## **Testing Contagion in Financial Time Series**

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## Abstract

Financial contagion indicates a process through which transmission of shock originating in the financial market of one economy spreads to others. Although the study of causes and prevention of contagion is popularized by economists, very few quantitative studies exist on detection of contagion. This paper provides a new idea of Residual and Recurrence Times (RRT) of high or low values for multivariate time series to detect contagion. In presence of financial contagion, the distributions of residual and recurrence times are not the same. We examine the equality of two distributions using the permutation test. In comparison to other methods in multivariate extreme value theory, our proposed method does not need the i.i.d. assumption. We derive asymptotic results under the GARCH model. Our method can handle the situation where the extremes for different components do not occur at the same time. We justify our methods in two ways: first using thorough simulation studies and then applying the proposed method to real data on weekly stock indices from seventeen markets.