

Resilience to Contagion in Financial Networks

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Abstract

We derive rigorous asymptotic results for the magnitude of contagion in a large financial network and give an analytical expression for the asymptotic fraction of defaults, in terms of network characteristics. Our results extend previous studies on contagion in random graphs to inhomogeneous directed graphs with a given degree sequence and arbitrary distribution of weights. We introduce a criterion for the resilience of a large financial network to the insolvency of a small group of financial institutions and quantify how contagion amplifies small shocks to the network. Our results emphasize the role played by “contagious links” and show that institutions which contribute most to network instability have both large connectivity and a large fraction of contagious links. The asymptotic results show good agreement with simulations for networks with realistic sizes.

Keywords: systemic risk, default contagion, random graphs, macro-prudential regulation.

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