

# Volatility Jump Regressions\*

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## Abstract

This paper develops econometric tools for studying the jump dependencies between the underlying or latent spot volatilities of two assets from high-frequency observations on a fixed time interval – with a particular interest in the relationship between the individual volatilities of traded assets and the volatilities of aggregate risk factors such as the market volatility. The paper derives an asymptotically valid test for the stability of a linear volatility jump relationship between these assets and proposes an asymptotically valid and consistent likelihood based estimator for the beta in such relationships. The estimation context is made especially challenging because the error shrinks at a rate much slower than the standard root- $n$  parametric rate. To conduct inference the paper proposes a bootstrap procedure together with a justification of its asymptotic validity. Finally, the paper considers three empirical applications of the methods and an extension on how to incorporate a Bayesian prior.

**Keywords:** bootstrap, inference with noisy data, jumps, regression, semimartingale, specification test, stochastic volatility.

**JEL classification:** C51, C52, G12.

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