Bayesian Systemic Risk Analysis using Latent Space Network Models

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In the financial market, systemic risk is a kind of risk that the failure of one stock in the market triggers a sequence of failures. Our study proposes a Bayesian decision scheme to dynamically keep track of the systemic risk under any preference and restriction in financial risk management. We begin with capturing the moving correlations of stock returns. The correlation represents the strength of the relationship among stocks. Then, we construct a dynamic financial network to link together those stocks with a strong relationship. Making use of the financial space, which is related to the position of stocks on the network plot, we locate two stocks on the financial space at a closer distance when the relationship between these two stocks is strong. Using the distance between stocks on the financial space, together with the preference and restriction in financial risk management, we propose a systemic risk measure. We demonstrate the use of our proposed systemic risk measure on raising an early signal to global financial instabilities in March 2020 and March 2022.