Systemic risk is a major threat to the stability of modern financial systems. In the interconnected system of financial institutions and sovereigns, the investigation of systemic risk involves a thorough study on the time variation of financial risks, and the dependence structure which may lead to systemic credit events. This thesis is written to provide a unified econometric framework that can be applied to measure financial systemic risk in a general and consistent way. The risk assessing framework is general enough to fit the non-Gaussian features and the time-varying conditional covariances of the risk factors. We document strong evidences of time variation of systemic risk and highlight the importance of capturing higher-order moments in modeling systemic risk.

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