Complex Systems Approach to Economic Dynamics

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We discuss complex economic dynamics based on numerical modeling of business cycles. A complex economics system exhibits multiscale and multistability behaviors, as well as coexistence of order and chaos. In particular, we focus on the dynamics and structure of unstable periodic orbits and chaotic saddles in type-I intermittency and crisis-induced intermittency in nonlinear economic cycles. We show that chaotic saddles are responsible for the transient motion preceding convergence to a periodic or a chaotic attractor within a periodic window. In addition, we demonstrate that a chaotic attractor is composed of chaotic saddles and coupling unstable periodic orbits. These unstable structures embedded in complex economic systems are useful for pattern recognition and forecasting of economic cycles, and for optimization of management strategy and policy decision. The relevance of global climate change in complex economic systems will also be discussed.

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