

## Return and Volatility Contagions of Financial Markets over Different Time Scales

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### Abstract

This paper proposes a wavelet-based multivariate GARCH model to investigate the return and volatility contagions over financial markets. Compared with traditional multivariate GARCH analysis, the new method can identify detailed market dynamics over each time scale. Taking the NASDAQ and TWSI (Taiwan) indices as an illustration, this study shows that on the raw data (or on the aggregated level) the lagged NASDAQ returns have a great predictive power on Taiwan's stock index, but on the wavelet-based analysis the aggregated predictive power is unequally divided over time scales. The volatility contagion significantly depends on the time scales. Owing to the fact that different groups of investors operate (or trade) on different time scales, the results of this study help them to uncover the dynamics and causal relationships of their horizons and make a good hedge on their risk.

Key words : Wavelet analysis; Multivariate GARCH model; Financial contagion; Multiple time scales