



The foreign exchange market: return distributions, multifractality, anomalous multifractality and Epps effect

<http://www.firstlight.cn> 2008-06-30

We present a systematic study of various statistical characteristics of high-frequency returns from the foreign exchange market. This study is based on six exchange rates forming two triangles: EUR-GBP-USD and GBP-CHF-JPY. It is shown that the exchange rate return fluctuations for all the pairs considered are well described by the nonextensive statistics in terms of q -Gaussians. There exist some small quantitative variations in the nonextensivity q -parameter values for different exchange rates and this can be related to the importance of a given exchange rate in the world's currency trade. Temporal correlations organize the series of returns such that they develop the multifractal characteristics for all the exchange rates with a varying degree of symmetry of the singularity spectrum $f(\alpha)$ however. The most symmetric spectrum is identified for the GBP/USD. We also form time series of triangular residual returns and find that the distributions of their fluctuations develop disproportionately heavier tails as compared to small fluctuations which excludes description in terms of q -Gaussians. The multifractal characteristics for these residual returns reveal such anomalous properties like negative singularity exponents and even negative singularity spectra. Such anomalous multifractal measures have so far been considered in the literature in connection with the diffusion limited aggregation and with turbulence. We find that market inefficiency on short time scales leads to the occurrence of the Epps effect on much longer time scales. Although the currency market is much more liquid than the stock markets and it has much larger transaction frequency, the building-up of correlations takes up to several hours - time that does not differ much from what is observed in the stock markets. This may suggest that non-synchronicity of transactions is not the unique source of the observed effect.

[存档文本](#)