

## ECONOMICS OF COUPLED STOCHASTIC MARKETS

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### Abstract

Collective economic behaviour is discussed within the framework of an idealised wealth circulation model. This comprises various markets with interconnections, including direct influence and feedback and cycles in update form. All constituent markets are approximated by stochastic processes on a "price" axis, along the lines of limit order market models with non-constant rates but no agent intelligence (1).

The condition of the economy, including that of each market, is regarded as a state vector, and the market processes as operations on parts of it, corresponding to action of vertex or scattering functions. Microscopic and coarse-grained variables, as well as stochastic or deterministic (including mean field) ones are distinguished.

Specific idealised market models are possible, incorporating particular simple stochastic processes.

This very versatile formulation is providing preliminary results for  
(a) evolution: characteristic macrodynamics time scales; interplay between long time dynamics of macroeconomy and Hurst dynamics of market constituents; role of time-scale separation and its breakdown; role of quasi-conservation laws in markets

(b) quasi-static distributions

(c) susceptibilities and response functions.

### References

- (1) See e.g. D. Challet and R. Stinchcombe, *Physica A* 300, 285 (2001)  
D. Challet and R. Stinchcombe, cond-mat/0208025 (2002)  
E. Smith et al., cond-mat/0210475 (2002)