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# Monitoring Vulnerability and Impact Diffusion in Financial Networks

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## Abstract

In this paper, we propose novel risk-related network measurements to identify the roles that financial institutions play as potential targets or sources of contagion. We derive theoretical properties and provide a clear systemic risk interpretation for the proposed measures. Devised upon the notion of communicability in networks, we introduce the impact susceptibility index, which indicates whether market participants are locally or remotely vulnerable. We show how this index can be used as a financial stability monitoring tool and apply it to analyze the Brazilian financial market. We find that non-banking institutions are potentially remote vulnerable in certain periods, while banking institutions are not susceptible to indirect impacts. To address the perspective of market participants as sources of contagion, we propose the impact diffusion influence index, which captures the potential influence of financial institutions on propagating impacts in the network. We unveil the presence of a portion of small/medium banking institutions that is consistently more influential than large banks in potentially diffusing impacts throughout the network. Regarding financial system stability, regulators should identify the entities that play these two roles, as they can render the system more risky.

*Keywords:* systemic risk, monitoring, vulnerability, impact propagation, networks

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