

# Analysis of chain bankruptcies on multiplex Japanese Inter-firm Networks

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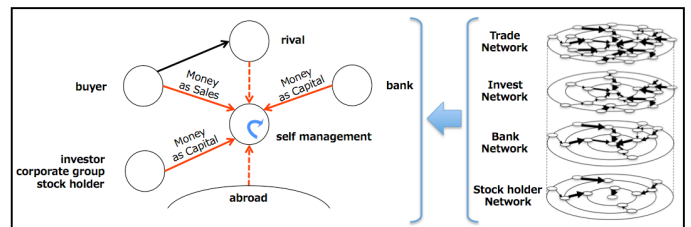
## Abstract

We study multiplex Japanese inter-firm networks, which are constructed by relationships of trade, investment and stockholders, to understand firms' capacity against some kinds of stresses from the viewpoint of systemic risk. In this study, especially, we focus on the phenomena of chain bankruptcy in Japan and simulated to evaluate the robustness of Japanese inter-firm networks.

**Keyword:** Econophysics, Complex Network, Systemic Risk

As the European Central Bank announced to implement of bank stress testing, it is important for our society to grasp how much capacity firms have against stresses. Especially, a firm has interdependent relationships with others, like Lehman crisis, so it is much better to evaluate it as a system. Iyetomi and his collaborators [1] developed an agent-based model for firms' dynamics, which was constructed by the relationship between firms and banks. Fujiwara and his collaborators [2] also analyzed large firm-bank's lending network to evaluate robustness of bank in Japan. As a macro approach, those analyses would be beneficial to understand how robust our society is.

Based on the above discussion, we study multiplex Japanese inter-firm networks, which are constructed by trade, investment and stockholders, to estimate the robustness. In this study, we focus on the phenomena of chain bankruptcy in Japan and make a model to simulate how chain bankruptcies expand by



**Figure 1 : The image of multiplex networks**

applying the money transport model [3] with high precision.

## References

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