



Bayesian Two-Glasso for the Study of Financial Contagion

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The recent banking crisis, timed just as a large generation of American workers hits retirement age, has tested many of the previous economic assumptions about the stability and sanity of the world's financial markets. Ever since the '87 crash and the '97 Asian Markets crisis, there has been vigorous debate by economists over whether correlation structure changes along with volatility during moments of financial panic. While we feel that compiling the final interpretations of this current crisis will be project of large scope, we consider an application of recent statistical modeling developments for estimating short-term correlation to benefit investors in their choices just as the dam bursts. Gaussian Graphical Models, which go back to Professor Dempster's 1972 Covariance Selection algorithm, have received heavy new interest since Tibshirani's *Glasso* paper suggested that an L1-penalty estimator can be applied to large datasets with frugal computational cost. If the correlation structure of market data can be represented well by a sparse network, hedging strategies exist to benefit investors locked into correlated holdings. We apply the Two-Lasso Bayesian weight adaptation scheme to *Glasso* Correlation/Concentration estimation, along with methods to improve *Glasso* volatility estimation, and we augment the sparse concentration hypothesis with baseline concentration that may stem from an unaccounted factor. The Two-*Glasso* improves upon *Glasso*'s selection abilities and serves the need for a sparse MAP estimator with flexible connection structure, helpful when quick exploratory analyses are needed to inform upon major features of a Gaussian network.