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Dynamics on/in financial markets: dynamical decoupling and stylized facts

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Stylized facts can be regarded as constraints for any modeling attempt of price dynamics on a financial market, in that an empirically reasonable model has to reproduce these stylized facts at least qualitatively. The dynamics of market prices is modeled on a macro-level as the result of the dynamic coupling of two dynamical components. The degree of their dynamical decoupling is shown to have a significant impact on the stochastic properties of return trials such as the return distribution, volatility clustering, and the multifractal behavior of time scales of asset returns. Particularly we observe a cross over in the return distribution from a Gaussian-like to a Levy-like shape when the degree of decoupling increases. In parallel, the larger the degree of decoupling is the more pronounced is volatility clustering. These findings suggest that the considerations of time in an economic system, in general, and the coupling of constituting processes is essential for understanding the behavior of a financial market.

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