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Distress and Default Contagion in Financial Networks

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We develop a new model for solvency contagion that can be used for stress testing financial networks. In contrast to many existing models it allows for the spread of contagion already before the point of default and hence can account for contagion due to distress and mark-to-market losses. We propose a reduced form approach for modelling distress contagion. Our model contains classical default contagion models as special cases.

Furthermore, we provide analytical comparison results for different contagion models by deriving ordering results for certain outcome measures of stress tests. The ordering results hold true regardless of the underlying network structure. In particular, we discuss how solvency contagion model can amplify, contain or pass on losses in financial networks. In this context, we highlight the important role of bankruptcy costs when modelling distress contagion.

We provide an application of our new stress testing methodology to a data set used in a stress test by the European Banking Authority. We find that the risk from distress contagion is strongly dependent on the anticipated recovery rate in the case of default. While the existence of default costs is necessary in our setting to allow for distress contagion, only when default costs are low we observe a strong sensitivity with respect to the model parameters determining the shape of the decline of asset values due to distress contagion. If default costs are high, the high additional losses caused by bankruptcy dominate the overall outcome of the network.

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