Tail Event Driven Network of SIFIs

Yarema Okhrin

Abstract

The interdependence, dynamics and riskiness of financial institutions are the key features frequently tackled in financial econometrics. We propose a Tail Event driven Network model which addresses these three aspects. More precisely our framework captures the risk propagation and dynamics in terms of a quantile (or expectile) autoregression involving network effects quantified through an adjacency matrix. The model is evaluated using the SIFIs (systemically important financial institutions) identified by the Financial Stability Board (FSB) as main players in the global financial system. In order to quantify systemic risk arising from the interplay of SIFIs one needs to study the joint conditional dependency structure. Given that certain members or companies are at risk one may then quantify how much another SIFI members is at stress. A network geometry based on adjacencies of joint tail events seems to be an appropriate analysis tool to study systemic risk. While modelling the SIFI returns we account for node specific, market wide covariates, and potential persistency of the returns. The dynamics of the tail events for the remaining components is explained by the network factor. The adjacency matrix is constructed based on tail event covariates. A centrality analysis of it identifies a rank of systemic importance of SIFIs and thus provides measures for the required level of additional loss absorbency. It is discovered indeed that the network effect, as a function of the tail probability, becomes more profound in stress situations.

(joint with Cathy Chen and Wolfgang Härdle)