Informational balance, stability and systemic risk in networks of financial markets

One way to assess the degree of interaction between financial markets is to measure return-to-volatility spillovers from one market to another in terms of forecast error variance decompositions (fevds) of daily returns on their equity prices. This framework lends itself to an interpretation of financial markets as nodes in a directed network with edge weights defined by spillovers. Concepts of network connectedness carry over, and several market connectedness measures have been proposed, including an average connectedness index.

From a network point of view, a shock (news) to one market triggers a cascade of perturbations changing the network's status with respect to informational balance among markets, and the question of sensitivity to shocks and stability in terms of speed of shock digestion arises. The network's spillover matrix can be translated into the transition matrix of a Markov process running forward, or backward, in time. This enables us to study entropy-related aspects of shock dynamics, leading us to an assessment of intrinsic network properties which can be subject to monitoring across time.
Therewith, systemic breaks as they are happening or immediately after that become detectable, and systemic risk can be assessed on a daily basis. We consider the example of 'The Systemic Five': Dow Jones (New York), FTSE (London), sx5e (euro area), SSEC (Shanghai), and N225 (Tokyo).

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