

Structurally dynamic spin market networks

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The agent-based model of stock price dynamics on a directed evolving complex network is suggested and studied by direct simulation. The stationary regime is maintained as a result of the balance between the extremal dynamics, adaptivity of strategic variables and reconnection rules. The inherent structure of node agent “brain” is modeled by a recursive neural network with local and global inputs and feedback connections. For specific parametric combination the complex network displays small-world phenomenon combined with scale-free behavior. The identification of a local leader (network hub, agent whose strategies are frequently adapted by its neighbors) is carried out by repeated random walk process through network. The simulations show empirically relevant dynamics of price returns and volatility clustering. The additional emerging aspects of stylized market statistics are Zipfian distributions of fitness.