

Physics of foreign exchange fluctuations

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From the viewpoint of econophysics I firstly summarize basic statistical properties of currency exchange data; Yen-Dollar tick-data for 13 years, historical inflation data etc.. Empirical laws for rate fluctuations, volatilities, spreads and transaction intervals are reviewed. It is shown that the self-modulation effects among dealers with time-scale of a few minutes can be found widely in these data.

As a theoretical approach I introduce a phase-transition analogy for the market. A set of dynamical stochastic equations is derived theoretically for description of the microscopic price fluctuations from the dealers' basic properties. By applying a Monte Carlo renormalization method a macroscopic noiseless equation is obtained which is consistent with historical records of hyperinflations. This can be an example that econophysics bridges the micro economics and macro economics in terms of statistical physics.

Ref.

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