fractals"

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Ralph N. Elliott wrote the wave principle in 1938. In 1975 Benoit B. Mandelbrot coined the term fractal and in 1982 published his ideas in "The Fractal Geometry of Nature." The book brought fractals into the mainstream of professional and popular mathematics. In February 1999, Benoit Mandelbrot submitted an article to Scientific American called ”A Multifractal Walk down Wall Street.” In the article, he discussed how fractal geometry can be used to model the stock market curves. The enclosed research reworks the Mandelbrot Multifractal from a time cycle rather than trend perspective to prove that time fractal is more proportionate than the price fractal and is the real law of nature, which drives everything in nature. The case is validated by illustrating power law curves in time cycle periodicities. Power law is seen across nature and in diverse social trends. The power law in prices is a subject of extended study, but there has been no research attempt made to prove power law in time cycle periodicities. Testing cycle periodicity needs large historical data. Long term time series are difficult to obtain and many emerging markets have seen stock market trading activity only start a decade back. The continued prosperity after 1980’s was a reason why time fractals did not get researchers attention, unlike price fractal which was actively studied and researched. The fact that what we can see is what we can relate too more also made researchers focus more on price than time, which is less visible. Cycles are not conventionally believed to be patterns. Patterns are understood either conventionally or as Elliott wave fractals. Even few Elliott wave practitioners have admitted the limitation of the Elliott Wave structure as being more sharp on form than on time. These were few reasons why time time fractals remained unproven. This study further connects its findings with the existing research on various economic cycles finally extending the proof to a long – short intermarket strategy on an asset pair.

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