Transition probability, dynamic regimes, and the critical point of financial crisis.

Summary: An empirical and theoretical analysis of financial crises is conducted based on statistical mechanics in non-equilibrium physics. The transition probability provides a new tool for diagnosing a changing market. Both calm and turbulent markets can be described by the birth-death process for price movements driven by identical agents. The transition probability in a time window can be estimated from stock market indexes. Positive and negative feedback trading behaviors can be revealed by the upper and lower curves in transition probability. Three dynamic regimes are discovered from two time periods including linear, quasi-linear, and nonlinear patterns. There is a clear link between liberalization policy and market nonlinearity. Numerical estimation of a market turning point is close to the historical event of the US 2008 financial crisis.

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Keywords:
transition probability; birth-death process; critical point; financial crisis

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